Personal knowledge perceptions and memory for information : When does feeling ignorant make me remember more ?

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AND MEMORY FOR INFORMATION:

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DISSERTATION SUMMARY

Subjective knowledge is consumer perceptions about how knowledgeable they are in a specific product or service category (Brucks, 1985), as opposed to objective knowledge that refers to what an individual actually knows in a specific domain (Carlson et al., 2009). The present research focuses on a potential effect of subjective knowledge manipulation that has not been investigated yet; the mechanisms through which subjective knowledge manipulations may impact actual memory for information. Will consumers who are given the illusion that they know more (less) than they actually do be able to retain more (less) information when exposed to a message? We argue that moderating personality traits may need to be taken into account to explain contradictory evidences found in the literature. Building upon the ego protection and self-esteem literatures (Baumeister, 1993; Brockner & Chen, 1996; Rosenberg, 1965; Wiener, 1973), we propose that a manipulation of subjective knowledge may have a different impact on information processing depending on the initial level of consumer self-esteem. Chronic low self-esteem individuals tend to be doubtful about their capacities. Following self-consistency theory, a decrease in their subjective knowledge may enhance the negative perception they have of their capacities and discourage them to process any additional information. Opposed to this, positive feedback may boost low self-esteem individuals' confidence in their capacity and motivate them to process domain-related information. On the other hand, high self-esteem individuals are confident in their capacities. Increasing confidence in their capacity may drive them to become overconfident, rest on their laurels and possibly retain less information. However, decreasing their perception of knowledge may boost their motivation to search for additional information. This prediction is in line with prior research suggesting that the highest level of information processing is reached at a moderate level of subjective knowledge (Brucks, 1985; Park & Lessig, 1981).

In order to test our hypotheses a series of five studies was conducted. We first run a pilot study to gain initial insights about the feasibility of this research. After reporting their subjective knowledge on different domains including our focal topic (computer knowledge), thirty-four undergraduate marketing students took part in a moderately difficult quiz about computers. In a second step, subjective knowledge of the participants was manipulated via false feedback on a

quiz using two conditions (very low vs. very high score compared to a school average). Thirdly, subjective knowledge of computers was reassessed. Finally, participants were asked to complete a domain-related information-processing task. The manipulation of subjective knowledge occurred as predicted. No main effect of subjective knowledge manipulation on memory for information was found.

Next, one hundred and twenty undergraduate students participated in our first study. With respect to the pilot study, we refined our procedures in two main ways. We included a measure of trait self-esteem (self-esteem, Rosenberg, 1965) in an unrelated survey and assessed memory for information in a more exhaustive way. We thus included three different types of memory measures to increase construct validity: recall; recognition, and discrimination (i.e., ability to recognize whether a piece of information was present or not in the initial message). Data were analyzed using a 2 (subjective knowledge: increased, decreased) × 2 (self-esteem: low, high) between-subjects design. Objective knowledge was entered as a covariate. Our subjective knowledge manipulation occurred in the intended direction. In line with our pilot study, we found no main effect of subjective knowledge on any of our memory-related dependent variables. However, the interaction between self-esteem and subjective knowledge manipulation was significant: Low self-esteem consumers memorized better after a subjective knowledge increase than a subjective knowledge decrease, while high self-esteem consumers showed the opposite pattern. Converging patterns were found for each of the three memory measures.

To better understand the processes by which a subjective knowledge manipulation affects memory for information, experiment 2 aimed at testing the possible mediating effect of state self-esteem on the relation between subjective knowledge change and information processing. To this end, we included an implicit self-esteem measure after our manipulation, using the self-IAT (Greenwald & Farnham, 2000). Finally, we included the general self-efficacy scale (Schwarzer & Jerusalem, 1995) in order to assess whether this individual difference could moderate the relationship between subjective knowledge and memory for information, alternatively to self-esteem. One hundred and thirteen undergraduate students participated in this second study. In line with the first study, the interaction between self-esteem and subjective knowledge manipulation was significant. Participants with high self-esteem were better at memorizing following subjective knowledge decrease, while the opposite pattern was found for low self-

esteem but failed to reach significance. Interestingly, the decreased subjective knowledge manipulation affected high (but not low) self-esteem participants' implicit self-esteem score negatively. This suggests that after subjective knowledge decrease, high (vs. low) self-esteem consumers underwent ego-threat and put extra effort in memorizing domain-related information. Finally, we conducted two additional analysis of the data using a 3 (subjective knowledge: increased, decreased, control) × 2 (general self-efficacy: low, high) design and 2 (subjective knowledge: decreased, control) x 2 (general self-efficacy: low, high) design and none of them reached statistical significance. This allowed us to rule out general self-efficacy differences as an alternative explanation to our results. Thus, our second study brings further credit to the hypothesis of a key role played by self-esteem in the relationship between subjective knowledge and information processing. First, we replicated the interaction between self-esteem and subjective manipulation on memory performance. Second, we found partial support for the hypothesis that subjective manipulation can function as an ego-threat for consumers. When high self-esteem participants' subjective knowledge was threatened, we observed a decrease in their implicitly measured self-esteem. These findings bear societal and marketing implications, given marketers manipulating subjective knowledge may affect their consumers' self-esteem levels.

Next, study 3 explored the memory mechanisms underlying our findings. We were specifically interested to know whether encoding of incoming information or retrieval failures drove the observed effects in the first two studies. To this end, the procedure used in this study was similar to the first study, with one noticeable exception: participants were exposed to the ad prior to our subjective knowledge manipulation. Thus, the procedure of study 3 contained the following materials: a personality test including measures of subjective knowledge and self-esteem, an ad about computers, a knowledge quiz followed by the critical subjective knowledge manipulation, and finally a memory quiz. Seventy-two participants took part to the third study. The interaction between self-esteem and subjective knowledge manipulation did not reach significance. Thus, study 3 allowed us to rule out the possibility that differences in high (vs. low) self-esteem participants' memory performance under decreased subjective knowledge were driven by retrieval rather than encoding divergences. Thus, this third study was useful to specify the range of the memory effect found in this research. It appears that subjective knowledge manipulations influence motivation to encode incoming information but does not affect motivation to retrieve information already processed. The implication is important for marketers

wishing to maximize the attention consumers pay to their message. Indeed, if a brand manager has information about his targeted segment' self-esteem level, he could design messages comprising subjective knowledge manipulations, in an effort to increase his consumers' motivation to process subsequent domain-related information. However, boosting consumers' retrieval capacity may require different types of methods.

Finally, to test whether our subjective knowledge manipulations were distinct from a self-threat manipulation, a new manipulation of subjective knowledge was introduced in study 4. Additionally, to increase the external validity of our results, we focused on another domain, namely knowledge of luxury. Finally, we intended to test whether narcissism could be another alternative personality trait involved to explain differences in information processing following decreased subjective knowledge. Eighty-two participants from a large Midwestern University took part to the fourth study. The subjective knowledge manipulation worked in the intended direction. A 2 (subjective knowledge: decreased, control) × 2 (self-esteem: low, high) ANOVA was run with total memory score as a dependent variable. In line with study 2, the interaction between self-esteem and subjective knowledge manipulation was significant. High self-esteem participants memorized better domain-related information following subjective knowledge decrease, while the opposite pattern was found for low self-esteem participants. Such effects were not obtained when narcissism (instead of self-esteem) was used as an individual difference measure. Thus, using a different methodology to manipulate subjective knowledge and focusing on a different topic (i.e., luxury), this fourth study extends the generalizability of our findings. Marketers and brand managers wishing to boost (vs. decrease) their consumers' subjective knowledge in an effort to increase memory for ad-related content have a wide range of available methods to reach this goal (e.g., feedbacks, reference point switching, altering the complexity of provided information…). We discuss the ethical implications of these findings in the general discussion section of this research.

Thus, this research suggests that self-esteem is a personality trait that needs to be taken into account to understand the relationship between subjective knowledge manipulations and information processing. Overall, we believe the present research project promises important insights for our understanding of the underlying mechanisms of the relationship between subjective knowledge manipulation and information processing strategies. This research may also have substantial applied implications, as the findings will likely prove useful in improving information retention in public policy, health-related as well as sustainable marketing communications.

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General Introduction

Subjective knowledge refers to consumer perceptions about how knowledgeable they are in a specific product or service category (Brucks, 1985). In the past few years, marketers have developed a strong interest in the level of subjective knowledge of their target segments and have often placed subjective knowledge in the spotlight of persuasive messages. Subjective knowledge can be either boosted or decreased by communication campaigns. For instance, while the website eHow.com's tag line attempts to boost its users' perceptions about their knowledge (i.e., "*Discover the expert in you*",) the *For Dummies* instructional book series' title underlines prospective readers' lack of knowledge in an effort to attract them. By boosting or reducing consumer knowledge perceptions, such messages can foster additional information search and memorization with respect to the domains promoted by the company. Besides, in addition to marketing messages, consumers face many daily situations wherein their perceptions of knowledge in various domains are either boosted or decreased. For instance, while listening to their banker using complex financial notions and technical jargon, many consumers realize that they have less knowledge of finance than what they initially thought. Conversely, when their novice friends ask them for advice in domains (e.g., computer, cars, literature, pricing tactics…) in which they are considered as "experts in the field," these same consumers can experience a subjective knowledge boost. In other words, situations that alter consumer knowledge are pervasive in contemporary consumption contexts.

However, our understanding on the effects of such subjective knowledge changes on consumer responses, in general, and on information processing, in particular, is relatively limited. What is more effective to generate positive consumer responses - an increase or a decrease in subjective knowledge? Extant research regarding the effects of subjective knowledge on consumer information processing provides rather scattered answers. On the one hand, subjective knowledge is associated with confidence in one's judgment and stored mental content, which can make consumers less receptive to new information (Park & Lessig, 1981; Park, Gardner & Thukral 1988; Trafimow & Sniezek, 1994). Indeed, if a consumer believes he is very knowledgeable about a given product category, he may not feel the need to search for more

information on this domain. On the other hand, subjective knowledge is associated with consumer capacity to look for additional domain-relevant information and could help consumers engage in more extensive information processing. For instance, a consumer who believes he has developed extensive expertise about cars should be confident in his abilities and be more likely than his novice counterparts to gather, collect, and memorize a large amount of information in order to compare different car models. Conversely, being persuaded that they lack of knowledge about computers, some consumers could be discouraged to pay attention to incoming technical information when watching computer ads. In line with this view, several studies found a positive relationship between subjective knowledge and extent of new information search (Brucks, 1985; Raju, Lonia & Mangold, 1995), as well as motivation to shop and search for information in expertise-relevant categories (Moorman, Diehl, Brinberg & Kidwell, 2004). In brief, while we are not the first ones to investigate the relationship between subjective knowledge experimental manipulations and information processing, consumer research has so far failed to provide a comprehensive account of the relationship between subjective knowledge and consumer information processing strategies. Specifically, extant consumer research has not settled whether and under which conditions a decrease (vs. an increase) in subjective knowledge should lead consumers to engage in a higher (vs. lower) amount of information processing.

The present dissertation intends to bridge this gap by investigating the underlying mechanisms at stake when subjective knowledge is manipulated. Whereas past research has focused on the relationship between subjective knowledge and different measures of information processing without taking into account personality variables, we propose a new theoretical account that explains possible individual differences in the relationship between subjective knowledge and information processing. Specifically, we argue that subjective knowledge is closely related to consumer self-esteem. We focus on the self-related mechanisms through which subjective knowledge manipulations may impact consumer memory for new information. Building upon self-related motives and self-esteem research, we propose that a manipulation of subjective knowledge may result in self-esteem changes and lead to different memorization strategies depending on consumers' initial self-esteem levels. As low self-esteem consumers tend to be doubtful about themselves, a decrease in their subjective knowledge may enhance the negative perception they have of their capacities and discourage them to process any additional

information. Opposed to this, positive feedbacks may increase their confidence in their capacity and motivate them to process domain-related information. On the other hand, high self-esteem consumers are confident in their capacities. Increasing confidence in their capacities may drive them to become overconfident, rest on their laurels and possibly retain less information. However, decreasing their knowledge perception may boost their motivation to search for additional information. Thus, whether consumers who are given the illusion that they know more (vs. less) than they actually do retain more (vs. less) information when exposed to a domain-related message, may depend on their trait self-esteem level. For instance, consumer self-esteem could influence consumer responses to a title starting with "*For Dummies.*" While low self-esteem consumers could be deterred from reading a book starting with a title putting at the forefront their lack of knowledge, high self-esteem consumers could be attracted to buy the book just for the sake of the challenge (i.e., "*Dummy, me? Let's prove them wrong!*") In contrast, following subjective knowledge boosts, such as the one used by eHow.com (i.e., "*Discover the expert in you,*") high self-esteem consumers could be deterred from using the website (e.g., "*I don't need a website to discover the expert I am.*") Conversely, low self-esteem consumers may be encouraged by the prospect offered by the website (i.e., "*This service may help me achieve a level I am not able to reach by myself.*")

In four experiments, we investigate these propositions using two types of subjective knowledge manipulations across two different consumption domains (computers and luxury). Our research represents an important step toward integration of extant research on subjective knowledge and consumer behavior and opens up new directions for future research. It also bears substantial applied consequences for marketers and public policy makers in their efforts to use consumer knowledge perceptions more effectively. Thus, our research contributes to the topic of consumer knowledge and has implications for practitioners. First, theoretically, while extant research on the relationship between subjective knowledge and information processing is rich, research manipulating subjective knowledge remains scarce (e.g., Hadar, Sood & Fox, 2011; Moorman et al, 2004; Park, Gardner & Thukral, 1988; See, 2009; Tversky & Fox, 1995). Moreover, existing studies do not investigate the psychological processes possibly at stake under subjective knowledge manipulations. In line with Haugtvedt, Liu and Min (2008), we believe that the use of relevant individual difference measures may be useful to enable a process-level

understanding of the phenomena at stake. Second, as no consumer research till date has examined the possible influence of personality traits in the relationship between subjective knowledge and information processing, the managerial contributions of this dissertation may be important for marketing managers and communication agencies. Indeed, playing upon subjective knowledge boosts and threats to catch consumers' attention, and possibly influence their attitudes and behaviors, may require an understanding of consumers' psychological traits. Failing to take into account possible differences in consumers' personality traits may drive part of the targeted consumers away from the company or agency delivering the message.

This dissertation is structured as follows. First, we review the extent literature about two key fields for our investigation. The first field pertains to research assessing the link between objective and subjective knowledge, on the one hand, and information processing and decision-making, on the other hand. The second covered field includes research on the self and self-related motives, which will lead us to highlight the fact that consumers may have different reactions to subjective knowledge manipulations depending on their initial level of self-esteem and consequently, be more likely to engage in distinct courses of action. Thirdly, based upon this literature review, we develop our conceptual model and main hypotheses. Our key proposition is that self-esteem is likely to play a moderating role in the relationship between manipulation of subjective knowledge and actual memory for information. The fourth part focuses on the presentation of our empirical results. We start this part with a presentation of our methodology and the chosen empirical setting. Meanwhile, we explain the reason why we have chosen an experimental protocol. Furthermore, we discuss the potential limits and benefits of choosing a sample of university students. Next, we present each study's purpose, structure, and result, before discussing its implications and limitations. Finally, the fifth and final part is a general discussion of our results and of the theoretical and practical implications of the findings. We also highlight the limitations of our research and the need to conduct additional studies to enrich our contribution.

Each main part starts with a general introduction detailing the key objectives and investigated topics. The goal is to allow the reader to have a brief overview of the key points covered in each part. Within each part, we follow a top-down approach. We start with general constructs (e.g., information processing and memory models, knowledge, self and self-related

motives…). Next, we narrow down the investigation to focus on the key points this dissertation focuses on (e.g., relationship between consumer knowledge and information processing, link between subjective knowledge and memory for information, hypotheses of self-esteem moderation in the relationship between subjective knowledge manipulation and memory for information). Finally, we conclude each key part and subpart with a summary and implications' section aiming at displaying the way our key theoretical building blocks are structured and interconnected. Each section includes tables and figures following the American Psychological Association (APA) guidelines (American Psychological Association, 2009) and numbered independently following the sequence in which they are referred to in the main text.

Figure 1: Thesis structure
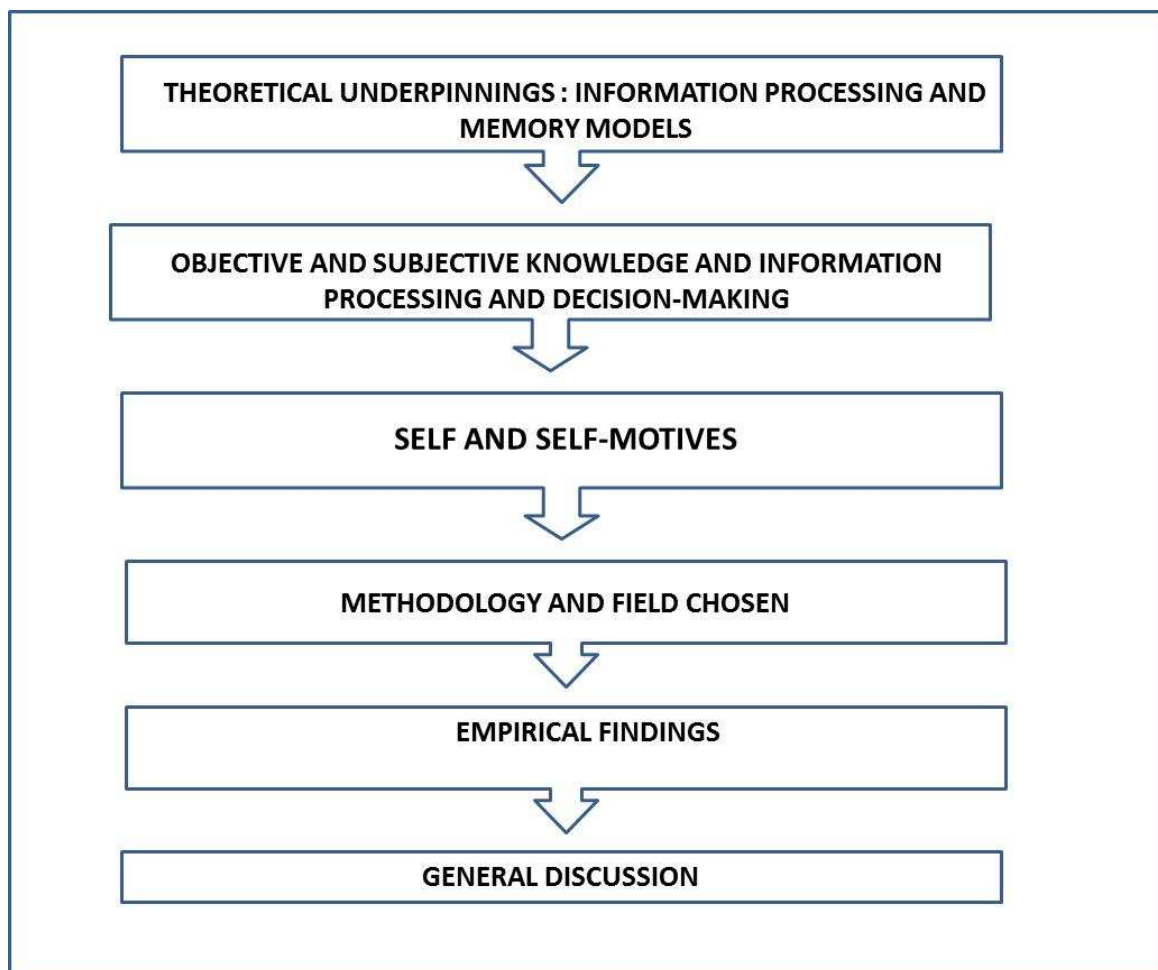
Part 1: The relationship between knowledge, information search and decision outcomes

1.1 Preliminary remarks on consumers' cognitive limitations to process and memorize information

As the present dissertation focuses on the relationship between subjective knowledge manipulations and memory for information, we start this chapter with a presentation of the key conceptualizations of information processing and memory models. Because of their limited cognitive capacities, consumers engage in selective exposure to incoming stimuli and messages. As attention and short-term memory are limited, consumers have a greater likelihood to process information thoroughly when it responds to an activated need. Thus, the next section describes the key needs served by information search. In this quick overview, we underline the fact that information processing not only serves functional purposes (reducing risk when making decision under uncertainty) but also fulfills self-related needs (self-identity defense and expression). Finally, we explore the types of needs a consumer subjective manipulation could activate.

1.1.1 Information processing and memory models: taking into account the limited capacities of the human mind

In this section, we review evidence from economic research, cognitive science and consumer research highlighting consumers' limited capacities to process and memorize information. Because of their cognitive limitations, consumers have developed strategies of selective information processing.

First, Herbert Simon (1957) proposes a theoretical framework highly appropriate to understand consumers' cognitive limitations. Indeed, building upon cognitive science, Simon has developed an economic model that captures individuals' limited capacities to process information and to take decisions. Besides, his framework gives a useful overview of the status of information within a world of limited capacities. Against traditional models in economy that picture a rational agent able to take optimal decisions based on a complex calculation of the utility of all available options, Simon (1957) described an agent with limited, "bounded" capacities. These "boundedly rational agents experience limits in formulating and solving complex problems and in processing (receiving, storing, retrieving, transmitting) information"

(Williamson, 1981, page 553). Due to cognitive limitations and resources, as well as time constraints, the individual agent depicted by Simon uses satisficing, in contrast to optimization strategies, when making decisions: seeking satisfactory solutions as opposed to optimal ones. Within such a framework, information is not only a resource, but it also entails a cost, as stated by Simon (1971, pages 40-41): "What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention, and a need to allocate that attention efficiently among the overabundance of information sources that might consume it." Simon's framework fits very well contemporary marketing contexts in which consumers are overloaded with information coming from various sources (e.g., TV, radio, press, mobile devices, the Internet…). It stresses the idea that information has a cost as it consumes scarce resources such as time and attention. In such contexts, consumers are likely to "consume" information only if they believe the benefits of search are likely to outweigh the costs incurred by it. Such a conception of information as a cost to benefits tradeoff echoes with the work conducted by the economist Stigler. In his work (Stigler, 1961), this economist typifies information search as a trade-off between potentially positive outcomes (reaching the best price in the absence of a centralized market,) and costs incurred (time and effort).

Building upon cognitive science models, consumer behavior conceptualizations of information processing (Solomon, 2009; Loudon & Della Bitta, 1993) also highlight consumers' limited capacity and the information selection strategies adopted as a result thereof. Specifically, these models describe the multiple filtering procedures occurring at different stages of information processing. Indeed, given consumers' limited resources (e.g., time, cognitive capacities…), ability to retrieve information is subject to several filtering processes. First, exposure to a given unit of information is contingent on the types of environment (e.g., TV channels, stores, internet sites, radio stations…) consumers have chosen to stay in. Second, consumers pay selective attention to the incoming information depending upon their capacity and motivation to process the message. Attempts to determine the optimal amount of incoming information that would maximize attention and avoid sensory overload have not led to straightforward answers (Malhotra, 1984). Next, once the information has been paid attention to, it goes through two subsequent filtering processes, namely interpretation and memorization. Interpretation refers to the meaning assigned to the sensory stimuli based on schemas and sets of

beliefs stored in consumers' mind. Finally, once the information has been interpreted, it is stored in memory according to existing cognitive structures and memory models.

Thus, consumer information-processing models highlight the notion of selection: Endowed with limited resources, consumers filter, select, and structure information according to their capacity and motivation. In a related vein, the consumer information acquisition framework developed by Bettman (1978) underlines the type of information search strategies adopted by consumers because of their limited capacities. It distinguishes active search from passive exposure (i.e., being confronted with information,) and take into account three dimensions within the search process: direction (which pieces of information are searched,) degree (intensity of the search,) and patterns (the way the search process is organized.) Thus, according to Bettman (1978) various levels of involvement and search intensity have to be taken into account to understand the way consumers process information. Because consumers have limited resources and capacities, they allocate various levels of attention and effort to the information they receive. The extent to which a given unit of information responds to consumers' needs is therefore a crucial factor that influences their information processing level.

Memory models also converge in showing consumers' limited capacities to retrieve information at a given moment in time. According to the multiple-store approach (Atkinson & Shiffrin, 1968), several kinds of memory systems have to be distinguished. First, information is received by our senses for a fraction of a second. Then, an initial level of filtering occurs: either further attention is dedicated to the stimulus and information is transferred to short-term memory or information is not given additional attention and is lost. Specifically, the short-term memory system has limited capacity (generally a minute or so). Miller (1956) used the concept of chunking, according to which short-term memory can only hold five to nine units (referred to as "chunk") of information (seven plus or minus two). While the actual number of pieces of information a human mind can process at a given moment in time may vary from one individual to another, be hard to assess precisely and be contingent upon the types of information considered (Schweickert & Boruff, 1986), the notion of chunking has an important conceptual implication: the idea of limitation in short-term memory. Finally, if the information is processed further, it can be transferred to long-term memory where information is organized semantically, is stored permanently and can be retrieved later when needed. While information is always available once stored in long-term memory (Lynch & Srull, 1982), only a small portion of the

available information in long-term memory is accessible at a given moment in time, which depends upon the presence of retrieval cues and the amount of competing information.

Later memory models also take into account consumers' limited information processing capacities and their adoption of selective attention strategies. According to the level of processing model (Craik and Lockhart, 1972), different levels of processing of incoming information result in various memorization patterns. As individuals have limited processing capacities, depth of processing of incoming information may be fluctuating. Lower levels of processing, such as sensory analysis (e.g., "*The message is written in blue*") require fewer capacities but are less likely to lead to long-term memorization of information. Higher and deeper levels of processing (i.e., analyzing the message content and putting it in relation with other beliefs or pieces of information available in memory) consume higher capacity, are more elaborate and are more likely to result in long-term memory retention. Craik and Lockhart (1972) model of memory thus implies that various levels of motivation and capacity to process information result in distinct memorization patterns. As such, memorization can be motivation-driven.

In brief, two main conclusions can be highlighted from this overview of consumer information processing and memory models: the notion of limited capacity and the need to take into account two parameters to understand the information processing strategies adopted by consumers, namely ability to process and motivation. In this respect, understanding the way subjective knowledge interplays with motivation and ability to process information is necessary. In the next section, we review empirical evidence from social psychology and consumer research highlighting the role played by capacity and motivation on information processing and memorization.

1.1.2 Processing and memory for information as driven by motivation and capacity

Evidence linking ability to process information and actual acquisition is given by Capon and Davis (1984) who linked cognitive ability to performance in information processing tasks. Such a conclusion concurs with the finding of Hu, Huhmann and Hyman (2007) who showed, in support of their resource-matching approach, that higher level of external search occurs when consumer self-efficacy matches perceived task difficulty. Thus, when consumers perceive they

do not have the ability to conduct an information search task, they tend to engage less effort in information search. Similar types of links between capacity and message memorization can be inferred from the conclusion of Kent and Allen (1994). Their experiment showed that when ad execution, prior exposure, processing objectives and exposure time were controlled, participants better recalled new product information for more (vs. less) familiar brands. A possible explanation is linked to the existence of richer cognitive structures for familiar (vs. non-familiar) brands. Indeed, new product information about familiar brands can be stored more easily using existing structures from long-term memory whereas cognitive efforts entailed by memorizing information about non-familiar brands are likely to be higher. When familiarity is low, the associative networks the incoming information can be attached to are likely to be weaker and less accessible.

In addition, several studies in consumer research have highlighted the key role of motivation as a driver of consumer information processing and memorization. Building upon the theory of motivation developed by Atkinson (1957), Burnkrant (1976) theorized information search in terms of motivation. In this theoretical framework, information processing intensity is determined by the need for information on the topic, the expectancy that processing the stimuli will fulfill this need and the evaluation of the message as a source of information. Such a focus on the importance of motivation to determine intensity of search can be put into perspective with the ELM model developed by Petty and Caccioppo (1986). Indeed, those two social psychologists also emphasized the role of motivation and ability to determine the extent to which recipients elaborate on a message and give weight to its informational content when making a judgment.

In a similar vein, Choi, Koo, Choi, and Auh (2008) developed converging findings regarding the influence of motivation on information processing. Specifically, these authors showed that, once high need for cognitive closure consumers have found a satisfying solution likely to fulfill their needs, they are attached to "stick" to their choice and motivated not to search for additional information that could possibly induce confusion and uncertainty (Choi et al., 2008). Evidence of the influence of motivation on memorization is also growing in social psychology and consumer research. For example, Aaker and Lee (2001) showed that recall is higher when a persuasive message type (promotion vs. prevention oriented) matches consumers' self-regulatory motive. Similarly, Wood and Lynch (2002) showed that high knowledge

consumers may learn less about new product information than low knowledge consumers, due to lack of motivation at the time of encoding. In addition, evidence regarding the role of motivation at the time of retrieval can be found in Park and Hastak (1994). Consumers under low involvement at the time of encoding but high involvement at the time of judgment engaged in an extensive search in memory for product information and used it to form an evaluation. Relatedly, Puntoni and Tavassoli (2007) showed evidence of the role of context in advertising memory. Words and ads applicable to social desirability are accessed faster and recalled better in the actual or imagined presence of others than in the absence of interaction with others, due to the activation of impression management motives when others are present. The aforementioned studies highlight the need to take into account the motives present in consumers' mind, either chronically or contextually, in order to gain a deeper understanding about the way they process and memorize information.

Thus, ability and motivation determine the amount of processing and encoding of information in memory. Therefore, the influence of subjective knowledge on consumer motivation and ability to process information needs to be explored in our research. Intuitively, we could presume that consumers' stored knowledge would negatively influence the amount of effort dedicated to search and attention to incoming information. As cognitive misers, should consumers have access to a rich stored knowledge database, they could rely on this asset to save the efforts entailed by attention paid to incoming information. Based upon the bounded rationality model described in the above section, we could thus expect at first sight a linear negative relationship between knowledge and attention paid to new information. However, a deeper understanding of the relationship between knowledge and information search requires an overview of the diverse functions served by information search within a consumer setting. In the following section, we highlight the various needs fulfilled by information search and show that information processing does not only respond to functional goals (i.e., reduction of uncertainty in a purchase decision context) but also fulfills self-related needs.

1.1.3 The multiple motives served by information within a consumer setting

Given consumers' limited cognitive capacities, a given unit of information is more likely to be processed if it responds to a specific need. In this section, we categorize the different types of needs fulfilled by consumers' information search. Importantly, we show that, in addition to

functional needs (i.e., risk-reduction in a context governed by uncertainty) information processing also fulfills self-related needs.

A key function of information search in consumer contexts is to reduce uncertainty when facing a risky situation. In a purchase decision process, Murray (1991) showed that perceived risk drives search behavior. Perceived risk entails several components: financial, performance, social, psychological, safety, and time and convenience loss. As perceived risk increases (e.g., when purchasing durable goods, engaging in a costly investment…), the tendency to buy without searching information in advance decreases (Locander & Hermann, 1979). In this respect the higher the uncertainty entailed, the greater the likelihood consumers will search for and pay attention to information.

In addition to the functional needs served by information search, information also responds to self-related needs. First, information seeking can be a mode of cognitive dissonance reduction. Festinger (1957) suggested that when individuals hold two conflicting cognitions, they experience a state of discomfort that they try to reduce using strategies of dissonance reduction. Among these different strategies, information search has been identified as a mode of dissonance reduction (Brehm, 1956). A typical example is a purchase context in which consumers have made a difficult choice between two similarly attractive options A and B. In order to reduce the discomfort stirred up by the fear of having made the wrong choice (i.e., choosing option A when option B may have been the best or conversely), consumers can engage in biased and extensive information search of arguments in favor of the product they have chosen or against the product they have not chosen. In doing so, they support the choice they have made and keep away from the fear of having made the wrong choice.

In addition to this defensive self-related side of information seeking (i.e., avoiding dissonance), information can serve self-related needs such as self-expression and need for belonging. When a given brand or product is part of one's identity, as is the case in brand communities, seeking information and sharing it with other members help consumers fulfill identity expression needs. As *"specialized communities, based on a structured set of social relationships among admirers of a brand,"* (Muniz & O'Guinn, 2001, page 412) brand communities are characterized by shared consciousness, rituals and traditions, and a sense of moral responsibility. In this respect, seeking distinctive information about the brands or products they admire helps brand community participants reassert their identity as members and fulfill one

of the obligations entailed by this sense of moral responsibility (i.e., to engage in a community-oriented action, namely sharing information with other members.) Such strategies of information acquisition and sharing have been observed in various domains, including motorcycles (Schouten & McAlexander, 1995), cars (Algesheimer, Dholakia, & Herrmann, 2005) and computers (Belk & Tumbat, 2002). In addition, searching for new information about the domain one affiliates to helps experts assert their identity (Shanteau, 1992).

Finally, information search may serve hedonic needs, as evidenced, for example, in shopping contexts. In addition to searching for the best price or making the optimal purchase decision, people may shop for simple enjoyment (Marmorstein et al., 1992). In the same vein, Arnold and Reynolds (2003) typology of hedonic motivations to shopping includes a category that can be paralleled to search for enjoyment through shopping: "adventure shopping." This notion refers to search for stimulation by paying increased attention to the stimuli present in a shopping environment. Relatedly, Petty and Cacioppo (1982) developed an individual measure, "need for cognition" which refers to individuals' intrinsic enjoyment of thinking. In this respect, paying attention to and searching for new information within a consumer context may be a way of fulfilling this inner need for "food for thoughts."

Thus, this brief overview of the potential motivations behind information seeking highlights the fact that limiting our understanding of information search to utilitarian needs (i.e., reducing uncertainty in order to make the best purchase decision) would not give an exhaustive representation of the various motives behind information search. Indeed, information search also responds to self-related motives. Therefore, when investigating the relationship between knowledge and information processing, it is important to keep in mind the self-related functions that information search fulfills.

1.1.4 Motive-based information search and consumer knowledge: preliminary reflections

Based upon this presentation of the different motives behind information search, we focus on the possible roles played by the knowledge variable in relation to information seeking behaviors.

First, with regard to the utilitarian motive served by information search, it appears that the relationship between knowledge and search is ambivalent. On the one hand, having access to a store of existing information may drive consumers to believe they can ground their decision on

an existing knowledge base and thus save all the efforts implied by information search. Furthermore, knowledge can contribute to reduce the uncertainty facing consumers in decision contexts and thus limit the need to search for additional information (Locander & Hermann, 1979; Murray, 1991). On the other hand, being knowledgeable in a given domain may facilitate processing of incoming information (Alba & Hutchinson, 1987) or at least convince consumers that they have the capacity to search (Raju et al., 1995). Conversely, some novice consumers may be hampered in their search process by their incapacity to search efficiently or by a lack of confidence in their information processing abilities (Raju et al., 1995). Thus, taking into account solely the utilitarian motives served by information search, it is difficult to predict the effect of knowledge on information search, as conflicting forces seem to be at stake.

Beside utilitarian motives, information search fulfills self-related needs, such as self-expression and need for belonging, in addition to hedonic needs. To the extent that knowledge in a domain is likely to strengthen one's identity as a member of a community one belongs to, knowledge can motivate consumers to seek information within their domain of interest (Shanteau, 1992). In the same vein, being attached to one's identity as an expert or "people in the know" may lead to selective exposure: consumers seeking information in line with their domain of expertise, brands or products they are attached to and neglecting information from other domains (Moorman et al., 2004).

Finally, with respect to the hedonic need served by information search (intrinsic enjoyment of thinking and exploring the environment (Arnold & Reynolds, 2003; Marmorstein et al., 1992), one can assume a positive link between knowledge base and information search. Having access to an existing base of knowledge rich with conceptual nodes may enhance the hedonic pleasure derived from information search. Indeed, having access to a rich "playground" (the existing knowledge database) is likely to make the inclusion and categorization of new information within these rich and deep associative networks more pleasurable, challenging and stimulating for consumers who enjoy thinking. A case in point is provided by some wine connoisseurs and oenology experts who find it more enjoyable to take a small sip of a given wine, to identify the category, region and year to which it belongs to and to include it in their existing knowledge network rather than drinking a full glass of it. In this example, the pleasure of categorizing precedes the pleasure of consuming.

Thus, the relationship between knowledge and information search is complex, which can explain conflicting results found in the consumer research literature. Indeed, as will be detailed later in our literature review, while some research points toward a positive link between knowledge and information search, other studies find the opposite pattern.

1.2 Knowledge or knowledge(s): distinction between subjective and objective knowledge

While the present investigation focuses on subjective knowledge, a strong conceptual and empirical link exists between objective and subjective knowledge, as reviewed in the following section. Therefore, a detailed presentation of those two constructs and of their effects on consumer responses is necessary. Suppose a researcher investigates the relationship between consumer subjective knowledge about cars and memory for information included in a car ad, disentangling the effects linked to the subjective knowledge manipulation from those stemming from between-participants differences in objective knowledge in this product category is crucial. For instance, expertise about the car category (i.e., access to a rich and wide database of brand and product attributes) could ease processing and memory for information included in a car ad. In line with this view, consumer objective knowledge has been found to influence multiple consumer behaviors, among which information processing and memory for information (e.g., Brucks, 1985, Wood & Lynch, 2002), making it an important construct to take into account for marketers wishing to assess the influence of their communications on different types of targets (novices vs. experts). Therefore, in the next section, we do not only present extant research investigating the relationship between subjective knowledge and consumer information processing, but also include in our review studies dealing with the link between objective knowledge and cognitive outcomes.

1.2.1 The multiple definitions of knowledge

Two types of knowledge are generally distinguished in consumer research literature: objective knowledge and subjective knowledge (Alba & Hutchinson, 2000; Brucks, 1985; Park & Lessig, 1981). The two notions of objective knowledge and subjective knowledge are distinct

constructs with different definitions. Whereas objective knowledge refers to what an individual actually knows and is determined by accurate information stored in memory (Bettman & Park, 1980; Knight, 2005), subjective knowledge refers to what an individual believes he knows in a given domain (Brucks, 1985; Park & Lessig, 1981). Though these two constructs are related, a meta-analysis has shown that the correlation between objective knowledge and subjective knowledge is medium sized (0.37) and highly dependent on domain, type of good, and method of measurement: correlations are stronger for products versus non-products, public versus private goods and for subjective knowledge measures based on a comparison with an expert versus an average consumer (Carlson et al. 2009). Thus, various levels of correlation between objective knowledge and subjective knowledge have been reported, from very low (e. g., Radecki & Jaccard, 1995: 0.05) to high (Park et al., 1994: 0.65).

1.2.2 Consumer knowledge calibration

The degree of relation between subjective knowledge and objective knowledge is also a matter of individual difference; a concept referred to as consumer calibration (Alba & Hutchinson, 2000). Consumer calibration refers to the fit between objective and subjective knowledge for a given consumer. For instance, we can consider shoppers very confident about their knowledge of price within a category but incapable of assessing correctly product prices when asked to do so. In this case, these shoppers' knowledge is not well calibrated. Conversely, if consumers believe they know nothing about product prices within a category but are frequently correct in their price assessment, this is another case of poor calibration. Only when consumers' assessment of their knowledge matches their actual capacity can we talk about good calibration (Alba & Hutchinson, 2000).

Degree of familiarity with the relevant product category and motivation are two key factors influencing whether consumers are likely to be well calibrated or not. First, consumer research hints toward a phenomenon we could refer to as the "fallacy of familiarity." Thus, Carlson, Bearden and Hardesty (2009) showed that experience is an important moderator of the objective-subjective knowledge relationship with respect to pricing tactics. Their results showed that consumers who are experienced with pricing tactics are also the least calibrated and deem themselves more knowledgeable than they really are. In contrast, consumers who are less

experienced show a better calibration between subjective and objective pricing tactics knowledge. Such findings can be put into perspective with Kanwar, Grund and Olson (1989) results in the food nutrition domain. Indeed, these authors showed that whereas high familiar/low formal training participants' subjective knowledge and objective knowledge score were not correlated, low familiarity/high formal training participants' subjective knowledge and objective knowledge about nutrition were highly correlated, thus showing a better calibration.

Moreover, consumers' subjective and objective knowledge calibration may have a motivational origin. In this respect, Gershoff and Johar (2006)'s findings about consumers' calibration of their friends' knowledge are worth mentioning. These authors showed that while consumers were frequently accurate in guessing their friend knowledge about a neutral and non-involving topic (e.g., geography quiz), they often overestimated their friend knowledge about their personal tastes (e.g., movie preference). While the focus of this research is on calibration of one's friend knowledge rather than on one's personal calibration, it hints toward a motivational origin of consumer knowledge calibration that would be worth exploring in future research.

1.2.3 Distinct effects of objective knowledge and subjective knowledge

In addition to these varying relationships between objective knowledge and subjective knowledge, there is converging evidence that objective and subjective knowledge have different effects on consumer information search and behavior. For instance, Brucks (1985) showed that while both subjective and objective knowledge were associated with more efficient search, the effects of objective knowledge and subjective knowledge were different: Objective knowledge was positively linked to the number of attributes observed in a complex situation, whereas subjective knowledge was not. On the contrary, subjective knowledge was positively linked to reliance on salespeople advices, whereas objective knowledge was not. A possible way of explaining these differences stem from the specific nature of each construct: while objective knowledge is linked to existing stored content that can be activated while processing information, subjective knowledge is linked to confidence, which leads individuals to believe they are able to discriminate between reliable and unreliable information.

Thus, though objective and subjective knowledge are two distinct constructs and even if the present research focuses on the impact of subjective knowledge on information processing

and memory for information, it is necessary to take into account the possible effect that objective knowledge may play in our experiments. The following two sections will focus on the state of the art regarding the influence of objective and subjective knowledge on information search and consumer behavior. Each section starts with a definition of the construct and is followed by a presentation of the key studies that have investigated its effect on consumer information processing and decision-making.

1.3 Objective knowledge and information search: the capacity and motivation dilemma

Defined as accurate information stored in memory by consumers (Bettman & Park, 1980; Knight, 2005), objective knowledge is likely to play a role in consumers' information processing and memory for incoming information. For example, a computer expert watching a laptop ad may process and memorize attribute information more easily than a novice consumer. Indeed, the extensive amount of attribute information and rich cognitive structures a computer expert has already stored through his experience with the product category, could help him categorize the incoming information more easily. For instance, given he already has pre-established schemas about the key features of a laptop (e.g., storage capacity, random-access memory, processor, weight…), an expert could process and classify the incoming product information, relatively to the exemplars he has in mind.

Because participants can differ on objective knowledge of the topics we investigate, it is important to take into account the possible influence of this variable in relation to our investigation. Indeed, as our research focuses on the relationship between subjective knowledge and memory information, setting apart the contribution of objective knowledge on information processing from the effects of subjective knowledge appears necessary. Therefore, in the present section, we review extensive evidence from consumer research literature dealing with the relationship between objective knowledge and information processing.

While experts' specific skills and cognitive capacities may ease their processing of rich, diverse and complex domain-related data, their motivation to spend time and effort searching for new domain-related information may be impeded by their having already stored extensive mental content in the concerned product category.

1.3.1 Objective knowledge: definition and operationalization

Objective knowledge is what consumers actually knows (Carlson et al, 2009) and is determined by accurately stored information in memory (Bettman & Park, 1980; Knight, 2005) and the capacity to use specific cognitive structures (Alba & Hutchinson, 1987). While the definition of objective knowledge is relatively straightforward, the way it can be operationalized is more complex and has given birth to several approaches.

Measuring, manipulating, assigning or asking experts: the multiple ways of assessing objective knowledge

A first distinction can be made between studies measuring objective knowledge and those manipulating this construct (Park et al, 1988; Wood & Lynch, 2002). Manipulating objective knowledge levels is specifically relevant in domains where participants share the same amount of knowledge prior to participating in an experiment. This is the case when the study deals with new product categories and domains (Wood & Lynch, 2002) or when pre-checks ensure that, between experimental conditions, participants do not differ in objective knowledge levels. Typical manipulations of objective knowledge consist of giving participants assigned to the high (vs. low) objective knowledge condition a higher amount of information (Park et al, 1988; Wood & Lynch, 2002). A key advantage with this method is linked to the fact that objective knowledge is thus isolated from other potential confounds such as usage and experience, for instance. The main drawbacks, however, come from the difficulty of providing, within a laboratory setting and limited time resources, enough information to participants assigned to the high knowledge condition to differentiate them substantially from novices. Moreover, while this method is particularly relevant in new product categories wherein participants do not differ in knowledge prior to the experiment, it makes less sense in already existing product categories in which participants are likely to have varying levels of expertise prior to the study.

The most popular methods used to operationalize objective knowledge include measures of objective knowledge that typically consist of exposing participants to dedicated tasks or

quizzes. The most widely used method is a knowledge quiz based on multiple choices or true-false questions (e.g., Maheswaran & Sternthal, 1990; Maheswaran, 1994, Park et al 1994; Radecki & Jaccard, 1995; Su et al., 2008). A median split is frequently used to distinguish a population of experts from novices based upon the quiz results. A key advantage with this method stems from its convenience, as it is both easy to administer and to code.

More sophisticated but complex ways of measuring objective knowledge include analysis of participants' stored mental content by asking specific questions about the organization and content of their knowledge through open-ended questions and categorization tasks (Mitchell & Dacin, 1996). For instance, one could ask participants to list all the thoughts that come to their mind when the word "computer" is pronounced. In a second step, the participants would be asked to structure the content that they have listed in the thought-elicitation task using their own categories. Depending on their expertise levels with the computer category, participants could use various levels of technicality and categorization depth. Whereas experts are expected to use technical words and complex categories and subcategories, structuration of the stored mental content of a novice is expected to be simpler and comprising a smaller number of categories and subcategories. Thus, this methodology is aligned with Alba and Hutchsinson (1987)'s definition of knowledge in terms of richness of mental stored content. However, an important limitation is linked to the complexity and time required to administer the task and code the data. Moreover, richness and depth of the information provided by participants may not only stem from objective knowledge differences, but also reveal various levels of motivation to complete the task as thoroughly as possible. In addition, personality variables, such as need for cognition, may be at play to account for the richness of the cognitive structures elaborated by participants.

Another approach to measure objective knowledge is used when the researchers themselves determine in advance high and low objective knowledge profiles and recruit participants accordingly. For instance, in their studies related to the nutrition domain, Kanwar, Grund and Olson (1989) recruited two different types of profile to create high and low objective knowledge groups. Whereas the low nutrition objective knowledge group was made up of housewives with no formal training in nutrition, the high nutrition objective knowledge group was made up of students having received a formal training in nutrition. A key limitation of this approach is the risk of confounding objective knowledge with other factors (e.g., age,

experience…), which may be one of the reasons why this approach is not frequently used in the literature.

Finally, Shanteau proposes an alternative way of measuring objective knowledge based on peer recognition and operationally defines experts as "those who have been recognized within their profession as having the necessary skills and abilities to perform at the highest level." (Shanteau, 1992, page 255). The key advantage of this approach is the possibility it offers to overcome the artificialness linked to the division of rather homogeneous populations of students into subgroups of experts and novices. However, the two key limitations of this approach are methodological and conceptual. First, operationally and for convenience purposes, it is difficult to (a) define a group of experts and (b) have them identified a target group they would be apt to classify as expert or novice. Second, at a conceptual level, the definition proposed by Shanteau (1992) may be closer to "inter-subjective knowledge" (i.e., the subjective assessment of a target's knowledge by a group of experts), rather than a real objective assessment of expertise.

Thus, despite the various methods developed in consumer research to assess consumer expertise, as summarized in Table 4, one dominant approach prevails: measuring objective knowledge using multiple-choices and true-false items. Despite its possible limitations, such a method offers a convenient way of dividing a given population in sub-groups of novices and experts and assessing how these two groups differ for various cognitive and behavioral outcomes. We will use this method to measure objective knowledge, as part of our studies.

Table 1: Measuring or manipulating objective knowledge: a review of the different methods

Method used to assess objective knowledge	Definition	Advantages	Drawbacks	References
Manipulating objective knowledge	Giving high objective knowledge participants information about the product category and no information to low objective knowledge group	Manipulation of objective knowledge allows for causal inference between objective knowledge and dependent variable	Artificialness Hard and time consuming to implement Risk that participants differ in objective knowledge prior to the study	Park et al, 1988 Wood &Lynch, 2002
Knowledge quiz	Quiz containing multiple-choice items and true-false items about the investigated domain	Easy to implement Easy to code	Artificialness of the method: using median split analysis, difference between high objective knowledge and low objective knowledge group does not always allow for a clear understanding of objective knowledge's effects	Maheswaran & Sternthal, 1990, Maheswaran, 1994; Park et al, 1994; Radecki & Jacquard, 1995 ; Su et al, 2008
Open-ended questions and categorization tasks	Dedicated tasks asking participants to list all their thoughts about a domain and structure them using their own categories	Conceptual clarity: very close to Alba and Hutchinson's (1987) definition of knowledge as stored mental content	Hard to implement. and to code Risk that participants' mapping of mental content is influenced by additional factors such as motivation to complete the task for instance	Mitchell & Dacin, 2006
Selection of experts by the researcher	The researcher defines criteria of expertise and recruits participants accordingly	Researcher sets criteria	Risk of confound with other factors such as experience, age for instance	Kanwar, Grund & Olson, 1989
Selection of experts by other recognized experts	The researcher asks recognized experts to identify other experts in the field	Possibility to overcome the artificialness of the method based on knowledge quiz	Difficult to implement Unclear whether this method measures objective knowledge or perception of targets' knowledge by experts	Shanteau, 1987 Shanteau, 1991

1.3.2 Different capacities between experts and novices

Experts are endowed with capacities and skills that help them make sense of an extensive amount of information.

Cognitive structure and stored mental content

First, experts differ from novices in the way they organize their knowledge. Whereas novices are mostly able to use basic levels (for instance "car") to categorize objects, experts are able to use a much wider spectrum of options to categorize an object. They are able to categorize objects below basic levels: For instance, instead of using the car category, they are able to distinguish different categories of cars (microcar, minicar, compact car…) and categorize objects accordingly. Conversely, they are also able to use higher-level and more abstract categorizations. For instance, instead of using basic food categories (poultry, meat, fish, eggs…), they are able to categorize food items depending on their properties: high fiber, high cholesterol, high calcium (Alba & Hutchinson, 1987). Thus, experts are able to use more sophisticated, less stereotyped, and more complex categories than novices.

In addition, experts tend to store information using more subcategories than novices, thus resulting in objects and attributes being classified using more complex associative networks than those used by novices, as can be seen in the two examples listed below. The two examples detailed below show the differences between experts (figure 7) and novices (figure 8)'s knowledge networks.

Figure 7: Example of a hierarchic associative network for an expert
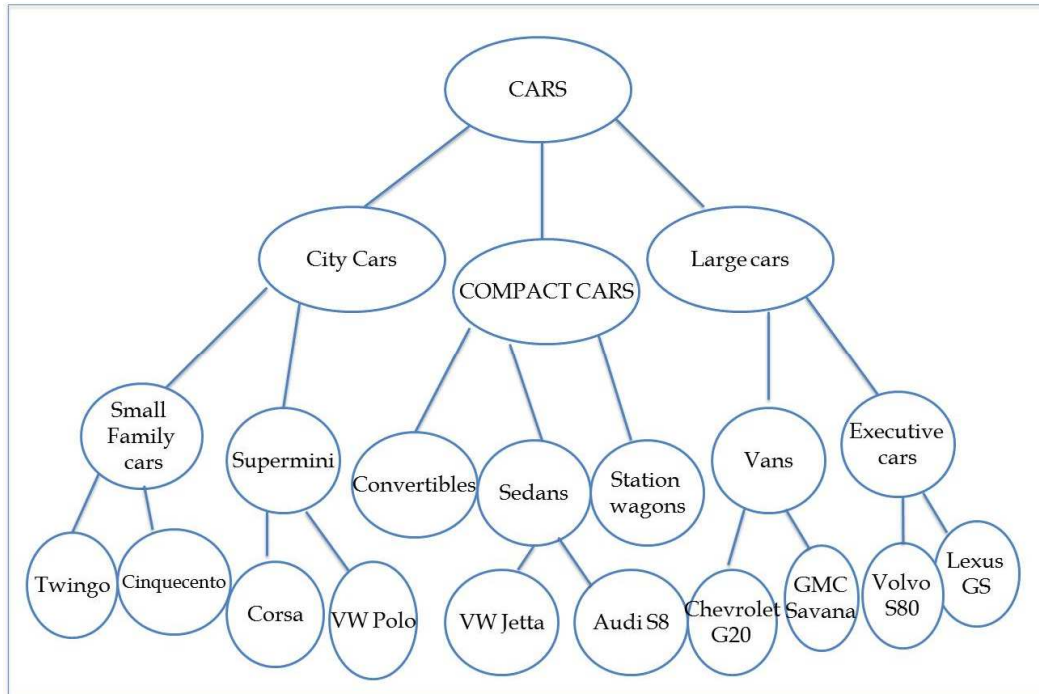
As can be seen in Figure 7, experts use complex and extended categories. In this example, they structure the car industry using technical terms (city cars, compact cars) and are able to describe sub-categories and to list exemplars within each subcategory.

Figure 8: Example of a hierarchical associative network for a novice
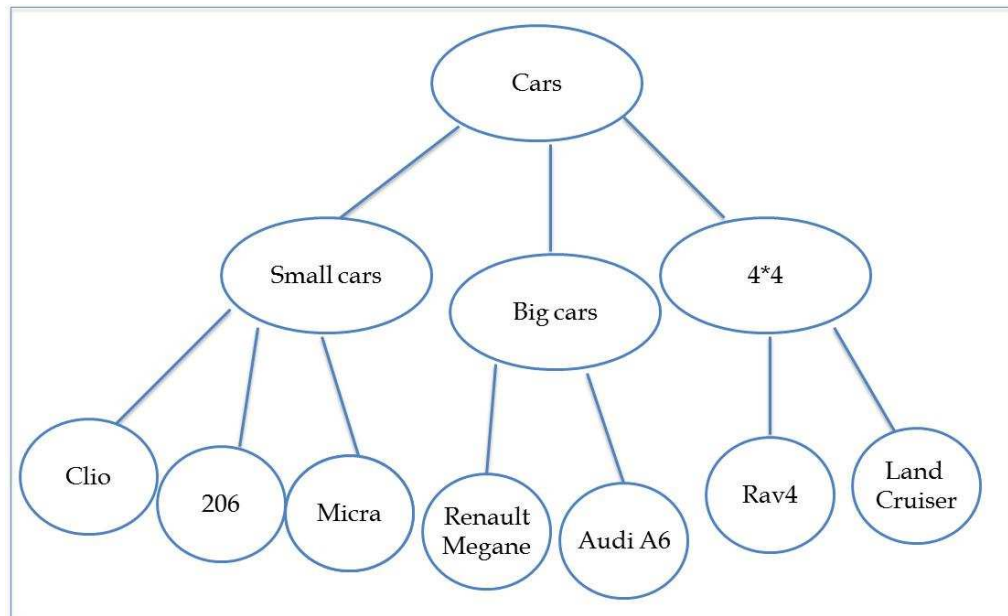
As can be noticed in Figure 8, novices use simpler categories and non-technical words in describing the car industry. Contrary to experts, they use a smaller number of sub-categories to organize their knowledge. This leads to a poorer and less sophisticated associative network.

Different memory capacities between experts and novices

Finally, experts' elaborate way of classifying information bears consequences on memory processing. Using complex associative networks, experts (vs. novices) are able to retrieve more information, thus leading to higher capacity to recall information (Alba & Hutchison, 1987). For instance, Mitchell and Dacin (1996) showed that experts are able to recall a higher number of brands and attributes than novices. In their study about knowledge about motorcycles, the authors evidenced experts' higher recall capacity: Experts were able to recall higher number of brands, models and product types. In addition, using memory probes, the authors showed that experts were able to elicit a higher number of associations with each brand, model, product type, component, performance attribute and to list a higher number of models associated with each product type. Finally, experts were able to organize memory content in a more structured and

interconnected way. Noticeably, experts were able to link knowledge about technical features of motorcycles with performance (e.g. "four valves per cylinder"----"great gas flow") whereas novices failed to do so. Such capacities of experts help them in choice contexts. Indeed, their ability to infer performance from knowledge of physical attributes allows experts to choose motorcycle models adapted for various usage situations. In a related vein, in his study about home computers, Brucks (1985) found a positive link between objective knowledge and number of attributes observed in an information search task. Brucks concluded that number of attributes observed was primarily determined by consumers' actual memory content. Access to a rather limited number of categories could preclude low objective knowledge consumers from conducting an information search as wide as their high knowledge counterparts who can rely on a much greater range of attribute types available in memory.

1.3.3 Different capacities lead to different strategies of information processing

A more attribute based processing of information among experts

Experts have higher capacities to understand the meaning of attributes (e.g., technical information, features of a product…) compared to novices. This higher capacity to understand attributes results in an information processing style different from the one used by novices. Being able to link physical attributes to performance, experts use a more analytical and evaluative processing and are able to reformulate as opposed to repeating literally the arguments presented in an ad, as evidenced by Maheswaran and Sternthal (1990). In this experimental design, participants evaluated a computer and listed the thoughts they had while processing the information, following exposure to a description of a computer. Expertise was measured using a quiz, and two factors were manipulated: message type (attributes; benefits; attributes and benefits) and the degree of motivation (high vs. low). Elaboration was measured using a thought-listing exercise and was composed of several measures: number of thoughts listed by participants and type of thoughts based on a classification in four categories (attribute-oriented thoughts, attribute recall thoughts, categorization thoughts and simple evaluative thoughts). The results showed that, as far as experts were concerned, higher processing of information depends on

degree of motivation and format type. Under high motivation, high processing of information among experts occurred when the message contained only attributes or a mixture between attributes and benefits. Under low motivation, only the attribute version of the message led to high elaboration among experts. In both cases, experts elaborated information, which was evidenced by the high proportion of attribute-oriented thoughts relative to attribute recall thoughts. In other words, when motivated to process information or given the format they preferred (attribute only), experts did not just reproduce the information that had been provided to them but translated it into their own words and integrated it within their own associative network to make a judgment about the product.

Finally, when evaluating a message, experts show a preference for attribute-based in contrast to literal description of benefits. Not only are experts more able to process attributes, but they also prefer message and ads using an attribute-based as opposed to a benefit-based structure, as shown in the study conducted by Su, Comer and Lee (2008). Using an experimental design, the authors investigated the underlying mechanism behind consumers' satisfaction when using interactive recommendation agents. To enhance external validity, the researchers used a real website where MP3 players were displayed. In addition, they manipulated the format of the recommendation (attribute-based format agent; benefit-based format agent; no agent). Participants had to choose a product and indicated the perceived benefits and costs of the information search and decision-making process, as well as their satisfaction with the outcome. The result of Su, Comer and Lee (2008)'s study revealed an interaction between type of format and level of expertise. While both experts and novices preferred interactive recommendation agents as opposed to none, they differed in the type of format they preferred. Indeed, novices perceived more value in the decision-making process and were more satisfied with the outcome when the interactive recommendation agent used a benefit-based format (i.e., asking questions about their end needs). In contrast, experts judged the decision process to be more beneficial and were more satisfied with the outcome of the process when the interactive recommendation agent used an attribute-based format (i.e., listing various product attributes, asking consumers to rate the importance of each attribute, and screening the products based on their preference). Thus, using a web-based interface and interactive recommendation agents, experts' propensity to process attributes and use them to make their own evaluation was evidenced.

Hong and Sternthal (2010) showed that experts' preference for specific types of processing influences the way they evaluate brands. Their research results showed that experts gave a better evaluation of a brand when information prompted a sense of progress (i.e., eliminating alternatives quickly to narrow the scope) rather than gave a detailed assessment of each alternative. In addition, experts gave higher brand evaluations when information was displayed at a higher construal level. Brand evaluations were higher when information was presented in an abstract way as opposed to a concrete way (study 3) and when the message focused on future as opposed to present benefits (study 4).

A more selective and adaptive processing of information among experts

Experts vary in type and amount of information processing depending on the demand of the context. In this respect, Maheswaran (1996) showed that experts processed information differently depending on the degree of ambiguousness of the information presented to them. In his studies, participants were asked to read a description of a product containing several attributes. As part of this experiment, the researcher manipulated information about the country of origin. Half of the participants were told that the product came from a country with a positive reputation in the domain (i.e., a German sound system); the remaining participants were informed that the product came from a country with an unfavorable reputation in the product category (e.g., a Thai stereo sound system). Later, participants evaluated the product and listed the thoughts they had while processing information. The results are in line with the hypothesis that experts adapt their information processing to the context involved. Whereas in unambiguous attribute conditions, experts ignored the country of origin and focused their attention on attribute information to make a judgment, their processing differed when information was ambiguous. Indeed, when the product contained both positive and negative attribute information, experts' recall was influenced by the country of origin. More specifically, when the country of origin sent a positive signal (e.g., Japanese electronic device) and when the ads contained both strong and weak attributes, experts focused on strong attributes and ignored weak ones. Thus, when dealing with information that was unambiguous, experts' information processing and judgment were not influenced by peripheral cues, such as the country of origin. However, when processing ambiguous information, experts just like novices took into account the country of origin to select

information and make a judgment. Thus, experts seem to be able to adapt their information processing strategy and evaluation to the specificity of the situation involved.

In addition, experts adjust their level of information processing to the complexity of the situation as evidenced in Brucks (1985). Participants had the possibility to visit several stores, to ask questions about the attributes of various sewing machine models and to ask for dealer evaluations. A key originality of the methodology stems from the way participants could ask questions about attributes. To overcome the drawbacks of display boards comprising a limited set of brand-to-attribute information, Brucks conceived a participant-to-computer interface. Using this interface, participants could type in any type of questions regarding the sewing machine models' attributes and a human confederate translated their questions in one of the hundred pre-prepared answers. Such a design gave participants the impression they were interacting with a computer able to understand and answer their questions with precision. Thus, greater external validity was reached, and participants were encouraged to use their stored knowledge of attributes, without being limited to a reduced and pre-established set of attributes. In addition to measuring participants' knowledge, Brucks included an additional independent variable: degree of complexity of the usage situation. Participants were randomly assigned to either a simple or complex usage situation. Brucks (1985) evidenced an interaction effect between usage situation and objective knowledge on the way consumers searched for information. Specifically, in a complex usage situation (i.e., putting oneself in the mindset of a frequent and expert sewer), objective knowledge was positively related to variability of search, number of attributes taken into consideration and negatively related to degree of inappropriate search. Opposed to this, in a simple usage situation (i.e., imagining an infrequent user with simple needs), objective knowledge was not related to variability of search, degree of inappropriateness of search and number of attributes considered. Brucks (1985) thus revealed experts' capacity to adapt their search to the demand of the situation: using their rich stored knowledge base only in complex usage situations in which such information is useful.

A different way of transferring information: abstract analogies used by experts versus simpler comparison for novices

Their capacity to process complex attributes influences experts' learning of new information, attitude formation and decision-making. First, their capacity to understand the meaning of attributes and their functions allows experts to transfer information from one product category to another, by identifying common relational structures between different product categories. Thus, experts are able to acquire new information by analogy (e.g., a phone in which pre-saved numbers can be stored can be compared to a calculator to the extent it allows to make automatic operations that hitherto needed to be made manually). In contrast, novices are limited to comparisons based on physical resemblance between a source and a target category (for instance; *my modem looks like a PlayStation, I should be able to find a modem in a video game store.*)

In addition, when comparing two products, experts are able to use their abstract knowledge to make judgments and inferences based upon structural properties of base and target. We can take the example of the cell phone product category to illustrate this capacity. Suppose that a group of experts need to compare two cell phones and that talk time is associated with standby time in their base knowledge set. In such a case, experts would be able to infer the target's battery talk time if they know base standby and talk time in addition to target standby time. In contrast, novices will make inferences based on similarity to an exemplar (Gregan-Paxton, 2001). Suppose they realize that a WebTV device looks similar to a video-game device (for instance, both are dark colored and have the same size), novices are likely to engage in unrestricted transfer of information from the video-game device to the WebTV. For instance, novices could infer, from the physical resemblance of the two devices, that WebTV, similarly to video game consoles, will be available in toy stores. In contrast, in this given context, experts will realize that, though video game consoles and WebTV share similar physical features (e.g., color, size…), they do not share the same structural features. For instance, experts recognize for instance that a videogame system delivers content via an internal source (cartridge), whereas the WebTV delivers content via an external source (e.g., phone lines, website, servers…). In such a

case, experts will restrict their transfer of knowledge to the product's physical features (Gregan-Paxton & John, 1997).

An attention paid to different type of information and cues

First, experts have the capacity to make sense of a greater variety of information types and can interpret these data using their existing cognitive structures, whereas novices tend to use simpler strategies when comparing different products. Typically, novices use numerical information in a simpler way than experts (e.g., comparing two objects based on numbers and choosing the bigger as opposed to understanding the meaning of the indicator). In contrast, experts have the capacity to make sense of complex verbal and numerical information and to use it to take decisions. This does not mean, however, that such capacities result necessarily in better and optimal decision-making. For instance, Sen (1998) showed that, because they could make more sense of the verbal information displayed to them, experts (vs. novices) were more prone to use heuristics to ease the decision-making process in a complex choice task. Indeed, facing the difficult structure of a choice task based on verbal information, experts were more likely than novices to yield to the "attraction effect". This heuristic occurs when the introduction of a decoy dominated by the target option (e.g., good food, fair service versus fair food, bad service), but not by its competitor (average food, excellent service), changes the preference of a consumer between the target and its competitor. As such, the attraction effect violates similarity and regularity of judgment in choice contexts. Thus, in some circumstances, experts' capacities to process complex information can lead them to use biases in their decision-making process, as oppose to examine thoroughly the merits of each option.

In addition to their ability to make sense of a greater variety of information types, experts are able to use diagnostic cues in a purchase context. For instance, in a retail product comparison context, high objective knowledge consumers use high diagnostic utility cues (product brand name as opposed to retailer name, for instance), while low objective knowledge individuals rather use non-diagnostic cues, such as retailer name (Cordell, 1997). Specifically, using a category in which the price-to-quality relationship is significant (i.e., 35 mm camera) and after measuring consumer knowledge, Cordell (1997) showed that expert users use relevant contextual

cues (e.g., brand name, country of origin) and neglect non-diagnostic ones (e.g., retailer name) to determine the price they are willing to pay for a given product. Concretely, high objective knowledge consumers valued a well-known brand with a good reputation (Nikon) higher than an unknown brand, whereas low objective knowledge consumers gave a weaker premium for the quality brand. In contrast, novices gave a higher premium for a product coming from a full-line department store as opposed to a discounter, whereas expert users paid a weaker premium to the department store. In other words, when information about the product is incomplete, expert users are able to use relevant extrinsic cues (e. g., brand name, country of origin…), while novice users tend to use less diagnostic and less relevant cues (e.g., retailer name).

Thus, experts have the capacity to make sense of complicated information and a preference to use "raw information" that they will be able to interpret using their own knowledge network to come eventually to an evaluation or a decision. Being able to distinguish diagnostic information from irrelevant cues (Cordell, 1997), they attach a high importance to be active in the evaluation and decision-making process in contrast to taking information at "face value" (Su, Comer, & Lee, 2008). However, their higher capacity to process complicated information can sometimes lead to sub-optimal decision-making and use of heuristics (Sen, 1998) when the information load is too high.

1.3.4 The confidence of expert can hamper motivation to process information

Several mechanisms may drive high (vs. low) objective knowledge consumers to be less motivated to pay attention to incoming information.

A reduced risk perception of experts

In an attempt to understand the factors influencing the likelihood to search for information and adopt genetically modified food, Klerck and Sweeney's (1997) survey-based empirical study highlighted the link between knowledge and risk perception. Their structural equation model showed a negative link between objective knowledge about genetically modified food and perception of psychological risk, which in turn led consumers to reduce their search for

additional information and increased their tendency to buy genetically modified food. Thus, knowledge about genetically modified food is negatively linked to search for additional information and positively linked to potentially risky behaviors, namely genetically modified food consumption. However, the survey-based methodology used in this study leaves important questions unanswered. Noticeably, one could wonder whether high knowledge consumers are dispositional risk seeker or whether, having already engaged in risk-reducing activities in the past (i.e., extensive information search), they can, at a given moment in time, bear a higher degree of risk than low objective knowledge consumers. If so, high objective knowledge individuals could be risk seekers and information search avoidant only to the extent they perceive themselves knowledgeable enough about the context of consumption and the types of products described. Such hypothesis would be in line with the findings of Wood and Lynch (2002) that showed that experts engaged in extensive information search only to the extent that newness cues (e.g., format) were provided to them. Additional data using experimental methods would be useful to assess more clearly the directionality of the link between objective knowledge, risk perception and adoption of risky behaviors.

Despite its limitation, Klerck and Sweeney (1997)'s study is an interesting step toward linking objective knowledge and adoption of potentially risky behaviors. Based upon the result of that study, one could infer a link between objective knowledge and confidence. Indeed, even though the authors did not measure confidence in their design, the reduced perception of psychological risk and lower intention to search for additional information they observed could stem from a higher confidence brought by consumer knowledge. Such a hypothesis remains, however, to be tested before firmer conclusions can be drawn.

Expertise and complacency: neglecting information

In line with the hypothesis that a higher degree of knowledge would result in a higher level of confidence, the results of the Wood and Lynch (2002) experiments are worth further consideration. In these studies, the researchers investigated the role of prior knowledge in learning new product information. The results highlighted a learning deficit of high knowledge consumers, due to a "complacency mechanism."

In their first study, objective knowledge was manipulated by randomly assigning participants to two conditions. In the high knowledge condition, they were given information about the focal domain (allergy medication), while in the low knowledge condition, they were given information about a different domain (tooth whitening). Thus, by providing the same amount of information in the two conditions, the researchers avoided confounding objective knowledge and involvement in the study. Next, participants were shown the focal new product in two different ways depending on the condition they were randomly assigned to. In the newness cues condition, the product was presented as dissimilar to existing ones (new drug form, different side effect). In the no newness cue condition, the product was presented as similar to existing ones (same drug form, same side effects.) Finally, participants took part in a memory quiz about the new product shown to them previously. The results evidenced an interaction between the type of cues (newness versus no newness) and objective knowledge. When no newness cues were presented, low objective knowledge participants outperformed high knowledge participants in the memory quiz. However, when newness cues were presented, the opposite pattern was observed: high objective knowledge participants outperformed low objective knowledge participants. Thus, when no newness cues were present, high knowledge participants seemed to rest on their laurels, neglecting incoming information and focusing on their existing knowledge base.

Next, to ensure the motivational origin of the learning deficit of high objective knowledge participants evidenced in the first study, Wood and Lynch (2002) manipulated motivation prior to encoding. Given a monetary incentive to memorize information prior to encoding, higher prior knowledge participants significantly outscored lower prior knowledge participants, independent of the type of cues provided to them (Wood & Lynch, 2002; study 2). Converging results were found when objective knowledge was measured instead of being manipulated (Wood & Lynch, 2002; study 3). Thus, this research shows that high knowledge consumers are able to learn more but learn less due to motivational deficits. Inferior learning of new product information by those with higher prior knowledge is caused by weaker motivation at encoding rather than reconstructive failure at retrieval.

Similar types of results were found in Poynor and Wood (2009). In their first study, the two authors manipulated objective knowledge by giving half of the participants information about the focal domain (charity organization). In addition, subcategory format information was

manipulated. Participants were either told that charity websites are structured by geographical location or by types of focus (health care, literacy or environmental concerns). Next, participants were shown a website that described charities using either a geographical or type of focus categorization. Finally, participants completed a 10-item memory quiz. Results showed that when high knowledge participants chose from the expected format, they did not memorize better than low knowledge participants. In contrast, when they had to choose from a website using an unexpected format, high objective knowledge participants significantly outperformed low objective knowledge individuals. Thus, without newness cues (i.e., unexpected subcategory format), high knowledge consumers were less motivated to process information and likely to yield to complacency. Next, Poynor and Wood (2009) documented the motivational origin of high objective knowledge participants' weaker memorization under the expected format condition. When they were given a monetary incentive (i.e., a possibility to participate in a lottery with a 50 dollar prize), high knowledge consumers outperformed low knowledge participants in the two formats (expected and unexpected) conditions. In contrast, when no incentive was given to them, high objective knowledge consumers did not outperform low knowledge participants in the expected format condition (Poynor & Wood, 2009; study 2).

Thus, Wood and Lynch (2002) and Poynor and Wood (2009) highlighted the motivational origin of the complacency mechanism found among high objective knowledge consumers. When no incentives were expected and when no newness cues were present, high knowledge consumers were not motivated to process information as thoroughly as their cognitive capacities would have allowed. These results show that knowledge may be detrimental to attention paid to new information unless clear incentives are given to high objective knowledge consumers.

1.3.5 Summary and implications: the expert dilemma

The preceding literature review on objective knowledge and information processing highlights the conflicting forces at stake among experts when processing new data, a situation which could be referred to as the "expert dilemma" (Figure 9). Indeed, the rich mental content and cognitive skills enabling experts to make sense of a large number of information is also likely to de-motivate them to process incoming information extensively.

Figure 9: Conflicting forces underlying the relationship between objective knowledge and information processing
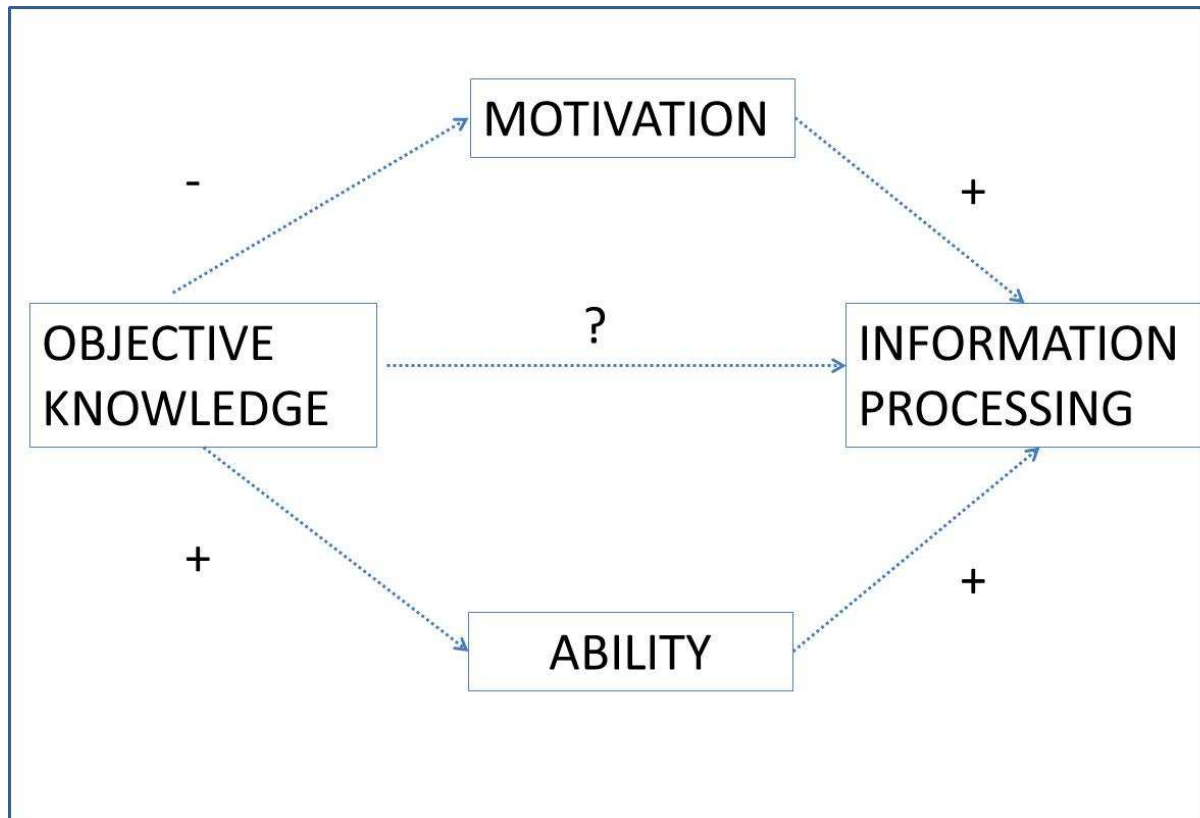
Thus, while objective knowledge gives consumers the capacity to process an extensive amount of domain-related information, consumer research has also evidenced the negative effect knowledge can have on consumers' motivation to process new information, possibly due to a complacency mechanism present among high objective knowledge consumers. This leads to a complex picture of the relationship between consumer knowledge and information processing, wherein antagonistic forces (i.e., high ability vs. low motivation) are at stake.

1.4 Impact of Subjective Knowledge on Information Processing and Decision Outcomes

In this section, we review existing literature linking subjective knowledge, information search and decision-making. We start with a definition and by a description of the different methods that can be used to measure and manipulate subjective knowledge, which is summarized in Table 5. Then, we give a detailed overview of empirical evidence in economy and consumer research linking subjective knowledge with cognitive and behavioral outcomes. In doing so, we

make a distinction between studies measuring and those manipulating subjective knowledge. We conclude by highlighting the important link that may exist between subjective knowledge and confidence, which calls for conceptual development and studies taking into account the possible moderating impact of individual factors influencing consumers' initial confidence levels.

1.4.1 Two different ways of studying subjective knowledge: measuring or manipulating

Consumer subjective knowledge can be defined as what consumers believe they know in a given domain (Park & Lessig, 1981). In consumer research, a key distinction has to be made between studies measuring and manipulating subjective knowledge.

Measuring subjective knowledge

Studies that measure subjective knowledge (e.g., Brucks, 1985; Carlson et al., 2007; Knight, Mather & Holdsworth, 2005; Kwon & Lee, 2009; Park et al., 1994; Phillips, 1993; Radecki & Jaccard, 1994; Selnes & Gronhaug, 1987) generally include one to five self-report questions tapping into several dimensions of subjective knowledge. First, typical subjective knowledge questions include a general assessment of consumer's subjective knowledge in absolute terms, such as "Rate how knowledgeable you are about…" or "How would you rate your knowledge about…" (Knight et al., 2005). Another type of subjective knowledge question assesses participants' knowledge compared to an average person (Brucks, 1985). Additionally, a question about participants' perceived familiarity can be added, such as "circle one of the number below to describe your familiarity with…" (Brucks, 1985). When assessing subjective knowledge, most of the time, a Likert scale comprising items with five to seven points ranging from "not at all knowledgeable" to "extremely knowledgeable," "not familiar" to " extremely familiar," "one of the least knowledgeable" to "one of the most knowledgeable" is used. A median split is then frequently conducted to distinguish high subjective knowledge from low subjective knowledge consumers.

Manipulating subjective knowledge

Research manipulating subjective knowledge is scarcer (Hadar, Sood & Fox, 2011; Heath & Tversky, 1991; Moorman et al., 2004, Park et al., 1988; See, 2009; Tversky & Fox, 1995; Xu & Wyer, 2010). Two main methodologies have been used to manipulate subjective knowledge.

The first type of methods is based on false feedbacks. Participants are asked to take part in a quiz, and a false feedback is given to them, informing telling them that they belong to the 10th (low subjective knowledge) or 90th (high subjective knowledge) percentile, depending on the condition they have been assigned to (Moorman et al., 2004; Park et al., 1988). To enhance the manipulation, the quiz difficulty level can vary between conditions; easy versus hard questions (Park et al., 1988). Another possibility is to provide participants with the answer sheet following a quiz and ask them to score their performance and write down their rank, based upon a score distribution that differs between conditions. This latter option strengthens the participants' involvement with the feedback given to them as they take an active part in calculating their own score. A more indirect way of using this "feedback-based" methodology is to deliver the same type of information with different degrees of complexity and technicality (Hadar, Sood & Fox, 2011, study 3). If the message is delivered in complex terms that participants may not be able to understand and process, they may be led to reflect upon their lack of knowledge. In this case, the negative feedback is self-delivered. A key limitation of this method, however, stems from its potentially asymmetrical nature depending on conditions. Indeed, whereas it is relatively easy to imagine a participant reflecting negatively about his own competence when he does not understand a message, it is more difficult to imagine the same participant reflecting positively about his own knowledge because he understands a message delivered in simple terms. Thus, though the method may be effective in helping to reduce the subjective knowledge of participants, it may be more difficult to induce increase in participants' subjective knowledge using such self-inflicted and "suggested" feedback.

The second approach is based on the idea developed by Heath and Tversky (1991) and Tversky and Fox (1995) that subjective knowledge is a comparative process. According to them, we deem ourselves knowledgeable or ignorant in a given topic relative to a reference point, which can be another individual, another domain, or another period of time. Thus, by altering the reference point of a given individual, we may influence his perception of knowledge. A typical

example is given in Tversky and Fox (1995)'s study 6, which decreased participants' subjective knowledge about finance by priming them with either an expert source (i.e., professional stock analysts). The same methodology was used in See (2009)'s study 1, which manipulates participants' subjective knowledge about environmental policy by telling them that the same policy will also be evaluated by a panel of environment experts or by a group of high-school students interested in social science (See, 2009). Though this second approach may be subtler, non-intrusive and easier to implement, its effects on perception of knowledge may be weaker as it is more indirect. Indeed, it supposes that participants will respond to the priming by reassessing their own perception of knowledge, which may be contingent upon personality traits such as need to evaluate, for instance.

Table 2: Measuring or manipulating subjective knowledge: a review of the different methods

Method	Definition	Advantages	Drawbacks	References
Measuring subjective knowledge	Subjective knowledge assessed using 1 to 5 self-report items, typically including subjective knowledge measured in absolute and relative terms, in addition to perceived familiarity	Easy to administer Strong reliability of the scales used in the literature	Use of subjective knowledge measurements prevents from inferring causal links between subjective knowledge and cognitive & behavioral outcomes	Brucks, 1985 Carlson et al., 2007; Knight, 2005 Kwon & Lee, 2009 Park et al., 1994 Phillips, 1993 Radecki & Jaccard, 1994 Selnes & Gronhaug, 1987
Manipulating subjective knowledge using false feedback	Giving false feedback (easy versus hard) to individuals following participation to a knowledge quiz	Strong manipulation likely to affect significantly level of subjective knowledge	Ethical concerns linked to the use of deception device Time consuming to administer	Hadar, Sood and Fox, 2011; Moorman et al., 2004; Park, Gardner & Thukral, 1988
Manipulating subjective knowledge via switching participants reference point	Priming participants with novice versus expert source to alter their perception of knowledge about the domain	Subtle manipulation Easy to implement Non-intrusive Less aversive psychological consequences than subjective knowledge manipulations based on feedback	Being "softer" than false feedback manipulation, effect on participants' subjective knowledge is not always substantial	Heath and Tversky, 1991 Tversky & Fox, 1995 See, 2009

In consumer research, two different types of studies dealing with subjective knowledge and information processing have to be distinguished: those manipulating this construct and those measuring it. Findings from correlational studies measuring subjective knowledge and assessing its relationship with information processing reveal a complex picture, as highlighted in the next section.

1.4.2 Measurement of subjective knowledge and information search: conflicting conclusions from consumer research and social psychology

The motivation hypothesis: subjective knowledge as a driver to engage in information search and domain-relevant behaviors

A significant number of studies highlight the role played by subjective knowledge as a driver to engage in information search and domain-relevant behaviors.

First, the correlational analysis conducted by Raju, Lonia and Mangold (1995) established a positive link between subjective knowledge and information search. In this study, participants first filled in measures aimed at assessing their objective and subjective knowledge, as well as familiarity with videocassette recording (VCR). Next, they participated in a purchase scenario, in which they could search information within a brand-to-attribute matrix. Subjective knowledge was positively associated with information search. However, a key limitation of this finding is that, though subjective knowledge (but not objective knowledge and familiarity) was significantly related to increased information search, the explained variance was shared with other factors. Thus, experimental research manipulating subjective knowledge was called for by the authors to disentangle the effect of subjective knowledge from other types of knowledge (familiarity, objective knowledge). Raju et al. (1995) speculated that increased confidence associated with subjective knowledge may have encouraged high subjective knowledge consumers to search for more information. However, further research is needed to account for potential differences in confidence between high and low subjective knowledge participants.

More recently, Moorman et al. (2004)'s study 3 has shown that subjective knowledge motivates consumers to make consumption choices consistent with their domain of alleged expertise. In this study, a sample of consumers was selected while shopping in one of 20 categories and asked to complete a one-page survey. As part of this survey, subjective and

objective knowledge with respect to nutrition were measured. Overall healthiness of each of the two categories was then assessed. Results indicated that subjective knowledge but not objective knowledge in nutrition knowledge was a significant predictor of category healthiness. In other words, if individuals perceived they were knowledgeable about nutrition, they were more likely to select healthier category than low nutrition subjective knowledge consumers. Thus, subjective knowledge seems to work as a motivator, likely to drive people to engage in selective screening of information in their consumption environment.

Besides, a growing number of correlation studies measuring subjective knowledge have shown that subjective knowledge enhances the consumer tendency to engage in domain-relevant behaviors, to a greater extent than objective knowledge. Thus, subjective knowledge of recycling behavior is positively correlated to pro-ecological behaviors, such as recycling, actions aimed at reducing greenhouse-gas emissions, and political action behaviors (Ellen, 1994), and predicts participation levels in a recycling program to a greater extent than objective knowledge (Sénécal & Bergéron; 2003). In a different domain, subjective knowledge in biotechnology has been associated with support for biotechnology applications (Knight, 2005). The results of this researcher's survey showed that subjective knowledge, but not objective knowledge, was a reliable predictor of support for plants' genetic modification. Finally, Phillips (1993) showed that subjective knowledge is a good predictor of the decision to engage in HIV-testing. Based upon a large sample (n=29 659) from the National Health Interview Survey, a significant relationship between subjective knowledge about AIDS and HIV-testing was found. In contrast, objective knowledge about AIDS was not significantly associated with HIV-testing use. Thus, the correlational studies listed above support the view that subjective knowledge can be a better predictor of certain types of attitudes, commitments and, ultimately, behaviors than objective knowledge. Such an observation can be put into perspective with Selnes and Gronhaug (1986)'s home computer study, in which the authors concluded that, "it can be argued that objective measures are preferable when research is focusing on ability differences, while subjective measures should be preferred when preoccupied with motivational aspects of product knowledge." (Selnes & Gronhaug, 1986, page 71)

Thus, a growing number of studies concur to suggest that subjective knowledge is associated with an increase in motivation to engage in domain-relevant actions. However, a key limitation of these studies is their correlational nature, which leaves unanswered whether subjective knowledge is a motivator to engage in domain-related behaviors or whether people who engage in a given behavior are also the most prone to acquire information about the

given domain. In contrast to the aforementioned work, another series of studies led to the conclusion that higher level of subjective knowledge should result in less information search.

A negative link between subjective knowledge and information search

Radecki and Jaccard (1994) found a negative link between subjective knowledge and new information search. In their study, participants were asked to provide information about their subjective knowledge in two different topics (nutrition and birth control). Next, they were given an information search task, in which they were offered the possibility to acquire information about each of the focal domains prior to answering domain-related questions. Such a protocol was useful to test whether subjective knowledge stirs up enough confidence to encourage participants deeming themselves knowledgeable to shorten the new information search phase. Radecki and Jaccard (1994)'s information search task was based on a brand-attribute matrix with the use of an information-display board. Results showed a negative link between subjective knowledge and extent of information search. Radecki and Jaccard (1994) concluded that individuals who believed they were poorly knowledgeable in a given domain sought new information to compensate their lack of knowledge. In contrast, individuals who perceived they were sufficiently knowledgeable about a given topic did not engage in extensive information search prior to answering domain-related questions. Such a result is in line with the aforementioned hypothesis that subjective knowledge goes along with an increased confidence in one's inner stored resources prior to engaging in a task requiring domain-related information. Such a confidence in one's inner resources can thus be detrimental to new information search.

On a related note, Brucks (1985) found that, independent of objective knowledge, subjective knowledge influences the type of search strategy used by participants and reduces utilization of external advices. In this study, in addition to objective knowledge, subjective knowledge was measured, which allowed to set apart the unique contribution of each of these two types of knowledge on cognitive and behavioral outcomes. Increase in subjective knowledge, but not objective knowledge, was associated with a decrease in the utilization of salesperson recommendations. Thus, subjective knowledge goes along with a tendency for consumers to rely on their own evaluative skills rather than on external advices. We will explore in a later section a possible underlying mechanism behind these effects, namely

consumer confidence in their choice. In this respect, the decision to use external recommendations could be determined by consumers' level of confidence in their capacities to make the right choice rather than on actual cognitive limitations induced by lack of knowledge.

Evidence of an inverted U-shaped relationship between subjective knowledge and information search

A possible way of reconciling the contrasted findings listed above would be to propose that the relationship between subjective knowledge and information search is non-monotonic and that some consumer samples have not covered the whole spectrum of subjective knowledge levels. For instance, Raju et al. (1995)'s study pointing toward a positive link between subjective knowledge and information search may be driven by the relatively low level of subjective knowledge about VCRs in the studied population. Among a population of low familiar consumers, the supposedly high familiar group may be in fact just moderately familiar in absolute terms. Indeed, consumers who are moderately familiar with VCRS could engage in higher levels of information search than low familiar ones, due to low familiar consumers' lack of confidence in their search capacities. However, high levels of familiarity in absolute terms could be associated with reduced information search. For instance, an expert about VCRs may find it unnecessary to search for external information when making a purchase decision in this product category. Because Raju et al. (1995)'s sample was made of university student, it is difficult to determine whether the effects of high familiarity levels on information search have been investigated by the authors. This calls for the development of consumer studies wherein real experts (vs. novices) are recruited, as suggested for instance by Shanteau (1992). In brief, the possibility that average levels of familiarity would maximize the amount of information search, while lower and higher levels of familiarity would be associated with reduced information search cannot be ruled out.

In support of this hypothesis, preliminary evidence of a non-monotonic relationship between subjective knowledge and information search is found in Bettman and Park (1980). Measuring information processing in a choice task based on a brand to attribute matrix, Bettman and Park (1980) showed that the highest level of information processing is reached under moderate subjective knowledge. In this research, participants completed a decision-

making task regarding a microwave oven and were first asked to narrow down their choice scope and then choose their preferred model. As part of the decision-making process, participants were asked to verbalize their thoughts, which were then categorized. Results showed an inverted U-shaped relationship between levels of familiarity and information processing. Usage of prior information was higher for low and high familiarity groups than for moderately familiar students. Such effect was not contingent upon the decision-making process stage, as it held both for choice reduction and preferred product selection steps. Thus, highest levels of information processing were reached at moderate levels of knowledge. The authors hypothesized that at low knowledge and familiarity levels, participants may not be able to process incoming information and need to rely on a very restricted set of prior attitudes and usage database. In contrast, at high familiarity levels, participants may be able to process incoming information but prefer using past knowledge, experience and attitudes to guide their choice. Thus, possibly due to a motivational mechanism, higher levels of processing of new information were reached at moderate levels of knowledge and familiarity.

One of the underlying reasons behind high subjective knowledge consumers' reduced information processing could be a higher confidence in their capacities. High subjective knowledge consumers may deem themselves knowledgeable enough to spare additional (and potentially useless) information processing. Such a hypothesis could be put into perspective with the results obtained in studies focusing on consumer confidence.

A possible explanation of the relationship between subjective knowledge and information search: consumer self-confidence

Several consumer research studies point toward a positive link between consumer subjective knowledge and confidence. Locander and Hermann (1979) were the first to show that self-confidence influences information seeking in a consumer context. In their survey-based study, participants answered questions about their personality traits (e.g., general self-confidence, anxiety, specific confidence about different consumer product categories…) and about the way they would respond to five different purchase situations covering the whole spectrum of performance and social risks, from very low (paper towels) to very high (stereo). An important finding of Locander and Hermann (1979) is the influence of category-specific

confidence on risk reduction strategies used in high-risk product categories. High self-confident consumers relied heavily on direct experience (e.g., direct observation, experience…) as opposed to external sources (e.g., impersonal recommendations, mass media advertising…) to take a purchase decision within the concerned product category. In contrast, the pattern of risk-reduction used by low self-confident consumers showed a strong reluctance to use direct experience. Thus, this early study gives preliminary support to the idea that subjective knowledge (a notion close to the way the authors operationalized self-confidence in their study) may give consumers the confidence needed to rely heavily on their own resources, such as observation and direct experience, instead of paying attention to impersonal and external sources of information.

On a related note, Park and Lessig (1981)'s results hint toward a positive link between subjective knowledge and self-confidence. Park and Lessig assessed the link between "familiarity" (defined as "what the subjects think they know") and decision-making strategy in a purchase scenario regarding microwave oven. Both at the choice selection (identifying acceptable options) and reduction (choosing one's favorite model) stages, high familiarity participants were more confident in their choice than low familiarity participants. As a result, one can propose that lack of confidence induced by low familiarity can stimulate individuals to search for additional information, a hypothesis in line with the aforementioned study (Radecki & Jaccard, 1994).

Although no studies have directly measured the link between subjective knowledge and confidence, research seems to indicate that a high level of subjective knowledge combined with low objective knowledge can drive consumers to become overconfident in their judgment and take risky decisions. In a financial context, Kwon and Lee (2009) showed that consumers who combine low levels of objective knowledge with high levels of subjective knowledge make the riskiest choices. When consumers' knowledge perception exceeded their real skills, they were more easily influenced by external reference points (i.e., presence of another financial product), engaged in biased processing of attribute information, and preferred riskier options to safer ones. Thus, poor calibration between objective knowledge and subjective knowledge (high subjective knowledge/low subjective knowledge) may amplify biased information processing and consumer risk-seeking tendencies.

In brief, although the relationship between subjective knowledge and search for information has been investigated by many correlational studies, no firm agreement has been

reached regarding the relationship between those two constructs. While several findings converge in showing that high subjective knowledge may give consumers the needed confidence to engage in greater information-processing, other studies show in contrast that this very confidence may drive consumers to rest on their laurels, neglect incoming information and take risky decisions.

1.4.3 Manipulation of subjective knowledge and information search: limited evidence

Given prospect theory's important conceptual and methodological foundations to the field of subjective knowledge research, we start this part with a presentation of the major contributions of this economic theory to the subjective knowledge literature before reviewing experimental studies manipulating subjective knowledge in consumer research.

Insights from prospect theory

As part of a general effort to include psychological mechanisms and processes in economic models, prospect theory has documented the type of heuristics stemming from competence feelings. Heath and Tversky (1991) have developed the competence hypothesis, according to which people prefer betting on their own judgment rather than on an equiprobable chance event when they consider themselves knowledgeable about the topic. Subjective knowledge may thus lead individuals to violate probability principles and become overconfident in their judgment. According to the "competence" hypothesis proposed by the authors, perception of knowledge influences our willingness to bet on uncertain events: "The willingness to bet on an uncertain event […] depends on one's general knowledge or understanding of the relevant context. […] People prefer to bet in a context where they consider themselves knowledgeable or competent than in a context where they feel ignorant or uninformed. We assume that our feeling of competence in a given context is determined by what we know relative to what can be known." (Heath & Tversky, 1991, page 7) In support of this theoretical proposition, several past empirical results are good hints that people prefer betting in domains where their relative knowledge is higher; betting on future events as opposed to past events (Rothbart & Snyder, 1970), betting on boxes with known versus

unknown probability (Ellsberg, 1961), betting on skill rather than chance (Howell, 1971; March & Shapira, 1987).

In order to give empirical support to their theorizing the authors developed an experimental setting based on five studies, two of which deserve further attention given their relevance to our own field of investigation. First, Heath and Tversky (1991)'s study 1 showed that when people believed they were knowledgeable about an issue, they preferred betting on a domain-related uncertain event than betting on a chance game with the same probability of winning. Second, study 4 is particularly interesting, as it is one of the first attempts in behavioral research to manipulate subjective knowledge. In this experiment, the authors manipulated subjective knowledge by altering participants' reference point. In line with the authors' hypothesis, giving participants an expert (vs. a novice) as a reference point altered their perception of knowledge in the concerned domain. As inferring one's knowledge of a given domain is a relative process determined by comparison of one's level relative to the one of people present in the environment at the time of evaluation, exposure to a novice (vs. expert) source increased (vs. decreased) participants' perception of knowledge in the concerned domain. In turn, this subjective knowledge manipulation influenced participants' preferences. Holding probability of winning constant, people preferred betting in a domain they deemed themselves knowledgeable in, then on a chance game and eventually in the domain in which they deemed themselves ignorant.

Tversky and Fox (1995) attempted to examine the drivers of competence feeling or lack thereof. They highlighted the relative nature of "feelings of ignorance": "people's confidence is undermined when they contrast their limited knowledge about an event with their superior knowledge about another event, or when they compare themselves with more knowledgeable individuals." (Tversky & Fox, 1995, page 587) Two important points can be drawn from this definition. First, according to prospect theory, subjective knowledge is a matter of reference point. We perceive ourselves knowledgeable relative to a comparison point, which can be another individual, another topic or another moment in time or space. Second, the authors establish a link between confidence and subjective knowledge. In order to support the comparative hypothesis, a set of six studies highlights the relative nature of perception of lack of knowledge. Study 6, that manipulated subjective knowledge, is especially relevant to us. It was shown in this experiment that when participants were primed with people that were more knowledgeable than themselves (for instance, a professional stock analyst when having to choose between a risky financial bet and a sure payment), they

experienced a feeling of incompetence, which decreased their willingness to bet on their own judgment.

Thus, this set of two articles has built important theoretical and methodological foundations. Theoretically, Heath and Tversky (1991) and Tversky and Fox (1995) have highlighted the potential link between subjective knowledge and confidence. In their research, the authors showed that subjective knowledge could generate biases in the decision process, making people violate probability principles. Methodologically, these two contributions have shown that switching the reference point of individuals can alter their subjective knowledge. Different ways of manipulating consumers' subjective knowledge can be conceived based on these findings; priming them with a novice source (increased subjective knowledge) or an expert source (decreased subjective knowledge); giving participants very simple sets of descriptions (increased subjective knowledge) or very complicated ones (decreased subjective knowledge).

Manipulation of subjective knowledge and information search: findings from consumer research

In consumer research, to our knowledge, only a limited number of studies has manipulated subjective knowledge. Studies investigating the outcomes of subjective knowledge manipulation on consumer responses have followed three key directions: the relationship of this variable to information processing and search strategies, its influence on decision-making in choice tasks and evaluative contexts, its effect on consumer risk-seeking tendencies.

First, several studies have shown that subjective knowledge manipulations influence consumer information processing and search strategies. Noticeably, Park, Gardner and Thukral (1988) investigated the effects of subjective knowledge on information processing for choice tasks. Specifically, the influence of subjective knowledge on new information learning was examined and both objective and subjective knowledge were manipulated. Objective knowledge about Videocassette Recording (VCR) was experimentally induced by providing to participants a booklet with a different amount of information prior to the beginning of the experimental session, while subjective knowledge was manipulated via varying difficulty of a quiz and giving participants false feedbacks. Following the subjective knowledge manipulation, participants were given attribute information about VCR devices in three

different stages. Overall, the study indicated that high subjective knowledge consumers attach higher weight to information stored during the early stages of the session than to information acquired in a later stage. Independent of objective knowledge, lower subjective knowledge is associated with higher importance given to new information. In a different stream of research, Moorman et al. (2004) analyzed the link between subjective knowledge (manipulated via false feedback) and search location preferences. Using a computerized shopping environment, the authors explored whether high subjective knowledge would lead consumers to prefer shopping in locations consistent with their expertise area. In line with the authors' hypothesis, high subjective knowledge participants preferred shopping in categories consistent with their alleged expertise domain (i.e., knowledge about fat content). In their second study, Moorman et al. (2004) showed that high subjective knowledge participants' higher between-category selectivity was driven by need for consistency. When forced not to shop in a low-fat level category, high (vs. low) subjective knowledge participants reported a higher need for consistency. Thus, preventing high subjective knowledge consumers from shopping in knowledge-consistent categories activated their need for consistency. As a conclusion, in this research, the influence of subjective knowledge manipulations on consumers' environment selection is evidenced, as consumers prefer locations consistent with their alleged expertise domains. For instance, if consumers believe they are knowledgeable about health, their tendency to shop in locations associated with this knowledge – such as healthy places in the store - is increased. Subjective knowledge is thus associated with a greater selectivity between marketing environments. In addition, a bridge between knowledge and self-related properties is made. People prefer shopping in an environment in which they deem themselves knowledgeable and assert their need for self-consistency when they are hindered from doing so.

A second set of findings in experimental research manipulating subjective knowledge relates to the link between subjective knowledge and the confidence consumers hold in their own judgment when evaluating messages and policies, as well as when taking decisions. First, in an attempt to understand the possible reasons underlying support for public policies, See (2009) highlighted the influence of subjective knowledge on consumer evaluation strategies. Her research based on three studies (2 experiments, 1 longitudinal field survey) revealed that when individuals feel very knowledgeable about a policy domain, they rely more on their judgment to assess the prediction rather than on an overall impression of procedural fairness. Specifically, while high subjective knowledge citizens' support for a policy was driven by an

assessment of the outcome of the policy in their own life, low subjective knowledge citizens' support for a policy was driven by a consideration of whether the policy respected their conception of procedural fairness. Thus, low subjective knowledge citizens judged a public measure based on whether the decision process leading to the policy was in line with established antecedents of procedural justice (e.g., bias suppression, accuracy and stakeholder representation…). Thus, when their subjective knowledge is boosted, individuals use their own interest (assessment of a policy based on its costs and benefits for them) as opposed to external values (i.e., procedural fairness) to gauge public policy. In a related vein, Xu and Wyer (2010) showed that under high subjective knowledge, consumers develop enough confidence in their judgment to discredit a message coming from a non-credible source. In their second study, the two authors experimentally manipulated participants' subjective knowledge about vests by altering the difficulty of a knowledge quiz. Led to believe their knowledge was high, consumers judged puffery ads coming from a non-expert source less informative and evaluated the ad and the product displayed in the ad more negatively. In contrast, low subjective knowledge consumers were influenced by puffery ads in both source conditions (expert vs. non-expert source). Thus, when they are led to believe that the information source is less knowledgeable than themselves, consumers have enough confidence to judge puffery ads for what they are: containing complex but meaningless information in an attempt to persuade them. When they do not deem themselves more knowledgeable than the source, consumers are more likely to yield to the persuasive power of puffery ads.

Finally, several recent works highlight the link between subjective knowledge manipulations and consumer risk-seeking tendencies. First, in a financial decision-making context, Hadar, Sood and Fox (2011) established a link between subjective knowledge and risk-taking tendencies. The result was supported by a set of three studies that manipulated subjective knowledge in different ways: altering the perception of available information about a target fund by varying the number of pieces of information about an alternative fund in a choice task (study 1); varying the difficulty of a general finance quiz (study 2) and varying the technicality and amount of description about a fund (study 3). Results converged in showing that under low subjective knowledge, participants tended to choose the safer option, while under high subjective knowledge, they were more prone to opt for riskier funds. Thus, consumers can be driven to choose risky financial options if they are led to believe that they are knowledgeable about the product they are about to invest in. This can be achieved by

providing consumers simple descriptions of the target products or by giving them the impression they are able to process and understand the product information. Quite paradoxically, giving consumers too much technical information about risky investment in an effort to reinsure them can have a counterproductive effect. Indeed, an attempt to increase their objective knowledge can increase consumers' perception of lack of knowledge and, consequently, their reluctance to invest in risky products. As a conclusion, this research establishes bridges between subjective knowledge and risk-taking propensity of individuals: Increasing subjective knowledge may enhance risk-seeking tendencies among consumers.

In a health context, despite methodological limitations, Kim and Park (2011) offered interesting insights about the possible origin behind the relationship between subjective knowledge and risk-taking tendencies. The two authors analyzed the effects of specific persuasive appeals in direct-to-consumer (DTC) prescription-drug advertising. In their research, students were randomly assigned to one of four conditions based on a 2 (subjective knowledge: high; low) x 2 (framing: gain; loss) factorial design. Subjective knowledge was manipulated by exposing participants to either a familiar topic (allergy pills) or a non-familiar one (contraceptive pills), following pre-tests. Although the manipulation of subjective knowledge may be subject to criticism (comparing the outcomes of two different domains raises methodological issues), the result is intriguing. Indeed, people who were assigned to the non-familiar category were more sensitive to the loss-framed message. Indeed, the study revealed that a loss-framed (vs. gain-framed) contraceptive pill ad that focused on the costs of not taking a prescription drug was more (vs. less) influential on consumers' attitudes toward the emergency contraception medicine and intentions to seek further information about it, consult a health professional to discuss it, and intentions to use it. For the familiar category (i.e., allergy medicines), there was no difference in effectiveness between gain- and loss-framed DTC advertisements. This study highlights important conceptual links worth exploring in future research. Indeed, high subjective knowledge individuals' lack of sensitivity to loss-framed message may be put in relationship with studies assessing the link between subjective knowledge and risk-taking propensity.

1.4.4 Other possible variables at stake under subjective knowledge manipulations

Thus, extant consumer research reveals the complexity of the relationship between subjective knowledge manipulations and information search strategies. Such complexity may stem from the fact that subjective knowledge manipulations may be related to other constructs unaccounted for, such as confidence level, motivation and state self-esteem.

Subjective knowledge manipulation and confidence

First, while the literature has not definitely settled the issue of whether subjective knowledge should lead to higher or lower information search levels, extant research manipulating subjective knowledge (Hadar, Sood & Fox, 2011; Park et al, 1988, See, 2009; Xu & Wyer, 2010) hints toward a positive link between subjective knowledge and consumer self-confidence in their capacities. Subjective knowledge leads consumers to rely more heavily on their inner resources (e.g., past information stored in memory, inner capacity to assess the consequences of a given measure on one's own life, confidence in one's judgment…). In contrast, risk aversion, openness to external advices and respect for formal procedures are reduced by increased subjective knowledge. Such a confidence in one's own capacity, which characterizes high subjective knowledge consumers, can in turn influence information search and adoption of risky behaviors.

Building upon the link between consumer self-confidence and search capacity (Park & Lessig, 1981), one can wonder to which extent a subjective knowledge manipulation may influence consumer self-confidence and in turn search strategies. If so, we could expect different kinds of consumer responses following subjective knowledge manipulation, depending on consumers' initial level of confidence. Importantly, consumers' confidence in their inner resources (vs. external advices and external information search) may not only stem from a given state of knowledge but also by inner personality traits, such as self-esteem. Given high (vs. low) self-esteem consumers do not start with the same general confidence level, they can react differently to a manipulation boosting (vs. decreasing) their subjective knowledge about the study focal domain. To take into account this possibility, in the next part

of this dissertation, we will investigate the extent to which personality variables may be at stake when a subjective knowledge manipulation is conducted

Subjective knowledge and Motivation

Several consumer studies have highlighted the link between objective and subjective knowledge and motivation (e.g., Moorman et al., 2004; Poynor & Wood, 2009; Raju et al., 1995; Selnes & Gronhaug, 1987; Wood & Lynch, 2002…). However, it is still unclear whether subjective knowledge should boost (vs. decrease) consumer motivation. While some researchers highlighted that consumer knowledge can hamper motivation to process information (Wood & Lynch, 2002), other studies showed that confidence in their abilities gave consumers the motivation to search for information (Raju et al., 1995). A possible explanation of these contradictory findings may be the presence of underlying personality variables not accounted for in extant research. Again, an increase in subjective knowledge may boost low self-esteem consumers' motivation to process incoming information but decrease high self-esteem consumers' motivation. Increasing high self-esteem consumers' subjective knowledge may make them more likely to yield to the complacency effect evidenced in the literature (Poynor & Wood, 2009; Wood & Lynch, 2002)

Therefore, subjective knowledge may have different motivational effects depending on consumers' self-esteem. Taking these motivational effects of subjective knowledge into consideration is essential given the importance of motivation as a driver of memory performance. For instance, research has shown that lack of motivation at the time of information encoding hampers high knowledge consumers' learning of new product information (Wood & Lynch, 2002). There is also evidence about the role of motivation on information retrieval. Consumers under low involvement at the time of encoding but high involvement at the time of judgment engage in extensive memory search for product information and use it to form evaluations (Park & Hastak, 1994). In this respect, this research will investigate whether subjective knowledge manipulations influence motivation to encode (vs. to retrieve) domain-related information.

Subjective knowledge manipulations and ego manipulations

Finally, the false feedback-based subjective knowledge manipulations (e.g., Hadar, Sood & Fox, 2011; Moorman et al., 2004; Park, Gardner & Thukral, 1988…) are similar to ego manipulations reviewed extensively in the next chapter. In both cases, consumers take part to a test and receive false feedbacks about their performance.

Following James (1890)'s definition, self-esteem is the ratio of a given person's successes to his pretensions. Thus, successes and failures in life domains considered important influence a person's self-esteem. In this respect, to the extent a subjective knowledge manipulation taps into a self-relevant domain, it may influence consumers' state self-esteem level. As such, reviewing extant research regarding consumer responses to ego-threats (vs. boosts) is necessary to foreshadow the possible consumer responses to a subjective knowledge manipulation.

1.5 Summary and implication

In brief, the relationship between knowledge and information search appears complex and researchers failed to reach a firm conclusion regarding the relationship between those constructs. While some researchers highlight the fact that an excessive confidence in one's existing knowledge can reduce consumers' motivation to process and memorize additional information, other studies demonstrate a positive link between subjective knowledge and information processing. Indeed, processing information requires confidence in one's capacity to search for relevant information.

We propose that the link between subjective knowledge and information search may be moderated by personality variables. In this respect, self-esteem is specifically relevant. Defined as the evaluation of one's own social worth and competence (Tafarodi & Swann, 2001), self-esteem is highly related conceptually to the confidence people put in themselves and in their judgments. According to Branden (1969), self-esteem can be approached as the sum of self-confidence and self-respect. In other words, as self-esteem is linked conceptually to confidence, various levels of self-esteem could result in different types of reaction

following a change in subjective knowledge. While consumers who are dispositionally confident in their skills could be drawn in an overconfidence zone following a subjective knowledge boost, low self-esteem consumers could benefit from a subjective knowledge boost. Indeed, increasing low self-esteem consumers' subjective knowledge could give them the confidence they need to believe in their information processing skills. Such a hypothesis would be in line with past findings from consumer research showing that the highest levels of search take place at a moderate level of subjective knowledge (Bettman and Park, 1980).

For these reasons, our next chapter focuses on the role of self-related personality variables in the relationship between subjective knowledge and information processing.

Part 2: The role of the self in the relationship between subjective knowledge and information processing

In this chapter, building upon self-related motives and self-esteem literature, we explain why we believe self-esteem is likely to play an important role when subjective knowledge is manipulated. In line with Haugtvedt, Liu and Min (2008) who defended the use of individual difference scales to enable a process-level understanding of consumer researchers' investigated phenomena, we propose that taking into account self-esteem differences may help us reach a process-level understanding of the different types of reactions to subjective knowledge manipulations. Indeed, such manipulations may result in self-esteem changes and lead to different memorization strategies depending on consumers' initial level of self-esteem. In addition, we discuss two other individual differences that could moderate the relationship between subjective knowledge changes and memory for information, alternatively to self-esteem.

2.1 The importance of the self in relation to our current research: self-motives, self-esteem and subjective knowledge manipulations

The self is a human-specific reflexive capacity. It refers to a set of self-related mental representations, which have emotional and behavioral consequences. Being able to think about themselves, individuals can evaluate themselves, react affectively to these evaluations and behave according to these representations (Leary, 2007).

We propose that self-esteem may matter when manipulating subjective knowledge are at play for two main reasons. First, a subjective knowledge manipulation is likely to affect the state the self is currently in, which can lead to the activation of different types of self-related motives. As such, it is important to give an overview of the key self-related motives that can be at play when self-states are altered. Therefore, we start the next part with a presentation of the main self-related motives and their possible outcomes in relation to our studies. Second, the evaluative offspring of the self's reflexive properties, namely self-esteem, can play a key role in determining consumer responses to subjective knowledge changes. Indeed, the set of representations consumers hold about themselves can influence the way they react emotionally and respond to situations including subjective knowledge manipulations. Such a hypothesis is in line with evidence from the social psychology literature linking self-esteem to

different types of emotional reactions and behavioral outcomes following ego threats (vs. boosts).

2.1.1 The self as a dynamic motivational system: the self and self-related motives

Defined as a reflexive and dynamic motivational system, the self encompasses different types of goals: maintaining its current state versus changing it (Leary, 2007). Self-related motives refer to goals aiming at regulating states of self-awareness, self-representation and self-evaluation. Because a manipulation of knowledge is likely to affect the state the self is currently in, it is important to present the key motives likely to be stimulated in response to subjective knowledge manipulations. In the next part, we describe the three key motives that have been the most extensively studied and could be relevant to our framework: self-enhancement, self-protection and self-verification (Leary 2007).

Key self-motives

Self-enhancement is the drive to regulate the positivity of the self-concept and focuses on attaining, maintaining and regulating self-views (Hepper et al., 2010). This includes a great variety of behaviors and cognitive biases. Hepper et al. (2010)'s extensive literature review on self-enhancement describes three types of patterns associated with self-enhancement. The first of them is self-serving attribution (Snyder et al., 1976), which refers to the tendency to attribute positive events to one's own personal characteristics but attribute negative events to factors beyond one's control in order to maintain a positive self-image. A second bias associated with self-enhancement is the better-than-average effect by which people judge themselves more positively than an average person (Alicke & Govorun, 2006) and judge themselves more positively than objective information processing would require (Colvin et al., 1995). The better-than-average effect is likely to lead to biased information processing whereby people pay more attention to positive information about themselves and neglect negative self-related information, in an effort to maintain the positivity of their self-image. Finally, self-enhancement also has a metacognitive component: individuals' tendency to think they are not subject to self-enhancing, referred to as the bias blind spot (Pronin et al., 2002). In relation to our studies, as will be detailed below, we can conceive that consumers adopting self-enhancement motives might try, following negative feedbacks about their knowledge,

engage in activities aiming at maintaining a positive self-view. For instance, such consumers could scrutinize carefully information related to the concerned domain in an effort to restore a knowledge level aligned with their original self-perception.

Self-protection is the defensive side of the motivation to feel good about oneself. It consists in avoiding, minimizing and repairing negative self-views and is especially relevant in situations of ego-threats, and following negative feedbacks, rejections or comparisons with superiors. Typical self-protection strategies may entail seeking comparison with inferior people following a failure feedback (Wood et al., 1994), avoiding contact with a partner who has recently rejected us to stay away from a self-threat (Ford & Collins, 2010), and forging friendships with people who are not quite as high in ability or achievement than us to reduce self-threat risk (Hepper et al., 2010). Thus, self-protection is a defensive strategy aiming at reducing risks associated with exposure to potentially self-threatening situations. Whereas self-enhancement is about maintaining or increasing the positivity associated with oneself, self-protection is about minimizing costs linked to self-threat situations. Following negative feedbacks regarding their knowledge on a given domain, consumers adopting self-protection motives might engage in strategies aiming at keeping away from the product category threatening their self-perceptions. Not paying attention to information related to the concerned product category could be one of these strategies.

The self-verification motive refers to the drive to verify, validate and sustain one's existing self-concept, even if it includes negative dimensions. It has been supported by observations that individuals are not systematically seeking positive feedbacks and can as well look for evaluations and feedbacks consistent with their own self-view. In support of this theory, evidence shows that participants chose feedback consistent with their current self-views, even when their self-view was negative (Hixon & Swann, 1993; Swann et al., 1981). Underlying this motive for accurate self-views as opposed to self-enhancing ones, several explanations have been advanced: stability of one's self-concept, self-understanding facilitating thoughts, actions and enjoyable interactions (Leary, 2007). Defined as attitudes toward oneself, self-views serve a typical attitude purpose: being a good guide for thoughts, actions and interactions with others. As such, having a stable self-view may be looked for due to the sense of security it provides. In this respect, according to the self-verification motive, self-view stability weighs more than self-view valence (Leary, 2007). In our current setting, consumers adopting self-verification motives should cope more easily with a negative feedback as long as it fits with their initial self-related beliefs.

Possible effects of self-motives applied to our current investigation

Important for us is the fact that self-enhancement, self-protection and self-verification lead to different types of behavior following negative feedback (Leary, 2007). Noticeably, in the face of negative feedback or ego-threat, self-enhancement may lead consumers to seek positive feedback, self-protection to discard negative one, whereas self-verification could result in the acceptance of negative feedback, as long as the evaluation is consistent with consumers' self-view. For instance, given a negative feedback about his physical appearance (for instance: *You are ugly.*) a consumer willing to self-enhance may engage in efforts aiming at persuading himself or the person who gave him the negative feedback that his appearance is great (*Look how beautiful I am when I smile.*) In contrast, following a self-protection motive, the threatened consumer will try to stay away from the person who gave him the negative feedback (*I don't want to waste my time with you.*) Finally, a self-verification motive would lead the threatened consumer to look at his reflection in the mirror (*Am I that bad looking?*) and following this investigation either accept the negative feedback as valid (*Indeed, I am.*) or discard it (*No, I look fine.*) Thus, self-related motives present in consumers' mind influence cognitive, evaluative and behavioral responses following a negative feedback.

Specifically, consumer information processing and memorization strategies may be influenced by the types of self-related motives adopted by a consumer at a given moment in time. In particular, to the extent that subjective knowledge manipulations lead to the activation of self-related motives, paying attention to and memorizing new incoming information may be a strategy adopted by consumers to fulfill self-related needs. For instance, after their knowledge about a product category has been decreased, consumers could decide not to pay attention to a domain-related message in order to self-protect from the threat that it epitomizes. In contrast, self-enhancing strategies could lead a consumer to spend a lot of time and effort in processing and memorize information related to a domain in which his abilities and knowledge have been put into question in the past.

In this respect, it appears important to highlight evidence showing that the type of motives adopted by people following ego manipulations is dependent upon a key personality trait, namely self-esteem.

2.1.2 Which self-motives for whom: self-esteem influences self-motives adoption following ego-threat (vs. boost)?

Self-related motive adoption is influenced by consumers' initial self-esteem level. Early accounts of self-esteem driven variations in self-motives adoption can be found in Wiener (1973). In this research, participants' ego was threatened using a French prose task and bogus negative feedbacks. Results showed that high self-esteem individuals heightened their performance more substantially than low self-esteem individuals following self-threat, in an effort to self-enhance. Indeed, following negative results on a test, high self-esteem individuals felt the urge to restore a positive self-view and put extra effort in preparation for future tests. Similarly, Tice (1991) showed that the types of motives individuals are likely to yield to depend on self-esteem. In her research, high and low self-esteem individuals yielded to self-handicapping practices for different motives and under different contexts. Using a 2 (self-esteem: high; low) × 2 (only success is meaningful; only failure is meaningful) x 2 (task importance: high; low) design, her study 1 showed that high self-esteem individuals engaged in self-handicapping strategies (i.e., putting less effort in a test preparation) when success was at stake, while low self-esteem people engaged in self-handicapping strategies when failure was at stake. Tice (1991) showed evidence for a possible underlying mechanism: High self-esteem individuals agreed to a larger extent than their low self-esteem counterparts to a statement linking lack of preparation to increased perception of ability in case of success (self-enhancement strategy). Conversely, low self-esteem participants were more supportive of a statement conceptualizing lack of preparation as a way of preserving one's ability perception in case of failure (self-protection strategy). In line with these first results, many additional studies concur in showing the use of self-enhancement strategies by high self-esteem individuals and of self-protection and self-verification strategies by low self-esteem individuals, as will be detailed below.

Evidence of self-enhancement strategies among high self-esteem individuals

Baumeister, Tice and Heatherton (1993) showed in a video game simulation (with money involved), that following ego-threat, high self-esteem individuals made inflated assessments about their capacity and placed risky bets likely to exceed their capacity. Such propensity to answer to self-threats by risky betting may be detrimental to their decision-making quality. Another evidence of self-enhancement strategy is given by Beauregard and

Dunning (1998): Following a self-threat, high (vs. low) self-esteem individuals used contrast strategies. After being given negative feedback on a bogus intelligence test, high self-esteem individuals used the opportunity to evaluate the SAT (Scholastic Assessment Test: a standardized reasoning test for college admission in the United States) score of an average individual to reaffirm their own value. Thus, if their own SAT score was high, high self-esteem individuals tended to judge this average target negatively (contrast strategy) whereas if their own SAT score was low, they judged the same target positively. Such strategies are in line with the notion of self-enhancement motives activated when high self-esteem individuals are under threat (Beauregard & Dunning, 1998). Indeed, judging an average target positively following failure of a test helps high self-esteem individuals enhance their own performance perception.

Besides, self-enhancement strategies among high self-esteem individuals following self-threats also result in relational outcomes (e.g., partner selection and impression given to others). Woods et al. (1994) showed that high self-esteem participants sought comparison with superior targets following failure feedback. In their research, students were asked to participate in a test linking personality characteristics to future career potential. After filling in the questionnaire, they were given a feedback about their own performance and pieces of information about another participant in various domains. Next, participants were asked to choose which feedback they wished to receive within a selection of 13 domains. This last step allowed to measure in a subtle way whether participants chose a comparison with the other participant (opting for feedback in domains where the other participant performance was known) or preferred instead to receive feedback in domains where no comparison could occur (i.e., opting for feedback in domains where the other participant's performance was not known). The results are supportive of the hypothesis of self-enhancement strategy at play among high self-esteem individuals under ego-threat: After receiving negative feedback, high self-esteem individuals asked additional feedback in domains allowing comparison with the allegedly superior other participant. In contrast, when they were first given positive feedback, they opted for additional feedback in domains in which they had no information about the other participant, thus avoiding comparison with them. Such propensity of high self-esteem people to self-enhance in the face of self-threats may be detrimental to their relationship quality. Vohs and Heatherton (2001) showed that after ego-threat, high self-esteem individuals were less likely to assert their independence, which resulted in weaker perceived likeability and could harm relationship quality. Similar results were found in Heatherton and Vohs (2000) who showed that under ego threat, high self-esteem participants were perceived

less likeable. They also showed that being perceived as antagonistic was one reason why high self-esteem ego-threatened individuals were perceived as less likeable. In brief, under ego-threat, high self-esteem individuals try to challenge and compete with other individuals, ideally superior to them, in an effort to restore the positive view they have of themselves, which has been threatened by negative feedback. Such a "fighting spirit" may be harmful to their social skills and perceived likeability.

Evidence of self-protection among low self-esteem individuals

In contrast to high self-esteem individuals, people with weak self-esteem are more likely to engage in self-protection and self-verification strategies. In this respect, Josephs, Bosson and Jacobs (2003)'s observation that low self-esteem individuals tended to disregard positive self-generated feedbacks and to accept self-generated negative feedbacks could be interpreted through the lens of self-protection: adopting a conservative strategy of self-evaluation in order to minimize the risk of having one's positive self-view challenged by external feedback. In addition, Wood et al. (1994) showed that, in contrast to high self-esteem individuals, low self-esteem participants sought comparison with inferior targets following success feedback but avoided comparison with potentially superior targets following failure feedback (study 1 and 2). Their third study identified a boundary condition to the effect: when the comparison involved risk and uncertainty, low self-esteem participants did not seek comparison with targets, even following success feedback. Thus, whereas high self-esteem individuals responded to a threat by exposing themselves to risky comparisons, low self-esteem participants did not follow such self-enhancement strategies. Instead, low self-esteem individuals self-protected using the following pattern: avoiding exposure to potentially self-threatening situations. Such self-protection strategies were adopted independently of the nature of the prior feedback given to them. Finally, including physiological measures (salivary cortisol) in their design, Ford and Collins (2010) showed that following ambiguous interpersonal rejection, low self-esteem individuals exhibited greater cortisol reactivity which in turn translated into partner derogation, a strategy that can be interpreted through the lens of self-protection: derogating the source of rejection to stay away from the self-threat. Thus, low self-esteem individuals use self-protection strategies whereby they avoid confrontation with potentially self-threatening partners or situations.

In an attempt to synthesize and integrate the strategy types used by people to self-enhance and self-protect, Hepper et al. (2010)'s meta-analysis identified four main strategies: defensiveness, positive embracement, favorable construal and self-affirming reflection. Particularly interesting to us, the use of self-enhancement strategy (positive embracement, favorable construal and self-affirming reflection) was linked positively to self-esteem. Conversely, the use of self-protection strategy was negatively linked to self-esteem.

Summary and implications

Thus, experimental and correlational data converge in suggesting that self-esteem is positively related to self-enhancement strategies and negatively related to self-protection strategies. This statement may have important implications for our current research. To the extent that subjective knowledge manipulations are effective in altering people's self-perception, we can expect consumers to engage in different information-processing strategies depending on their self-esteem level, in the face of subjective knowledge threats. More specifically, we can expect high self-esteem consumers to engage in self-enhancement strategies and low self-esteem ones to engage in self-protection strategies.

Therefore, within our framework, we first need to understand the extent to which a manipulation of subjective knowledge is likely to alter participants' self-evaluation. Second, to the extent that such a change in participants' self-evaluation leads them to engage in self-enhancement versus self-protection strategies, we need to conceive how these two strategies may translate into different processing strategies within our experimental setting.

2.2 Subjective knowledge and ego manipulations: Can subjective knowledge manipulations work as an ego threat and lead to different responses depending on consumer self-esteem level?

2.2.1 Self-esteem manipulation versus subjective knowledge manipulation

The next session discusses the link between ego and subjective knowledge manipulations. We describe the way these two manipulations are operationalized, as well as their similarities and specificities.

Subjective knowledge and ego manipulations share similar properties and can, under the conditions described below, have similar self-state related outcomes. First, subjective knowledge and ego manipulations can be induced using similar methods. Thus, feedback-based subjective knowledge manipulations (e.g., Hadar, Sood & Fox, 2011; Moorman et al., 2004; Park, Gardner & Thukral, 1988…) can be compared to feedback-based ego manipulations (e.g., Beauregard & Dunning, 1998; Harmon-Jones et al, 1997; Heatherton & Vohs, 2000; Vohs & Heatherton, 2001; Wiener, 1970; Wiener, 1973…). In both cases, researchers use false feedbacks to alter participants' perception about their skills. False feedbacks on verbal intelligence (e.g., Beauregard & Dunning, 1998; Wiener, 1973…), personality type (Harmon-Jones et al., 1997), spatial intelligence (Heatherton et al., 1991) are used in ego threat manipulations. In a related vein, in consumer research studies manipulating subjective knowledge (e.g., Moorman et al, 2004; Park et al., 1988 …), knowledge about specific product category is altered using false feedbacks. Second, we already mentioned that according to James (1890), self-esteem is people's global evaluation of their own worth, and is influenced by sub-evaluations in domains deemed important. Thus, subjective knowledge manipulations related to important product categories could influence consumers' specific sub-evaluations and ultimately their global self-esteem.

Yet, ego and subjective knowledge manipulations differ in various respects. First, while the key purpose of ego-threat and ego-bolstering manipulations is to alter participants' self-esteem state, and has been supported by manipulation checks, subjective knowledge manipulations do not purposely seek to change participants' self-esteem states. Indeed, no manipulation check has been used till date to verify whether a change in subjective knowledge results in state self-esteem or implicit self-esteem changes. Second, subjective knowledge has also been manipulated using methods distinct from ego-threat manipulations and unlikely to have a direct influence on participants' self-esteem levels. For instance, switching participants' reference point using an expert versus a novice message source (See, 2009) may alter individuals' subjective knowledge in a given domain without necessarily affecting their self-esteem.

In an attempt to reconcile those two views, one can propose that subjective knowledge manipulation may influence self-esteem levels to the extent that consumers judge the concerned knowledge domain self-relevant. For instance, Crocker, Karpinski, Quinn and Chase (2003) showed that self-esteem increased on days when students receive good grades and decreased on days they received poor grades. In addition, the effect was amplified when students based their self-worth on academic competence. Following such an approach, one

could conceive that subjective knowledge change is likely to alter a person's self-esteem to the extent that this person deems the considered knowledge domain important. For instance, if a consumer does not care at all about fat content but considers he is quite knowledgeable about the topic, receiving negative feedback about his fat content knowledge should not negatively affect his self-esteem. Conversely, if a consumer concerned about fat content and perceiving himself quite knowledgeable about it receives negative feedbacks about his fat content knowledge, the likelihood that his self-esteem will decrease is high. Thus, subjective knowledge manipulation could influence consumers' self-esteem to the extent the focal domain is important to individuals' self-evaluation.

In summary, though subjective knowledge and ego manipulations share commonalities, the link between subjective knowledge manipulations and self-esteem changes remains to be tested empirically, which calls for additional investigation. Our experimental setting will allow us to test the relationship between those two constructs.

2.2.2 Possible outcomes of subjective knowledge manipulations on memory processing: the hypothesis of self-esteem moderation

Given the commonalities between subjective knowledge and ego threat manipulations, extant research focusing on the moderating role of self-esteem in the relationship between ego-threats and behaviors is relevant to our framework. Just like an ego-threat either leads to self-enhancement or self-protection strategies depending on individuals' self-esteem level, we can conceive that following subjective knowledge threat, high self-esteem individuals will tend to self-enhance while low self-esteem may be more prone to self-protect. Thus, it is important to picture what could be the outcome of those two strategies when applied to a consumer information processing context.

Following the findings that under ego threat, high self-esteem individuals seek comparison with superior others in an effort to self-enhance (Wood et al., 2004) and put higher energy to prepare for future threat-related tasks (Wiener, 1973), we can suppose that after subjective knowledge decrease, high self-esteem consumers will try to pay higher attention to processing incoming information about the concerned domain. Indeed, paying high attention to information regarding a domain in which one's competence has been challenged can be a response to restore one's value.

In contrast, in line with Ford and Collins (2010) findings, following ego-threat, low self-esteem individuals tend to self-protect by derogating the threat source. By extension, we could expect that under subjective knowledge decrease, low self-esteem participants will seek self-protection. Such self-related motive could be reached by not paying attention to incoming information from the threat-relevant domain. Facing a negative feedback about their knowledge in a product category, low self-esteem consumers may decide to keep away from a domain judged threatening

2.3 Other self-related personality traits potentially involved when consumer subjective knowledge is manipulated: self-efficacy and narcissism

Alternatively to self-esteem, two other self-related personality traits could be potentially involved when consumer subjective knowledge is manipulated. First, people's beliefs about their abilities to produce certain levels of performance (i.e., self-efficacy, Bandura, 1977; 1986; 1994) could influence responses to subjective knowledge manipulations. Second, striving for others' recognition of their superiority (Bushman & Baumeister, 1998), narcissistic consumers could react fiercely to negative feedbacks regarding their knowledge, which could influence the attention they will pay to domain-related product information. Thus, the possible role of these two personality variables in relation to our empirical setting deserves further investigation.

2.3.1 Subjective Knowledge and Self-Efficacy: An Alternative Mechanism?

As an alternative explanation to self-esteem, it might be argued that self-efficacy levels influence consumers' reactions toward negative feedbacks regarding their knowledge on a product category.

Definition and consequences

Self-efficacy refers to the conviction that one can successfully execute a given behavior to produce the needed outcomes to succeed in a specific task. Self-efficacy is thus the perception individuals have of their capability to reach a given goal within a specific

domain (Bandura, 1977; 1986; 1994). Thus, giving a positive (vs. negative) product category knowledge feedback may increase (vs. decrease) participant's perception of their competence and ultimately performance in future domain-related tasks.

Most of the extant research on the topic puts the focus on the positive consequences of self-efficacy. Individuals high in self-efficacy set higher goals and achieve greater performance (Bandura, 1977; 1986; 2002; Lee et al, 1994). Self-efficacy has been shown to impact academic performance positively, individuals high (vs. low) in self-efficacy being more confident in the answers they provide (Bouffard et al., 2005). In a business environment, self-efficacy has been identified as an important factor of success: High self-efficacy people set higher goals, experience less stress in their activity and reach higher performance than low self-efficacy people (Sager et al., 2006). Recent studies (Vancouver, 2001; Yeo & Neal, 2006) have highlighted potential shortfalls of self-efficacy. Using air simulator and training participants for the task, it has been shown that at the within-subject level, self-efficacy may hinder future performance (Vancouver, 2001). Though not empirically demonstrated, a complacency mechanism has been evoked as the potential underlying mechanism of this negative relationship between self-efficacy and performance: Participants being too confident in their capability would neglect the gap between their real level and the goal they have set. Yet, such studies bear several limitations. First, the generalization of the findings can be put into question due to the use of games that are not always relevant to participants' real role in life and where chance, not only competence, is involved (Bandura, 2003; Yeo & Neal, 2006). Finally, the use of correlational designs makes it impossible to identify the direction of causality between performance and self-efficacy.

Distinction between task specific self-efficacy and subjective knowledge manipulation studies

Several elements might drive us to think that our manipulation of subjective knowledge may affect self-efficacy. First of all, we use a false feedback induction, which is a procedure that has been used to manipulate self-efficacy. Secondly, increasing or decreasing subjective knowledge may impact confidence and domain-related perceived self-efficacy.

However, both theoretical and empirical arguments can be used to rule out the objection that task-specific self-efficacy may be a potential confound with our subjective knowledge manipulation. First, conceptually, as defined by Bandura (1977; 1982; 1983) self-efficacy operates at a distinct level than our manipulation of knowledge. Indeed, self-efficacy

has been defined as a domain-specific construct. The notion captures individuals' evaluations of their capabilities and skills relative to the capabilities and skills needed to accomplish a desired level of performance (Bandura, 1986), and has been developed and mainly used in work-related environments. Importantly, self-efficacy is not an overall personality trait but rather refers to specific situations or tasks (e.g., dieting, exercise, social skills, arithmetical skills; see Maddux & Gosselin, 2003). Opposed to this, our manipulation of subjective knowledge is not related to a specific task, since the initial task (i. e., knowledge quiz about computer) is clearly distinct from our dependent variable (memorizing information about a computer). In addition, operationally, Bandura (1983) showed that self-efficacy effects on performance operated only when both performance feedback and well-defined goals were present. Feedback alone produced no significant changes in motivational levels and performance. Thus, self-efficacy operates in a context in which goals are clearly defined and wherein individuals can observe their performance relative to a standard. It implies repetition of the same, specific task that is often implemented in experimental settings via computer-assisted games. In such games, participants are given time for training and take part in several sessions of the same task (Lee, 2006; Vancouver, 2001). In contrast, our experimental setting neither involves well-defined instructions and goals nor repetition of the same task.

Integrating General Self-Efficacy as a Potential Moderator in the Framework

Even if task-specific self-efficacy is clearly not related to our design, it might be interesting to take into account the general self-efficacy construct (Chen et al., 2001; Smith, 1989). General self-efficacy is defined as a trait representing a judgment about how well one can perform across a variety of situations (Smith, 1989). As such, our manipulation should not impact this personality trait. However, general self-efficacy may moderate the relationship between our subjective knowledge manipulation and participants' memorization of domain-related information. Indeed, high general self-efficacy consumers may have greater coping abilities, which would lead them to be less discouraged when facing a negative feedback.

Relatedly, Judge et al (2002) suggested that measures purporting to assess self-esteem, locus of control, neuroticism, and generalized self-efficacy might be markers of the same higher-order concept. Therefore, general self-efficacy could follow a similar pattern to self-esteem and play an important role in our predicted effects. Thus, we included a general self-efficacy scale (Schwarzer & Jerusalem, 1995) in our empirical setting (i.e., study 2), in order to assess whether this individual difference could account for diverging information

processing patterns following subjective knowledge manipulations, alternatively to self-esteem.

In addition, another construct that has often been associated with self-esteem could be involved in our experimental setting: Because narcissists are much attached to maintain and project a positive self-image, a subjective knowledge manipulation may wound their ego and lead to strong behavioral and cognitive reactions.

2.3.2 Subjective Knowledge Manipulations and Narcissism

Definition

A construct that has often been associated with self-esteem, narcissism was another personality potentially involved in our experimental setting. As such, it was important to check whether narcissism also moderates the link between subjective knowledge manipulation and memory for information or whether self-esteem is the specific personality trait accounting for information processing differences when subjective knowledge is decreased.

The notion of narcissism has been brought to modern psychology by Freud based upon the mythological character of Narcissus who fell in love looking at his own reflection in the water. Narcissism entails two key components: fragility and grandiosity. Narcissists have thus a grandiose but fragile self-esteem. Therefore, they are constantly seeking reinsurance from others to validate their high self-image. Rather than being constantly persuaded of their high self-value (which would be a feature of high self-esteem people), narcissists are continuously striving to get sure that others recognize their superiority (Bushman & Baumeister, 1998).

Thus, while narcissism shares common features with self-esteem and has been shown to correlate positively with self-esteem (e.g., Bushman, Baumeister, Thomaes, Ryu, Begeer &West, 2009), the two constructs are distinct. By analogy with the attitude field, we could refer to self-esteem as the attitude itself (i.e., high self-esteem could be seen as a high overall evaluation of one's self-worth), while narcissism would be a combination between attitude and attitude stability (i.e., narcissists tend to have a high but unstable evaluation of their self-worth.)

Narcissists under ego threat or threat from Narcissists: the origin of violence

"Caring passionately about being superior to others," (Baumeister & Bushman, 1998, page 220) narcissists can react fiercely when their superiority is not recognized. Such a quest for having one's grandiosity recognized can have damaging consequences for narcissists' surroundings: "It is not so much the people who regard themselves as superior beings who are the most dangerous but, rather, those who have a strong desire to regard themselves as superior beings." (Baumeister & Bushman, 1998, page 223) Indeed, narcissism has been associated with negative emotions such as rage and anger (Emmons, 1987; Rhodewalt & Morf, 1998), hostility (Kernberg, 1975), antisocial behaviors such as physical aggression (Baumeister & Bushman, 1998), and cheating on exams to reach an academic achievement in line with one's ambitions (Brunell, Staats, Barden & Hupp, 2010).

More interestingly, narcissists' aggression and antisocial behaviors are amplified under ego threats, as evidenced in the academic works listed below. Several researchers in the field of social psychology conducted studies that are specifically useful to understand narcissists' aggressive reactions following ego threats. First, Baumeister and Bushman (1998) showed that following an ego-threat, narcissists became exceptionally aggressive toward the threat source. Based on a social interaction setting, this research showed that, led to believe that the other participant had criticized their essay-writing skills, narcissists did not hesitate to inflict upon their counterpart an intense and durable unpleasant noise when given the opportunity to do so in a second task (study 1). Study 2 confirmed the authors' hypothesis that aggression was driven by threat perception: When the essay evaluation was perceived as ego-threatening, participants had a greater likelihood to engage in aggressive behaviors. Second, Rhodewalt and Morf (1998) identified conditions maximizing narcissists' aggressiveness: According to Rhodewalt and Morf (1998), the negative emotions experienced by narcissistic individuals after a failure (deflated self-esteem and anger) are stronger after an initial success has been attributed to internal causes (individual qualities). Thus, narcissists' anger soars when the grandiose self-image they have built around themselves via attribution of initial success to their skills has been shattered by a failure feedback. Such hostile reactions of narcissists to a self-threat have to be put in relation with our own conceptual framework.

Narcissism and subjective knowledge decrease: Will narcissists fight back the negative feedback?

Having a high but unstable sense of self-worth, narcissistic consumers may be the most prone to have their ego threatened by a subjective knowledge decrease and thus to react fiercely to such negative feedbacks. We could expect narcissists' aggressive tendency following self-related threat to translate into a high attention paid to domain-related information in an attempt to counter the negative feedback. In other words, greater memorization following negative feedback may be more characteristic of narcissists than high self-esteem consumers. For instance, negative feedbacks about their knowledge of computer may hurt narcissistic consumers' self-image as competent people and they could react by paying higher attention to incoming information about computers in order to prove themselves and others their real worth. In other words, memorizing extra information could be an answer aiming at showing that the negative feedback was wrong and unrepresentative of their real worth.

Part 3: Conceptual model and key hypotheses: the moderating influence of self-esteem in the relationship between subjective knowledge and memory for information

The main objective of this section is to present our conceptual framework and key hypotheses based on the preceding literature review.

3.1 Key constructs

Our conceptual framework aims at assessing the relationship between subjective knowledge and memory for information. In the next part, we present the key constructs of our research and the reasons why we have decided to explore their relationships.

3.1.1 Subjective knowledge

Subjective knowledge is consumers' perception of their knowledge in a given domain and is distinct from objective knowledge: consumers' actual stored mental content on a given topic (Alba & Hutchinson, 1987; 2000; Carlson et al., 2009). While objective knowledge can be altered via training, education and experience (Park et al, 1988; Wood & Lynch, 2002), subjective knowledge can be manipulated via false feedbacks (Park & Lessig, 1988; Moorman et al., 2001), comparisons with experts (vs. novices), as in Heath and Tversky (1995). While the link between objective knowledge manipulations and memory for information has already been investigated (e.g., Poynor & Wood, 2009; Wood & Lynch, 2002…), to the best of our knowledge, no studies have explored the link between subjective knowledge manipulations and memory for information. Our research thus attempts to fill in this gap, given the important possible practical and theoretical implications of such a topic, as explained below.

3.1.2 Memory for information

Memory for information is defined in our framework as the extent to which consumers are able to retrieve pieces of information they have been exposed to previously. It encompasses several measures: *recall,* the extent to which consumers are able to retrieve

information without being aided, *recognition,* the extent to which consumers are able to recognize the correct information among a series of possible answers, and what we will refer to as *discriminant memory*, the extent to which consumers are able to recognize whether a unit of information was displayed in the original message or not.

The reason why we have decided to focus on memory for information in our framework stems from the importance of such a construct for marketers. Indeed, one of the key goals pursued by communicators is to ensure that their targets will retain the information they have delivered. Thus, many marketing communications aim at increasing brand name, product attribute or benefit recall, as well as brand names, logos, symbols and ads' recognition (Hoyer & Macinnis, 2009). For instance, when the *Under Armour* brand, traditionally known for men's apparel decided to target the women segment, specific ads with easily recognizable sounds ("*boom, boom tap*") were designed to boost brand retrieval. Other studies showed that Japanese consumers' use of a bank decreased as its brand name recognition declined (Hoyer & Macinnis, 2009). Thus, if subjective knowledge manipulations are able to influence memory for information, such techniques could have important practical implications for marketers: Subjective knowledge manipulations could boost product and brand attributes' recognition. Such techniques aiming at boosting consumers recall and recognition can be crucial in a time when consumers are overloaded with information coming from various sources (e.g., TV, radios, the Internet, Smartphones and touchscreen devices, newspapers…). As consumers' cognitive resources are limited, being able to design strategies boosting attention and memory for the ad content becomes crucial for marketers.

3.1.3 Subjective knowledge and memory for information

The reason why we have chosen to explore the link between subjective knowledge manipulation and memory for information is built upon the self-related needs fulfilled by information processing (e.g., Algesheimer, Dholakia & Herrmann , 2005; Belk & Tumbat, 2002; Festinger, 1957; Muniz & O'Guinn, 2001; Schouten & McAlexander, 1995; Shanteau, 2002…). To the extent a subjective knowledge manipulation affects the state the self is currently in, which would be in line with works showing a relationship between feedbacks and self-evaluation (e.g., Crocker, Karpinsky, Quinn & Chase, 2003), consumers can use information processing as a tool to regulate their self-states. For instance, following a subjective knowledge threat, some consumers may decide to pay higher attention to incoming

domain related information in an effort to self-enhance, while others may be tempted to stay away from the domain wherein their knowledge perception has been threatened; avoiding information as a self-protection tool. As a result, different memorization patterns can be adopted depending on the types of subjective knowledge manipulations and consumers' characteristics.

As consumers regulate their self-states differently depending on their self-esteem levels, self-esteem is the third key construct included in our framework.

3.1.4 Self-esteem as a possible moderator in the relation between subjective knowledge manipulation and memory for information

Defined as a stable sense of personal worth (Rosenberg, 1965), self-esteem is likely to influence reactions toward subjective knowledge manipulations. For instance, one can expect a consumer with a low initial perception of his personal worth to respond differently to a subjective knowledge threat than a consumer having a high perception of his own personal worth.

To the best of our knowledge, though the relationship between subjective knowledge and information processing has been previously studied (e.g., Brucks, 1985; Park & Lessig, 1981; Moorman et al., 2004; Park et al., 1988; Raju et al., 1995…), no research till date has investigated the potential moderating role of self-esteem following subjective knowledge manipulations. Meanwhile, including self-esteem in our framework may help us reach a process-level understanding (Haugtvedt, Liu & Min, 2008) of the relationship between subjective knowledge manipulations and memory for information. Indeed, research on self-esteem showed that high and low self-esteem individuals reacted differently to self-threatening situations. While high self-esteem individuals reacted to self-threat by increased effort in the threat domain (Hepper et al., 2010; Wiener, 1973), low self-esteem people stayed away from the threat source (Ford & Collins, 2010; Hepper et al., 2010). Therefore, to the extent that subjective knowledge manipulations influence self-evaluation, we can expect high and low self-esteem consumers to process domain-related information differently after a subjective knowledge manipulation. In order to examine the role played by self-esteem in our framework, our design includes different measures of self-esteem: trait self-esteem (i.e., self-esteem as a stable and chronic personality trait as in Rosenberg, 1965) to take into account participants' chronic level of self-esteem, as well as state self-esteem measures (i.e., self-

esteem as a state subject to fluctuations as in Heatherton & Polivy, 1991) and implicit measures of self-esteem (i.e., self-esteem IAT; Greenwald & Farnham, 2000) to check whether subjective knowledge threats lead to self-esteem fluctuations.

3.2 Key hypotheses

We start with a general prediction about the relative effect of gains versus losses in subjective knowledge. We continue with a presentation of our predictions about the potential main effects of increase and decrease in subjective knowledge on information processing. Finally, building upon the preceding review on self-esteem, we include predictions regarding the potential moderating influence of self-esteem in the relationship between subjective knowledge manipulations and information processing.

3.2.1 General prediction about the differential impact of losses and gains in subjective knowledge

In this section, we conceptualize increase and decrease in subjective knowledge as gains or losses relative to a reference point, the initial state of knowledge the individual possesses or believes he possesses prior to any subjective knowledge manipulation.

Our conceptualization starts with the properties of the knowledge construct. As shown in the literature review part focusing on the consequences of knowledge on decision-making, knowledge is an asset conveying many advantages to those who possess it. Those advantages include functional benefits, such as the capacity to make sense of complex information, and self-related benefits, such as the pride derived from belonging to a community of experts (Shanteau, 1992) and to be the one people refer to when making a decision in the given domain. By extension, subjective knowledge in a given product category can bestow self-related benefits (e.g., feelings of competence, belonging, recognition, self-worth…) to the consumers who possess it.

Following this approach, borrowing concepts developed by prospect theory (Kahneman & Tversky, 1979) can be insightful. First, prospect theory does not define value in terms of absolute wealth but rather as deviations (gains or losses) from a reference point, namely the current wealth of the individual. Besides, an important property drawn from the value function described in Kahneman and Tversky (1979) is the notion of loss aversion: The

loss function is steeper than the gain function. In Kahneman and Tversky (1979)'s terms, losses loom larger than gains. In the same vein, we can conceptualize subjective knowledge as an asset and, gains or losses in subjective knowledge as deviations from a reference point, namely the initial state of subjective knowledge of the individual prior to any manipulation. From this perspective, losses in subjective knowledge may have greater consequences than gains. Positive and negative manipulations of subjective knowledge may thus have asymmetric effects on consumer knowledge perceptions.

We therefore propose that:

Hypothesis 1: Consumers should be more easily affected by losses (vs. gains) in subjective knowledge

3.2.2 Main effect of increase and decrease in subjective knowledge on information processing

Gains in subjective knowledge

No clear patterns have emerged from our literature review about the links between knowledge and information processing, as conflicting mechanisms seem at stake. Indeed, as several works concurred in showing a potential relationship between subjective knowledge and confidence (Kwon & Lee, 2009; Raju et al., 1995; Tversky & Fox, 1995; Wood & Lynch, 2002), the complex nature of confidence makes it difficult to make strong predictions about any main effect of subjective knowledge manipulations on information processing.

On the one hand, based upon the link between subjective knowledge and confidence, one could expect an increase in consumers' subjective knowledge to result in greater confidence in their inner capacity and weaker sensitivity to external information. This would be in line with Locander and Herman (1979) who linked consumer confidence to reliance on inner resources and capacities at the expense of external recommendations. Stating it in prospect theory terms, relative to a neutral reference point in which no manipulation occurs, increase in subjective knowledge should increase consumers' perceived knowledge wealth and thus reduce their need for acquiring new information from external sources.

On the other hand, based upon Raju et al. (1995)'s observation that subjective knowledge may give consumers confidence in their search capacity, one could expect a positive link between subjective knowledge and information search. Indeed, if an increase in subjective knowledge gives participants confidence in their search capacities, they could be encouraged to seek more information than they would do without such confidence boosts. Stating it in prospect theory terms, relative to a neutral reference point in which no manipulation occurs, increase in subjective knowledge should increase consumers' confidence in their search capacities and, hence, their motivation for acquiring new information from external sources

Thus, given the ambivalent nature of the link between confidence and information search, we do not expect a main effect of subjective knowledge increase on amount of information processing.

Losses in subjective knowledge

Given the complex nature of the confidence construct, conflicting predictions could also be made about the link between subjective knowledge losses and information processing.

First, confidence can be approached as a factor likely to reduce the need for searching new information (Locander & Hermann, 1979). Following such an approach, a decrease in subjective knowledge should encourage consumers to compensate their recent loss by seeking additional domain-related information. Stated in prospect theory terms, a decrease in subjective knowledge, relative to a neutral reference point in which no manipulation occurs, should decrease consumers' perceived knowledge stock and hence, increase their need to pay attention to incoming domain-related information to compensate their recent loss. This would be in line with the loss aversion mechanism developed in Kahneman and Tversky (1979).

In contrast, confidence can also be approached as a factor boosting consumers' beliefs about their own search capacity (Radecki & Jaccard, 1994). Following such an approach, decrease in confidence about their search capacity in the focal domain may discourage consumers to seek additional domain-related information (Park & Lessig, 1981). This can be interpreted through the lens of prospect theory (Kahneman & Tversky, 1979); relative to a neutral reference point in which no manipulation occurs, decrease in subjective knowledge should decrease consumers' confidence in their search capacities and hence their motivation for acquiring new information from external sources.

Thus, given the ambivalent nature of the link between confidence and information search, we do not expect a main effect of subjective knowledge manipulations on extent of information processing. This stems from the fact that we expect different types of reactions towards subjective manipulations depending on consumers' self-esteem levels. Indeed, a key limitation of the preceding discussion is that it did not take into account potential individual differences in self-confidence, in addition to possible diverging levels of loss aversion among participants. Therefore, building upon the self-esteem literature findings reviewed in the preceding part of this dissertation, the next sets of hypotheses include self-esteem variables in our conceptual model.

3.2.3 Influence of subjective knowledge changes on state self-esteem

As previously conceptualized in our first set of hypotheses, increase and decrease in subjective knowledge can be assimilated, respectively, to gains and losses relative to a reference point represented by participants' initial state of subjective knowledge. As self-esteem has been conceptualized as a global evaluation of one's self-worth influenced by a set of self-relevant sub-evaluations, to the extent that the knowledge domain is important, gains (vs. losses) in subjective knowledge can impact positively (vs. negatively) participants' state self-esteem.

Gains in subjective knowledge and state self-esteem

Links between subjective knowledge and self-confidence can be inferred from extant consumer research discussed in our literature review (e.g., Kwon & Lee, 2009; Park & Lessig, 1981; Xu & Wyer, 2010…). In addition, Shanteau (1987) highlighted the pride that may come from a feeling of expertise and mastery in a given domain. Wine connoisseurs, computer geeks, motorcycle fans are just a few examples of consumers' feelings of pride and self-fulfillment stemming from belonging to a community of experts. We could thus assume that gains in subjective knowledge are likely to increase consumers' self-evaluation, to the extent that the domain is deemed important.

Thus:

Hypothesis 2: An increase in subjective knowledge should positively
influence consumers' state self-esteem.

Losses in subjective knowledge and state self-esteem

Perception of lack of knowledge is likely to weaken a person's self-evaluation. In support of this statement, as we have already seen in Part 2, links have been established between academic performance and self-esteem (e.g., Crocker et al, 2003) and between negative feedbacks on verbal or spatial intelligence tasks and self-esteem (e.g., Beauregard & Dunning, 1998; Heatherton & Vohs, 2000; Wiener, 1973). Similarly, one could propose that, to the extent that the focal domain is important, negative feedbacks about product category knowledge is likely to decrease consumers' global self-evaluation.

Thus:
Hypothesis 3: Decrease in subjective knowledge should negatively
influence consumers' state self-esteem.

3.2.4 Interactions between subjective knowledge manipulations and self-esteem on information processing

In the next part, we present our predictions about the moderating role likely to be played by self-esteem in the relationship between subjective knowledge manipulations and information processing. In doing so, we present separately increase and decrease in subjective knowledge as the two processes are distinct and may trigger different types of psychological reactions.

Increase in subjective knowledge

Based upon the aforementioned link between self-esteem and confidence, we propose that an increase in subjective knowledge is likely to have different consequences for high and low self-esteem consumers. Being endowed with different initial levels of self-confidence, consumers high (vs. low) in trait self-esteem are likely to react differently to an increase in

subjective knowledge. According to the definition developed by Tafarodi & Swann (2001), self-esteem is the sum of self-linking and self-competence beliefs. As such, it may be inferred that, holding objective knowledge constant, high self-esteem consumers are likely to be more confident in their search capacities than low self-esteem ones. Such a confidence in their search capacities could lead high self-esteem consumers to be able to process a high amount of information, following the link established between self-confidence and search capacity (Park & Lessig, 1981). However, following an increase in subjective knowledge, high self-esteem individuals may be drawn in an overconfidence zone, in which they are likely to yield to a complacency mechanism (Wood & Lynch, 2002) and pay little attention to domain-related incoming information. In this prospect, an increase in subjective knowledge may have a detrimental effect on their domain-related information processing effort.

Thus:

Hypothesis 4: Following an increase in subjective knowledge, high self-esteem consumers should pay lower attention to domain-related incoming information.

In contrast, low self-esteem consumers may have a greater propensity to be doubtful about their information search capacity, as self-esteem entails a sense of personal capacity (e.g., Branden, 1969; Tafarodi & Swann, 2001). Thus, a decrease in subjective knowledge could be detrimental to low self-esteem consumers' processing of incoming information. Indeed, reducing low self-esteem consumers' subjective knowledge may draw these consumers in an under-confidence zone, leading them to question their search capacity and eventually discouraging their processing of domain-related incoming information. This would be in line with Ford and Collins (2010)'s finding that following rejection low self-esteem individuals avoided confrontation with the threat source. In contrast, following an increase in their subjective knowledge, low self-esteem consumers may be empowered with enough confidence to be able to process more extensively domain-related incoming information, compared to a control condition in which no subjective knowledge boost occurs.

Thus:

Hypothesis 5: Following an increase in subjective knowledge, low self-esteem consumers should pay higher attention to domain-related incoming information.

Decrease in subjective knowledge

Based upon the definition of self-esteem as a person's overall evaluation of his or her own worth and to the extent this overall evaluation is influenced by domain specific evaluations (Harter, 1999; James, 1890; Pelham, 1995), appraisal of one's knowledge in one domain may be part of global self-esteem. In line with this approach, a positive correlation between academic achievement and self-esteem has been evidenced in educational and social psychology (Byrne, 1996; Marsh, 1986). Similarly, we can expect a downward manipulation of subjective knowledge to lower, at least momentarily, participants' self-perception. Based upon self-related motive literature findings, this negative threat to self-perception is likely to trigger self-enhancement strategies among high self-esteem consumers and self-protection strategies among low self-esteem consumers (Hepper et al., 2010; Wiener, 1973).

Within our framework focused on information processing, this could lead to the following prediction: for high self-esteem consumers, self-enhancement motives may be triggered by negative subjective knowledge feedbacks. Such self-enhancement strategies may be achieved by high attention paid to domain-related incoming information. High self-esteem consumers could extensively process threat-related incoming information in order to restore their deflated egos. This hypothesis is in line with Wiener (1973), who showed that a devalued ego led to increased productivity for chronically high (vs. low) self-esteem individuals.

Thus:

Hypothesis 6: Following a decrease in subjective knowledge, high self-esteem consumers should use self-enhancement strategies, which should translate into greater attention paid to domain-related information.

In contrast, for low self-esteem consumers, decrease in subjective knowledge could lead to self-protection strategies, such as attempting to stay away from the threat source (Ford & Collins, 2010; Hepper et al., 2010) by reducing attention to domain-related incoming information.

Thus:

Hypothesis 7: Following a decrease in subjective knowledge, low self-esteem consumers should use self-protection strategies, which should translate into weaker attention to domain related information.

Table 3: Hypothesis Table

Hypothesis 1: Consumers should be more easily affected by losses (vs. gains) in subjective knowledge

Hypothesis 2: An increase in subjective knowledge should positively influence consumers' state self-esteem.

Hypothesis 3: A decrease in subjective knowledge should negatively influence consumers' state self-esteem.

Hypothesis 4: Following an increase in subjective knowledge, high self-esteem consumers should pay lower attention to domain-related incoming information.

Hypothesis 5: Following an increase in subjective knowledge, low self-esteem consumers should pay higher attention to domain-related incoming information.

Hypothesis 6: Following a decrease in subjective knowledge, high self-esteem consumers should use self-enhancement strategies, which should translate into greater attention paid to domain-related information.

Hypothesis 7: Following a decrease in subjective knowledge, low self-esteem consumers should use self-protection strategies, which should translate into weaker attention to domain related information.

Figure 10: Main conceptual model
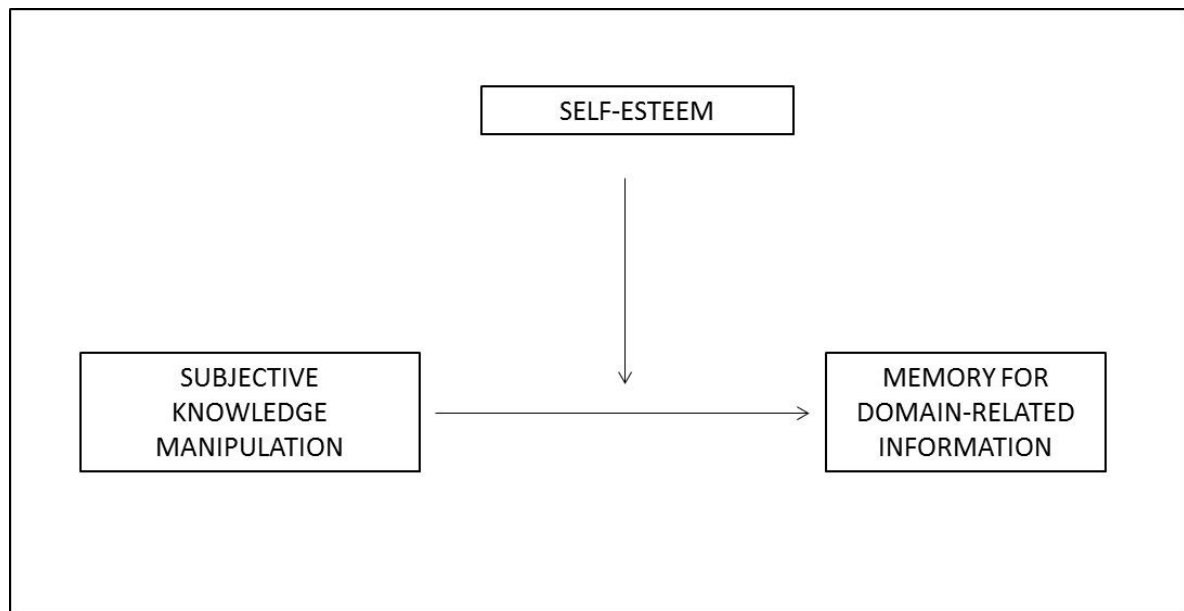
As described in figure 10, which summarizes our conceptual framework, we propose that the relationship between subjective knowledge manipulations and memory for domain-related information should be moderated by consumers' initial level of self-esteem. Building upon the possible influence of subjective manipulations on self-worth perception and upon the different types of responses of high- and low-self-esteem individuals to self-threats, consumer responses to subjective knowledge manipulations could be influenced by self-esteem levels. This could explain conflicting findings found in extant research investigating the relationship between subjective knowledge changes and consumer information processing.

Part 4: Presentation of the empirical findings

4.1 Method

4.1.1 Choosing an experimental approach

In this research, we experimentally manipulated subjective knowledge and assessed its effect on several variables pertaining to consumer memory for information. Several factors have driven this methodological choice.

First, an experimental design allows us to infer causal links between our key explanatory variable (subjective knowledge) and our dependent variable (memory for information). In contrast, a correlational design would only have allowed us to observe a link between these two variables without being able to draw any conclusion about the directionality of the effect (Shadish, Cook & Campbell, 2002). In addition, choosing an experimental framework allows us to control and select the profile of our participants, which enables us to improve our findings' internal validity, which was the key objective of this first series of studies. This is in line with Campbell and Stanley (1963) who defined internal validity as the fundamental requirement for an experiment to be interpretable. Finally, the limited number of studies manipulating subjective knowledge (Hadar, Sood & Fox, 2011; Kahneman & Tversky, 1991; Moorman et al., 2004, Park et al., 1988; See, 2009; Tversky & Fox, 1995; Xu & Wyer, 2010) calls for additional work in the field. We believe that one of the key reasons behind the rather limited number of experimental studies about subjective knowledge is due to: (1) the difficulty of manipulating subjective knowledge without affecting other factors and (2) issues around disentangling subjective knowledge effects from objective knowledge ones.

Therefore, one of the key empirical challenges to meet was to design a methodology enabling us to manipulate subjective knowledge yet controlling for the possibility of between-participants objective knowledge differences. In order to reach this goal, extensive pretests were conducted to be able to design a methodology that would be perceived as credible both by high and low objective knowledge participants.

4.1.2 Domain and sample

Sample choice: college students

The experiments were conducted using samples of students from a French business school and a US university. The choice of students when running experiments in social science has given birth to extensive discussions (Calder, Phillips & Tybout, 1981; Peterson, 2001; Petty & Caccioppo, 1996). It has been shown empirically that this type of sample strengthens the internal validity of findings via higher within-group homogeneity, but nevertheless sometimes at the expense of external validity (Peterson, 2001). Thus, in the future steps of our research program, results obtained among a student sample will have to be replicated in another type of population to allow us to increase the generalizability of our results. Thus, though well aware of the limitations linked to this type of sample, we consider that testing our hypotheses with student samples can be a starting point, enabling us to test the internal validity of our findings before trying to generalize them. Internal validity is our primary concern in the present dissertation. Nonetheless, future research is needed to replicate our findings using different sample profiles to strengthen external validity (Calder, Phillips, & Tybout, 1981; Peterson, 2001).

Choice of the domains of investigation: computers and luxury goods

One of the key stakes when conducting a research investigating the topic of consumer knowledge – objective or subjective – is to ensure that the domain is technical enough to be able to distinguish a population of experts from novices but familiar enough so that all the participants are able to understand and process the message contents (Maheswaran & Sternthal, 1990). In this respect, the domain of notebook computers meets these two goals (Maheswaran & Sternthal, 1990); it is sufficiently technical to enable setting apart experts from novices, yet familiar enough to be understood by the whole sample.

In order to explore product category complexity as a potential boundary condition of the hypothesized effects, an additional knowledge domain is also investigated. Indeed, it is possible that our manipulation works well with technical products wherein knowledge can be easily assessed using existing attributes but less so in domains such as luxury goods (for instance, perfume industry) or services (for instance, health care) wherein relevant attribute

identification is clearly more difficult and subjective. Replicating our studies in different categories was thus necessary to increase the generalizability of our findings. In this respect, we have conducted a fourth study within the domain of luxury goods. Indeed, luxury products meet the two aforementioned goals. First, they are sufficiently complex to make it possible to discriminate a population of experts from novices. Indeed, luxury "requires education, knowledge, initiation and connivance, which, once they are mastered become an additional source of pleasure." (Dubois, Laurent & Czellar, 2001; p. 13) Yet, the luxury concept is shared by many different cultures (Dubois, Czellar & Laurent, 2005) and luxury products are familiar enough to enable every participant to understand domain-relevant information

4.2 Studies overview

Our program of studies followed a specific structure that we develop in the present section and that is described in Figure 11. In addition, Table 4 gives an overview of the different set of hypothesis that each individual study tested. Our first objective was to gain preliminary insights about the feasibility of inducing experimentally a subjective knowledge change following our false feedback manipulation. To this end, we conducted a pilot study with a limited sample of students. Next, the first study aimed at testing the relationship between the key constructs of our studies and thus intended to test the whole set of our hypothesis (hypothesis 1-7). Our main goal was to check whether self-esteem played a moderating role in the relationship between subjective knowledge manipulation and memory for information. Once our initial hypotheses were confirmed, we intended to replicate our findings and get a first insight about the key mediating mechanisms at stake. To this end, we included a measure of implicit self-esteem to check whether hypothesis 2 and 3 could be verified using an implicit (vs. explicit) measure of state self-esteem. In addition, we included a measure of general self-efficacy to check whether self-esteem was the only moderating personality trait involved. Next, the goal of our third study was to identify a possible boundary to the memory effect that we found in the first two studies. To this end, we changed the sequence of our experiment to test whether differences in memorization between high and low self-esteem participants following subjective knowledge manipulations were also driven by reconstructive failure at retrieval, alternatively to hypothesis 6 and hypothesis7 or only by different levels of motivations at encoding in line with hypothesis 6 and hypothesis 7. Finally,

the main goal of the fourth study was to increase the internal and external validity of our findings by verifying whether hypothesis 6 and 7 would hold when an alternative subjective knowledge manipulation and another product category (i.e., luxury products) were used. In addition, we ruled out another potential confound (i.e., narcissism).

Figure 11: Research flow

Getting insight on feasibility of our research

Testing the feasibility of our subjective knowledge manipulation (pilot study)

Describing the relation between our key constructs

Testing our key hypotheses (study 1)

Explaining

Identifying underlying mechanism (ego-threat : study 2)

Increasing reliability, internal and external validity

Increasing reliability

Replication of our findings (Studies 2 and 4)

Increasing internal validity

Ruling out alternative explanation (general self-efficacy : study 2, narcissism : study 4)

Increasing external validity

Conducting studies across various settings (France : studies 1-2, USA : studies 3-4)
Extending our results to several product categories (computer : studies 1-3, luxury product : study 4)
Defining the scope of our memory effect (study 3)

Table 4: Summary of hypotheses

Study	Hypotheses tested
Pilot Study	Initial insight about the feasibility of our research
Study 1	Initial test of hypotheses1-7
Study 2	Replication of hypotheses 1, 4, 5, 6 and 7
	Test of hypotheses 2 and 3 using an implicit measure of state self-esteem
Study 3	Ruling out an alternative explanation to hypotheses 6 and 7
Study 4	Replicating hypotheses 6 and 7 using a different product category and an alternative subjective knowledge manipulation

4.3 Pilot Study

We conducted a pilot study to gain information about the feasibility of our subjective knowledge manipulation.

4.3.1 Method

Participants

Thirty-four students from HEC School of Management participated in our preliminary study in exchange for extra course credit. The study consisted of four main steps.

Materials and procedure

The preliminary study was introduced as a general questionnaire about personality and consumer products. Participants were seated separately in a lab, completed the task independently and were asked to fill in paper-and-pencil questionnaires. The duration of the experimental session was 30 minutes.

During the first step, participants indicated their subjective knowledge about different computer knowledge (Appendix II) using 7-point scales (1 = not knowledgeable at all, 7 = extremely knowledgeable; 1 = among the least knowledgeable, 7 = among the most knowledgeable; 1 = not familiar at all, 7 = extremely familiar). The mean score on these three items represented the initial subjective knowledge score (α = .91). Then, participants were asked to take part in a quiz about computers of moderate difficulty (Appendix III) to account for potential objective knowledge differences between participants. The paper-and-pencil quiz was developed using several computer knowledge quizzes found on internet (e.g., http://www.allthetests.com, http://www.quibblo.com/quiz,…) and pretested on HEC students (n=15) to ensure that the difficulty level was average. On average, participants were able to answer 11.2 questions out of 20, which was in line with our initial expectations.

During the second step, participants' subjective knowledge was manipulated via false feedbacks using two conditions: positive vs. negative feedback. In both cases, participants had to report their own score using the provided answer sheet and ranked their performance compared to other participants using the provided average score and distribution of score.

Our critical subjective knowledge manipulation consisted of changing the provided average score and score distribution, thus providing bogus feedback to participants.

In the increased subjective knowledge condition (Appendix IV), participants were told that the average score was 16.7 out of 40 and induced to believe that above a very easily reachable score (22 out of 40), they performed among the top 30%.

In the decreased subjective knowledge condition (Appendix V), participants were told that the average score was 33.7 out of 40 and induced to believe that below a very high score (31 out of 40), they belonged to the bottom 30% performers.

In the third step, subjective knowledge about computers was assessed once again using the same three items ($\alpha = .96$) to ensure that our manipulation of subjective knowledge was effective, and to be able to assess the magnitude of the subjective knowledge change.

Finally, participants were asked to complete a domain-related information-processing task. Participants had to read an advertisement about a computer, containing several pieces of attribute information (Appendix VI). The stimuli was adapted from a real computer ad found on the Internet (website: www.hp.fr), and included technical information about the computer attributes. The number of displayed attribute information units was reduced to prevent participants from being overloaded with information, in line with information processing theory (Miller, 1956) that states that the human mind can hold a limited number of chunks of information at a time. The ad was proofread by HEC Ph.D. students, and based on their comments, adjustments were made to ensure that the information displayed in the ad was neither too detailed nor too complex. Our measure of memory for information consisted of answers to questions about price, and motivation to acquire additional information was assessed using a measure of willingness to spend time on acquiring new information about the displayed computer (measured in minutes).

4.3.2 Results and discussion

Descriptive statistics

On an average, participants reported a subjective knowledge score of 4.36 out of 7 (SD = 1.27) and reached a score of 24.21(SD = 3.71) points out of 40 on the objective knowledge quiz.

They reported a willingness to spend 14.74 minutes (SD = 13.94) to acquire new information about the computer and memorized the computer price with an error margin of 41.5 euros (SD = 32.1 euros).

Manipulation Check on Perceived Knowledge

The manipulation of perceived knowledge worked in both directions ($F(1,32) = 59.8$, $p = .0001$, $\eta p2 = 0.63$). On an average, participants in the decreased subjective knowledge condition showed a decrease of their subjective knowledge score of -1.41 (SD = 1.13), whereas participants in the increased subjective knowledge condition increased their score of 1.44 (SD = 1.1), as shown in Figure 12.

Figure 12: Change in subjective knowledge as a result of the subjective knowledge manipulation (pilot study)
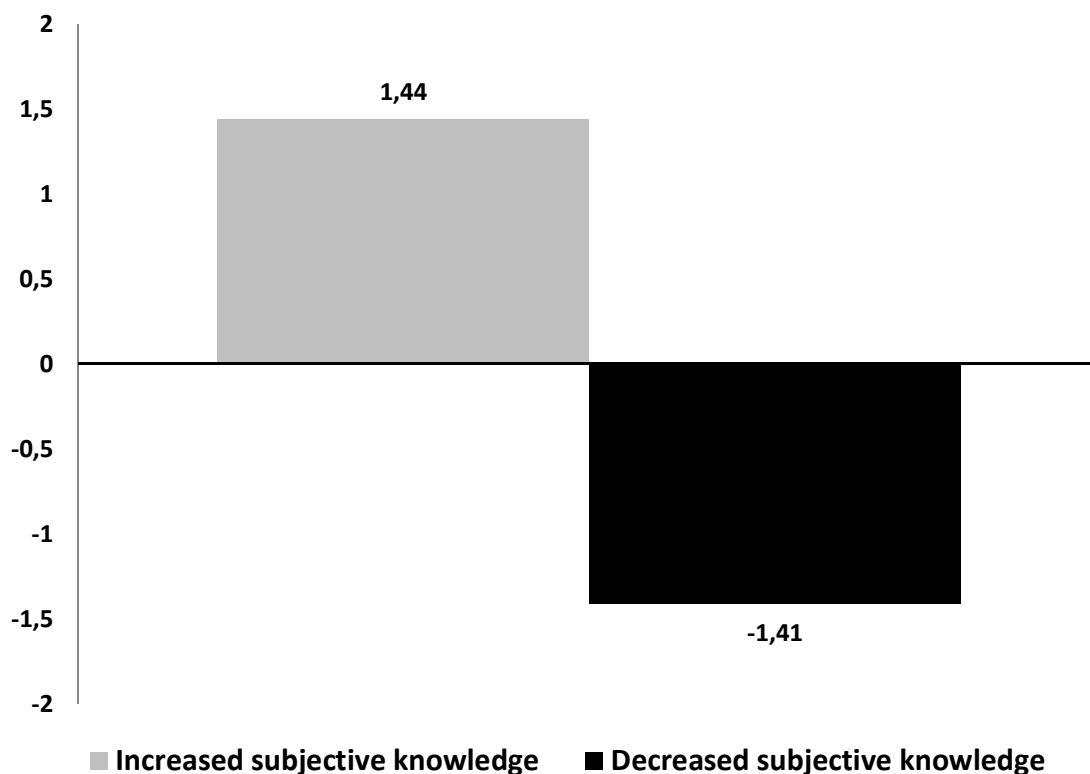
Impact of subjective knowledge changes on memory for information and on motivation to process additional information

Subjective knowledge condition did not influence memory for price. Indeed, although participants in the low subjective knowledge condition seemed on an average to have less mistakes in recalling the price of a computer than participants in the high subjective knowledge condition, the between-condition difference was not significant ($F(1,29) = 2.23$, ns). In addition, willingness to spend time to search for additional information was not influenced by our knowledge manipulation. Indeed, although participants' willingness to spend time acquiring additional information was higher (M = 17.8 minutes) in the low subjective knowledge condition than in the high subjective knowledge condition (M = 12.29 minutes), this difference was not significant ($F(1,29) = 1.23$, ns).

Discussion

In this preliminary study, the manipulation of subjective knowledge was successful. However, we did not find any significant effect of subjective knowledge manipulation on memory for information. Additional studies were needed to test our hypotheses on a larger scale and to introduce potential moderators in the relationship between subjective knowledge manipulation and information processing.

4.4 Study 1

Study 1 was designed to test our hypothesis 1-7 on a large scale, taking into account the potential role played by self-esteem when a subjective knowledge manipulation occurs. In order to test whether our subjective knowledge manipulation influences state self-esteem, we included a measure of state self-esteem (Heatherton & Polivy, 1991). In this first study, we operationalized memory for information in a more precise way, including both recall and recognition tasks, in order to enhance the construct validity of our memory for information measure. In addition, we included a measure of self-esteem to check whether this personality trait could moderate the relation between subjective knowledge manipulation and information processing. Indeed, many studies have shown that a decrease in self-esteem could lead to

reactions of ego protection. In accordance with self-concept protection theory, Wiener (1973) showed that devalued self-esteem leads to increased productivity for high chronic self-esteem individuals, but not for low self-esteem individuals. Wiener proposed that after an ego-threat, high self-esteem people try to perform better in a domain-related task in an attempt to restore their deflated ego. Relatedly, in our experimental design, high self-esteem participants who are disappointed by their performance on the computer quiz may try to protect their ego by processing with greater attention the domain-related information, in line with hypothesis 7. The opposite pattern may hold for low self-esteem people who may be discouraged to process any additional information following a decrease of their subjective knowledge in line with hypothesis 6.

4.4.1 Method

Participants

A total of 120 students from HEC Paris participated in our first study in exchange for course credit.

Materials and procedure

During the first step, participants were asked to complete a paper-and-pencil personality questionnaire, including a measure of subjective knowledge on computers and a measure of trait self-esteem (Rosenberg, 1965; Appendix I). The self-esteem scale had an acceptable reliability (α = .7), which was also the case of our three-item scale measure of subjective knowledge about computers (α = .92).

During the second step (computer knowledge quiz), participants were asked to take part in a quiz about computers of a moderate difficulty to account for potential objective knowledge between-participant differences. At the end of the knowledge quiz, participants' subjective knowledge was manipulated using the same feedback as in our pilot study. Following the feedback, subjective knowledge on computers was reassessed using three items (1 = not knowledgeable at all, 7 = extremely knowledgeable; 1 = one of the most knowledgeable, 7 = one of the least knowledgeable, 1 = not familiar at all, 7 = extremely

familiar; α = .91) to ensure that our manipulation of subjective knowledge occurred as intended and to be able to assess the magnitude of subjective knowledge changes.

Next, participants were asked to read the same computer ad as the one used in the pilot study (Appendix VI). Then, they completed the Heatherton and Polivy (1991)'s state self-esteem scale (Appendix VII), which is comprised of 20 items (α= .87). Finally, participants took part in a memory quiz (Appendix VIII), including questions about the computer displayed in the ad. In order to include both recall and recognition tasks, we asked participants different types of questions following exposure to the message. Indeed, in our empirical setting we have used various memory measures that we describe in the next paragraphs.

The first kind of measures (that will be referred to from now on as OPENQ) asked participants to answer different questions without any cue (e.g., what is the price of this computer? What is the power of its processor? What is the size of its RAM?) As such, they help us measure consumer recall; the extent to which consumers are able to retrieve information without being aided.

The second series of questions (referred from now on as CLOSEQ) consisted of multiple-choice items, wherein the correct answer was present. Participants were asked to circle the correct option among a series of possible answers. Examples of those multiple-choice questions include the following: What was the operating system of the computer featured in the ad? a) Vista family edition b) XP c) Vista Professional d) Windows 2000; What was the capacity of the Hard drive? a)120 GB b)160 GB c) 80 GB d) 140GB. This second set of memory measures allowed us to assess consumer recognition; the extent to which consumers are able to recognize the correct information among a series of possible answers.

In addition to these two memory tasks, we also included memory questions related to information that was not present in the initial message (referred to as NOPRES), as memory entails not only retrieving correctly stored information but also being able to identify whether a given type of information was listed or not in the initial message. In other words, when asked to provide an answer regarding a feature that was not present in the initial message, good memorizers should be able to detect that this information was not present. In order to include this "discriminant" property of memory in our experiment, we designed several multiple-choice items about features that were not listed in the original message. For instance, one question asked participants to assess the number of USB ports available on the computer described in the ad, while this information was not included in the computer description (i.e., How many USB ports are included in this computer? a) 2 b) 4, c) 1, d) 6 e) none of these

option f) information not provided. The correct answer was f.) This third set of measures enabled us to assess discriminant memory; the extent to which consumers paid enough attention to the ad to be able to recognize whether a piece of information was displayed in the original message or not.

Finally, we also measured the Number of Unanswered Questions (referred to as NR).

4.4.2 Results and Discussion

Descriptive statistics

On an average, participants reported a subjective knowledge score of 4.42 (SD = 1.10) and reached a score of 23.39 (SD = 3.94) points out of 40 on the objective knowledge quiz. The distribution of self-esteem scores in our sample was negatively skewed (M = 5.2, SD = .67). The correlation between SK prior to manipulation and self-esteem was non-significant (r = .01, NS). Of the twelve memory questions presented to participants, the mean number of correct retrievals was 5.31 (SD = 2.28). The mean number of correct answers to close-ended questions was 2.02 (SD = .99). On an average, participants correctly answered to 2.31 (SD = 1.1) open-ended questions and were able to recognize correctly 0.9 (SD = 0.4) piece of information that was not displayed to them.

Manipulation check.

Our subjective knowledge manipulation worked in the intended direction ($F(1,114) = 121.58$, $p = .0001$, $\eta p2 = 0.518$). Participants in the decreased subjective knowledge condition experienced a decrease of -1.3 (SD = 0.92) of their subjective knowledge score relative to the initial measure of subjective knowledge, while participants in the increased subjective knowledge showed an average increase of 0.7 (SD = 1.02) of their subjective knowledge score relative to the initial measure of subjective knowledge, as shown in Figure 12.

In order to test whether the magnitude of the subjective knowledge change was significantly different as a function of the direction (i.e., increase vs. decrease) of the subjective knowledge manipulation, a new variable (*DeltaSK2*) was created using the *compute* function of SPSS. *DeltaSK2* was computed by multiplying by -1 the subjective knowledge change score in the decreased subjective knowledge condition while keeping the

subjective knowledge change score identical in the increased subjective knowledge condition: This allowed us to compare the magnitude of the subjective knowledge changes between-condition. A one-way ANOVA test was then conducted with condition as a factor and *DeltaSK2* as a dependent variable and reached significance ($F(1,114) = 4.6$, $p < .05$). Thus, in line with hypothesis 1, participants' subjective knowledge scores were more affected as a result of a decreased (vs. increased) subjective knowledge manipulation.

In addition, it was critical for our manipulation to be effective both for high and low self-esteem participants. For this reason, we checked this manipulation within the high and low self-esteem subgroups of our sample.

As intended, our manipulation worked within the two self-esteem subgroups of participants. Within the high self-esteem subgroup, the subjective manipulation was successful ($F(1,60) = 66.5$, $p < .001$, $\eta p2 = 0.53$). High self-esteem participants in the decreased subjective knowledge condition experienced a decrease of -1.34 (SD = 0.96) of their subjective knowledge score relative to their initial measure of subjective knowledge. In the increased subjective knowledge, high self-esteem participants showed an average increase of 0.62 (SD = 0.93) of their subjective knowledge score relative to the initial measure of subjective knowledge, as shown in Figure 13. Within the low self-esteem subgroup, the subjective knowledge manipulation also worked as intended ($F(1,52) = 51.4$, $p < .001$, $\eta p2 = 0.5$). Participants in the decreased subjective knowledge condition experienced a decrease of -1.27 (SD = 0.83) of their subjective knowledge score relative to the initial measure of subjective knowledge and participants in the increased subjective knowledge condition experienced an average increase of 0.75 (SD = 1.13) of their subjective knowledge score relative to the initial measure of subjective knowledge.

Thus, given that the subjective knowledge manipulation worked as planned in the two self-esteem subgroups of our sample, we were confident in our ability to study the possible moderating role of self-esteem in the relationship between experimentally induced subjective knowledge change and information processing.

Main Results

State Self-esteem

A single factor (subjective knowledge manipulation: increase vs. decrease) ANCOVA was run with trait self-esteem as a covariate and indicated that the effect of subjective knowledge on state self-esteem was not significant ($F < 1$). No difference was found between the two subjective knowledge conditions on state self-esteem score ($M_{condition1} = 4.9$, $M_{condition2} = 4.8$).

Total Memory score

The total memory score was computed by adding up our three main memory measures (open-ended questions; close-ended questions; ability to identify non displayed information).

A 2 (trait self-esteem: high vs. low) × 2 (subjective knowledge manipulation: increased vs. decreased) ANCOVA with objective knowledge as covariate indicated that the main effects of subjective knowledge and self-esteem were not significant ($F < 1$).

However, the interaction between these factors was significant ($F(1,108) = 11.4$, $p < .001$, $\eta p2 = 0.1$; see Figure 13). For low self-esteem participants, decrease of subjective knowledge was associated with a lower score on the memory test ($M_{increased\ subjective\ knowledge} = 6.37$, $M_{decreased\ subjective\ knowledge} = 4.40$; $F(1,48) = 5.7$, $p = .02$, $\eta p2 = 0.11$). The opposite pattern was found for high self-esteem participants: a decrease of subjective knowledge was associated with a higher score on the memory test ($M_{increased\ subjective\ knowledge} = 4.43$, $M_{decreased\ subjective\ knowledge} = 5.78$; $F(1,59) = 5.17$, $p = .027$, $\eta p2 = 0.08$).

Figure 13: Total memory score as a function of subjective knowledge manipulation (study 1)
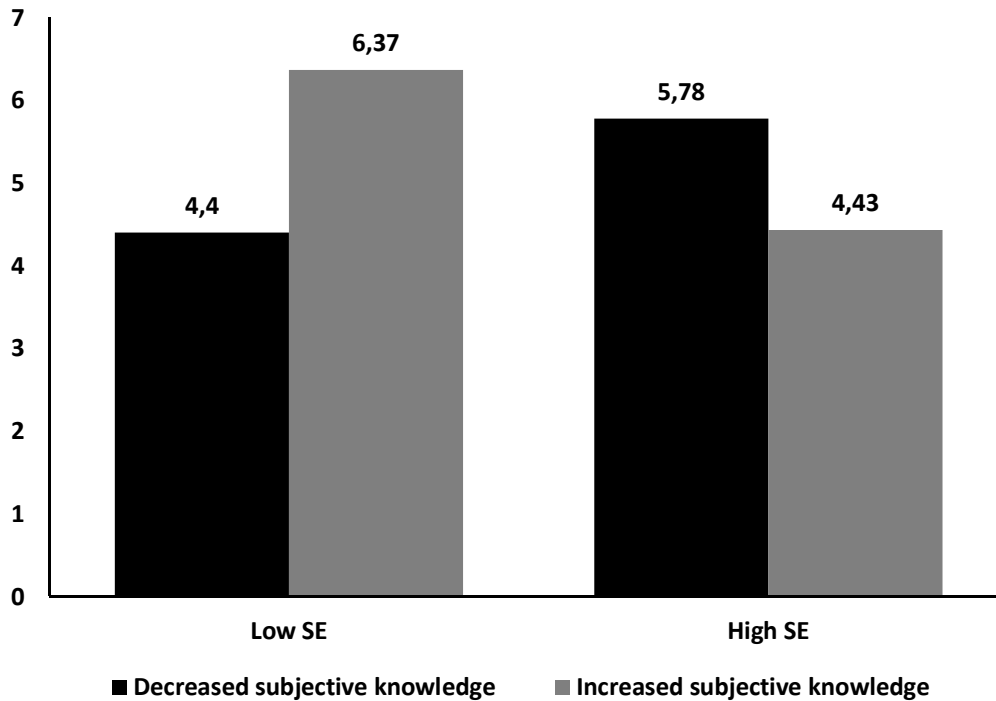
We obtained converging patterns of results when we examined the effect of subjective knowledge manipulations on each of the memory measures separately.

First, an interaction was found between subjective knowledge manipulation and self-esteem on open-ended questions scores (referred to as OPENQ), the overall measure of our recall task ($F(1,112) = 9.03$, p =.003, $\eta p2 = .075$, see Figure 14). For low self-esteem participants, a decrease of subjective knowledge was associated with a lower score on OPENQ ($M_{\text{increased subjective knowledge}} = 2.6$, $M_{\text{decreased subjective knowledge}} = 2.1$; $F(1,50) = 3.88$, p = .05, $\eta p2 = .07$). The opposite pattern was found for high self-esteem participants: A decrease of subjective knowledge was associated with a higher score on OPENQ ($M_{\text{increased subjective knowledge}} = 1,97$, $M_{\text{decreased subjective knowledge}} = 2,66$; $F(1,62) = 5.65$, p = .02, $\eta p2 = .08$).

Figure 14: Open-ended questions score (study 1)
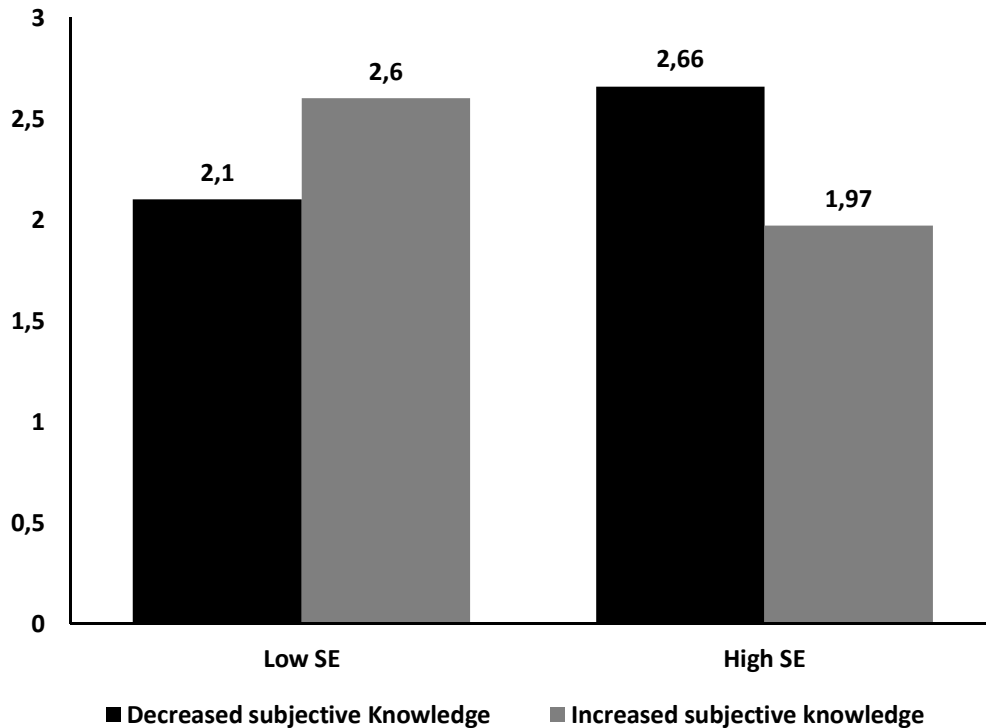
Second, an interaction was found between manipulation and self-esteem on close-ended questions' score (referred to from now on as CLOSQ), the overall measure on our recognition task ($F(1,112) = 5,8$, $p = .02$, $\eta p2 = 0.05$, see Figure 15). For low self-esteem participants, a decrease of subjective knowledge was associated with a lower score on CLOSQ ($M_{\text{increased subjective knowledge}} = 2.32$, $M_{\text{decreased subjective knowledge}} = 1.71$; $F(1,50) = 4.36$, $p = .04$, $\eta p2 = 0.08$). The opposite pattern was found for high self-esteem participants: A decrease of subjective knowledge was associated with a higher score on CLOSEQ ($M_{\text{increased subjective knowledge}} = 1.77$, $M_{\text{decreased subjective knowledge}} = 2.06$) although the relationship failed to reach significance ($F(1,62) = 1.47$, $p = .23$, $\eta p2 = 0.02$).

Figure 15: Close-ended questions score (study 1)
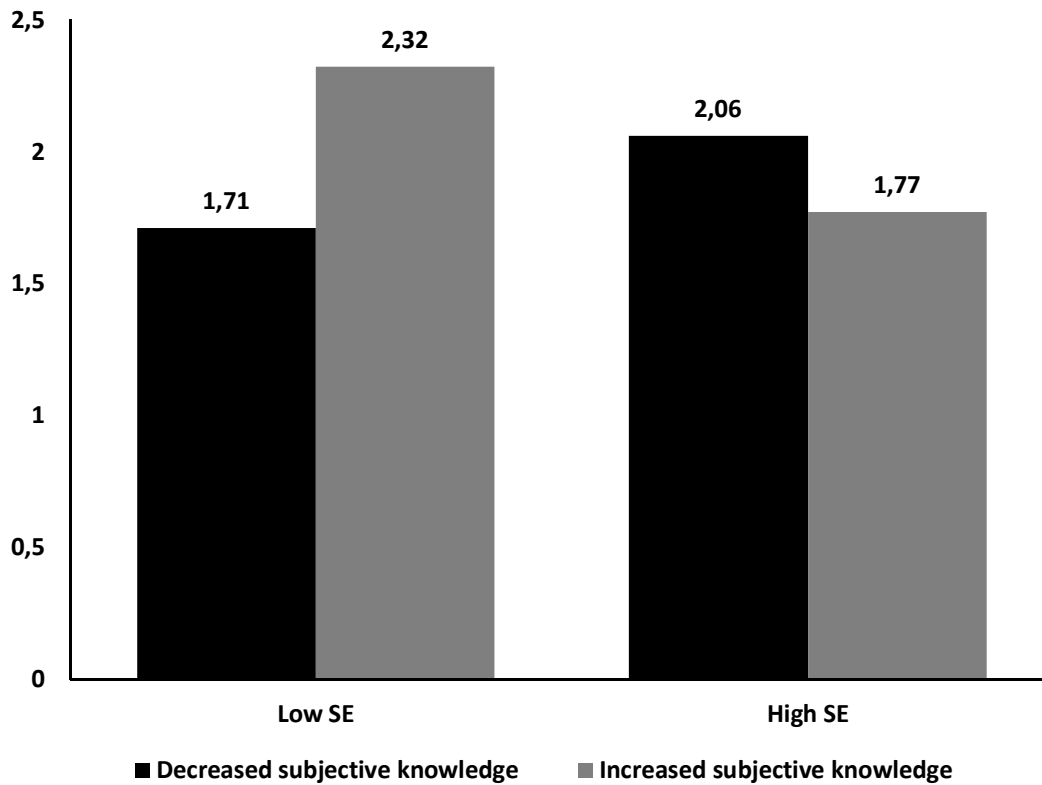
Third, an interaction was found between manipulation and trait self-esteem on participants' capacity to recognize non-displayed information (a capacity referred to from now on as NOPRES, the overall measure of our discriminative knowledge task) ($F(1,112) = 12$, $p = .001$, $\eta p2 = .1$). For low self-esteem participants, a decrease of subjective knowledge was associated with a lower score on NOPRES ($M_{increased\ subjective\ knowledge} = 1.42$, $M_{decreased\ subjective\ knowledge} = .62$; $F(1,50) = 8.27$, $p = .006$, $\eta p2 = 0.14$). The opposite pattern was found for high self-esteem participants: For high self-esteem participants, a decrease of subjective knowledge was associated with a higher score on NOPRES ($M_{increased\ subjective\ knowledge} = .61$, $M_{decreased\ subjective\ knowledge} = 1.06$; $F(1,62) = 3.7$, $p = .06$, $\eta p2 = 0.06$).

Finally, an interaction was found between manipulation and trait self-esteem on NR, measuring the number of question left unanswered by participants ($F(1,112) = 9.95$, $p = .002$, $\eta p2 = 0.08$). Given that a high number of items left unanswered reduced the overall score on our memory test, this measure needs to be analyzed in a reverse way compared to our other memory measures: As NR increases, memory performance is weakened. For low self-esteem

participants, decrease of subjective knowledge was associated with higher NR ($M_{increased\ subjective\ knowledge}$ = 0.74, $M_{decreased\ subjective\ knowledge}$ = 2.52; $F(1,50)$ = 8.38, p = .006, $\eta p2$ = 0.14). The opposite pattern was found for high self-esteem participants: Decrease of subjective knowledge was associated with lower NR ($M_{increased\ subjective\ knowledge}$ = 1.81, $M_{decreased\ subjective\ knowledge}$ = 1.03), although the relationship does not reach significance ($F(1,62)$ = 2.13, p = .15, $\eta p2$ = 0.03).

One of the key limitations of our first findings was linked to the fact that we used median split as opposed to continuous variable with respect to self-esteem. We thus decided to re-run our analysis linking self-esteem and subjective knowledge manipulation to memory performance, using self-esteem as a continuous rather than dichotomized variable, as recommended by Aiken and West (1991). Therefore, in accordance with the recommendations of Aiken and West (1991), participants' self-esteem scores were mean-centered and conditions were recoded (increased subjective knowledge = – 1, decrease subjective knowledge = 1). Recoded condition, self-esteem and their interaction terms were regressed simultaneously onto the dependent variable. A significant two-way interaction of condition and self-esteem was found, β= .353, $t(112)$ = 3.99, p < .0001) as shown in Figure 16.

We probed the significant interaction of self-esteem and condition. Therefore, we performed simple slope analyses at 1 standard deviation above and below the mean of the predictor self-esteem. The simple slope of memory was significant for participants with relatively high self-esteem (+ 1 standard deviation), β = .74, $t(112)$ = 2.65, p = .009), as well as for those with relatively low self-esteem (– 1 SD), β = -.86, $t(112)$ = -2.99, p = .003). This result strengthens our findings that both high and low self-esteem participants were affected by our knowledge manipulation, but reacted differently. While participants with high self-esteem remembered more items under subjective knowledge decrease, participants with low self-esteem remembered more under subjective knowledge increase.

Figure 16: Total memory score for low and high self-esteem participants following subjective knowledge manipulation (Study 1)
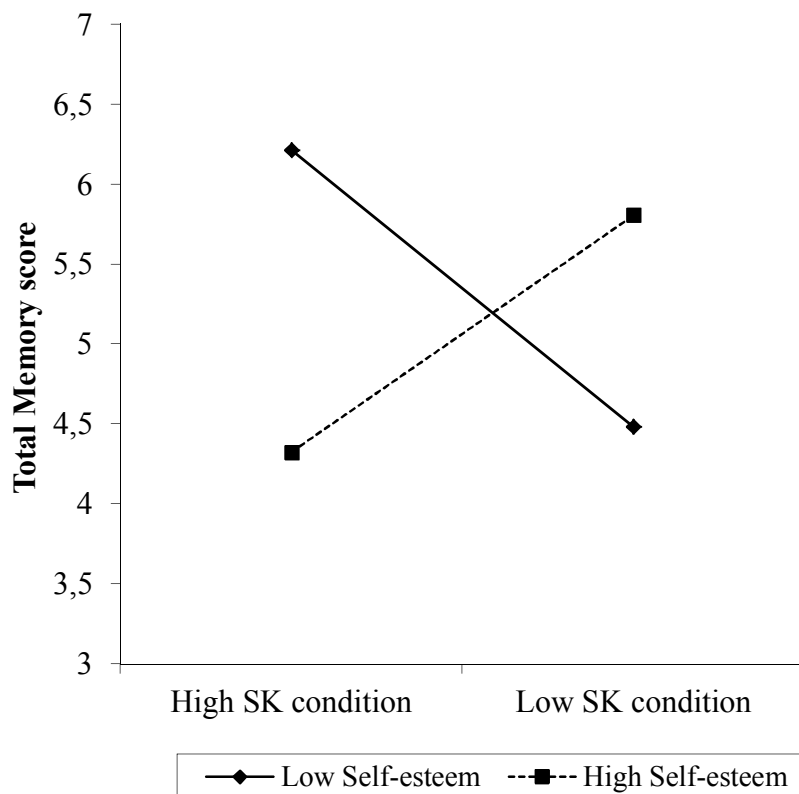
Discussion

Experiment 1 provides support for the moderating role of self-esteem on the relation between SK manipulations and memory for information. As we predicted in hypothesis 7, high self-esteem participants' performance was better following a decrease (vs. increase) in SK. An opposite pattern was found for low self-esteem participants, in line with hypothesis 6. Thus, this result is promising, as it gives support to our initial assumption that self-related personality variables are involved to account for the effects of subjective knowledge manipulations on memory for information. As such, these initial empirical findings bear applied implications for marketers wishing to use subjective knowledge manipulations to boost consumers' attention and memory for their messages. A key output to retain from these first results is that caution is needed when altering consumers' subjective knowledge, as these

manipulations can have detrimental effects on consumers' information processing. For instance, decreasing low self-esteem consumers' subjective knowledge can reduce the attention they pay to incoming information. Thus, executing a unique ad campaign that fails to take into account self-esteem differences among the prospected consumers may drive part of the ad targets' away from the message and the company that delivers it.

However, further investigation was needed to understand the possible underlying mechanisms behind the effects we found. Could it be, for instance, that high self-esteem consumers' better memory performance following knowledge decrease was driven by an attempt to engage additional efforts, in the face of self-threatening negative feedbacks? Given our initial study failed to find evidence of a link between subjective knowledge manipulations and state self-esteem, such conclusions could not be drawn at this stage of our research. Thus, despite preliminary support of our initial assumptions, this experiment bears several limitations. First, no control condition was included in our design, making it impossible to assess the effect of our SK manipulation, relatively to a baseline. Second, contrary to our hypotheses 3 and 4, the SK manipulations we designed did not influence participants' reported state self-esteem. We speculate that this may have been due to a reactance effect experienced by some participants not willing to admit openly in a self-report that their ego was affected by a knowledge feedback. To account for this possibility, our second experiment uses an alternative self-esteem measure after the performance feedback.

4.5 Study 2

Study 2 was designed with two main goals in mind: first, to replicate the findings of our first study (support of hypothesis 1 and hypothesis 4-7) and second, to test whether our hypotheses 3-4 (i.e., influence of our subjective knowledge manipulation on state self-esteem) could be supported using an implicit (vs. explicit) measure of state self-esteem.

To better understand the processes by which a subjective knowledge manipulation affects memory for information, study 2 thus aimed at testing the possible mediating effect of state (vs. trait) self-esteem in the relationship between subjective knowledge change and information processing. To this end, we included an implicit self-esteem measure (i.e., the self-esteem implicit association test developed by Greenwald & Farnham, 2000 and adapted from Greenwald, MacGhee & Schwartz, 1998) after subjective knowledge had been manipulated. Our reasoning was that an implicit measure of self-esteem would be more

sensitive to a subjective knowledge manipulation than the explicit state self-esteem scale (Heatherton & Polivy, 1991), given self-presentation biases associated with explicit self-report measures.

Specifically, the distinction between explicit and implicit measures of personality is relevant to our empirical setting. Indeed, explicit measures of self-esteem, such as the state self-esteem scale (Heatherton & Polivy, 1991), contain conscious representations stemming from a deliberate reasoning process. As such, they are subject to the limitations of explicit representations such as the self-presentation biases (Greenwald & Banaji, 1995; Schnabel, Asendorpf & Greenwald, 2007). For instance, following a decrease in subjective knowledge, some participants may not wish to recognize in a verbal report that their perception of self-worth has been hurt. Therefore, using an implicit measure of self-esteem might help us tap into possible self-states changes that the explicit measure we used in study 1 (Heatherton & Polivy, 1991) did not capture. In line with Dijksterhuis (2004) and Koole and Dehart (2007), our reasoning was that an implicit measure of self-esteem could be used as a measure of state self-esteem changes and would be more sensitive to self-related manipulations than a state self-esteem report. Indeed, implicit measures reduce the likelihood that participants guess the purpose of the measure and edit their answers accordingly. Moreover, Dijksterhuis (2004) showed that the self-esteem IAT was sensitive to fluctuations in state self-esteem induced by experimental manipulations.

In addition, we added a control condition to our experimental design to establish a baseline level of memory measure. Finally, we also included a general self-efficacy scale (Schwarzer & Jerusalem, 1995) in order to assess whether this personality trait could account for the relationship between SK manipulations and memory for information, alternatively to self-esteem. As defined in the second part of this dissertation, general self-efficacy is defined as a trait representing a judgment of how well one can perform across a variety of situations (Smith, 1989). As such, it was possible that general self-efficacy moderated the relationship between our SK manipulation and participants' reactions. Indeed, high general self-efficacy consumers may have greater coping abilities, which would lead them to be less discouraged when facing a negative feedback.

4.5.1 Method and procedure

One hundred and thirteen participants took part in our second study.

The procedure used in this study was similar to the first study, with two notable exceptions. First, we included a measure of general self-efficacy using the Schwarzer and Jerusalem (1995) scale. The Schwarzer and Jerusalem scale comprises 10 items (e.g., "I can always manage to solve difficult problems if I try hard enough," "It is easy for me to stick to my aims and accomplish my goals," "I can remain calm when facing difficulties because of my coping abilities.") Second, we introduced an additional control condition to our two experimental conditions. In the control condition, participants were simply asked to calculate their score without receiving any feedback, while the two other subjective knowledge conditions were similar to the ones used in study 1.

During the first step, participants were asked to complete a paper-and-pencil personality questionnaire (Appendix X), including a measure of trait self-esteem (Rosenberg, 1965; α = .8), of general self-efficacy (Schwarzer & Jerusalem, 1995; α = .84) and a measure of subjective knowledge on different domains including our focal topic, namely computer. The items measuring subjective knowledge about computers showed strong reliability (α = .91).

During the second step (computer knowledge quiz), participants were asked to take part to the same computer quiz as the one used in the first study (Appendix III). At the end of the knowledge quiz, participants' subjective knowledge was manipulated using the same type of feedback than the one used in our first study, with the noticeable exception that we added a control condition to the two experimental conditions. In the control condition, participants were simply asked to calculate their score without receiving any feedback, while the two other subjective knowledge conditions were similar to the ones used in study 1. Following the feedback, subjective knowledge of computers was reassessed using three items (1 = not knowledgeable at all, 7 = extremely knowledgeable; 1 = one of the most knowledgeable, 7 = one of the least knowledgeable, 1 = not familiar at all, 7 = extremely familiar; α = .87). This enabled us to ensure that our manipulation of subjective knowledge occurred as intended and to assess the magnitude of subjective knowledge change.

Following the subjective knowledge manipulation, participants were exposed to a computer ad. The ad stimuli (Appendix XI) was adapted from a real computer ad found on the

Internet (website: www.acer.fr), included technical information about the computer attributes, and was developed following the same procedure than the one used for the pilot study and study 1. To this end, the ad was first presented to a sample of HEC students to ensure that the information was neither too detailed nor too complex.

Next, participants were seated in front of a computer to complete the self-esteem implicit association test (Greenwald & Farnham, 2000). The IAT procedure used in the study is an adapted version of the traditional IAT developed by Greenwald, MacGhee and Schwartz (1998). In this test, participants are shown words in the center of the screen and asked to respond as quickly as possible. Category labels appear in the upper left and right corners of the screen, and participants are instructed to use the "e" and "i" buttons to categorize stimuli into the two categories. Seven blocks of trials were used, five of which (1, 2, 3, 5 and 6) being used for practice and two of which to score the IAT (4 and 7). Block 1 asks participants to categorize stimuli as *good* or *bad*. Block 2 asks them to categorize stimuli as self or other. Blocks 3 and 4 add the two categories together: e.g., good or self on one side of the screen versus bad or other on the other side. Block 5 is based on the same structure than block 2 but reverse the side of self and other. Blocks 6 and 7 are based on the same structure than Block 3 and 4 but reverse the type of association (i.e., by linking bad and self on one side and good and other on the other side). IAT latencies were calculated dividing the difference between test block means (4 and 7) by the standard deviation of all the latencies in the two test blocks, in line with the procedures outlined by Greenwald, Nosek and Banaji (2003) and detailed in the next section. Following this self-esteem IAT, participants took part in a memory quiz about the computer ad shown to them just after the subjective knowledge manipulation.

4.5.2 Results and discussion

Descriptive statistics

On an average, participants reported a subjective knowledge score of 4.2 (SD = 1.38) and reached a score of 23.41 (SD = 3.59) points out of 40 on the objective knowledge quiz. Participants' mean self-esteem score was 4.65(SD = .6). The correlation between SK and self-esteem was non-significant (r = .1, p = .27). Of the twelve memory questions presented to participants, the mean number of correct retrievals was 6.89 (SD = 1.92).

On an average, participants had a general self-efficacy score of 5.06 (SD =.77) and a self-esteem score of 4.65 (SD = .6). Correlation between general self-efficacy and self-esteem was medium sized (r = .295, p = .001).

Manipulation check

Our subjective knowledge manipulation worked in the intended direction ($F_{(2,110)}$ = 16.1, p < .001, $\eta p2$ = 0.23). Participants in the decreased subjective knowledge condition showed a decrease of – 0.98 of their subjective knowledge score relative to their initial measure of subjective knowledge; control condition participants' subjective knowledge score did not change significantly (–.17, NS); and participants in the increased subjective knowledge showed an average increase of 0.4 of their subjective knowledge score relative to the initial measure of subjective knowledge.

However, a one sample t-test revealed that for low self-esteem consumers, the subjective knowledge variation was not different from zero in the increased subjective knowledge condition (subjective knowledge increase $_{low SE}$ =.17, sig = .59). To ensure that our failure to increase subjective knowledge was not driven by ceiling effects, we examined subjective knowledge score prior to the manipulation for both self-esteem groups. Both within high and low self-esteem groups, the mean subjective knowledge score prior to the manipulation was average (mean subjective knowledge score $_{low SE}$ = 4.02, SD=1.39, mean subjective score $_{high SE}$ = 4.13, SD= 1.38). Thus, in both self-esteem groups, the initial subjective knowledge score was not so high as to account for the fact that the increased subjective knowledge manipulation would not succeed. Given the incapacity of our subjective knowledge increase condition to boost low self-esteem participants' subjective knowledge score, it became impossible to compare high and low self-esteem participants' reactions following an increase in subjective knowledge. Therefore, the increased subjective knowledge condition was dropped from further analyses. We hereafter focus on the consequences of subjective knowledge decrease on consumer information processing, taking into account consumers' initial level of self-esteem.

Interaction of self-esteem and subjective knowledge manipulation on Total Memory Score

Data were analyzed using a 2 (subjective knowledge: decreased, control) × 2 (self-esteem: low, high) between-participants design. In line with our first study, the interaction between self-esteem and subjective knowledge manipulation was significant ($F(1,82) = 5.7$, p = .02, ηp2 = .065, see figure 17). Participants with high self-esteem were better in memorizing following subjective knowledge decrease ($M_{subjective\ knowledge\ decrease} = 7.23$, $M_{subjective\ knowledge\ control} = 6.1$, p =.078, ηp2 = .076), while the opposite pattern was found for low self-esteem participants but only approached marginal significance ($M_{subjective\ knowledge\ decrease} = 6.5$, $M_{subjective\ knowledge\ control} = 7.42$, p = .129, ηp2 = .054).

Figure 17: Study 2 Total Memory Score
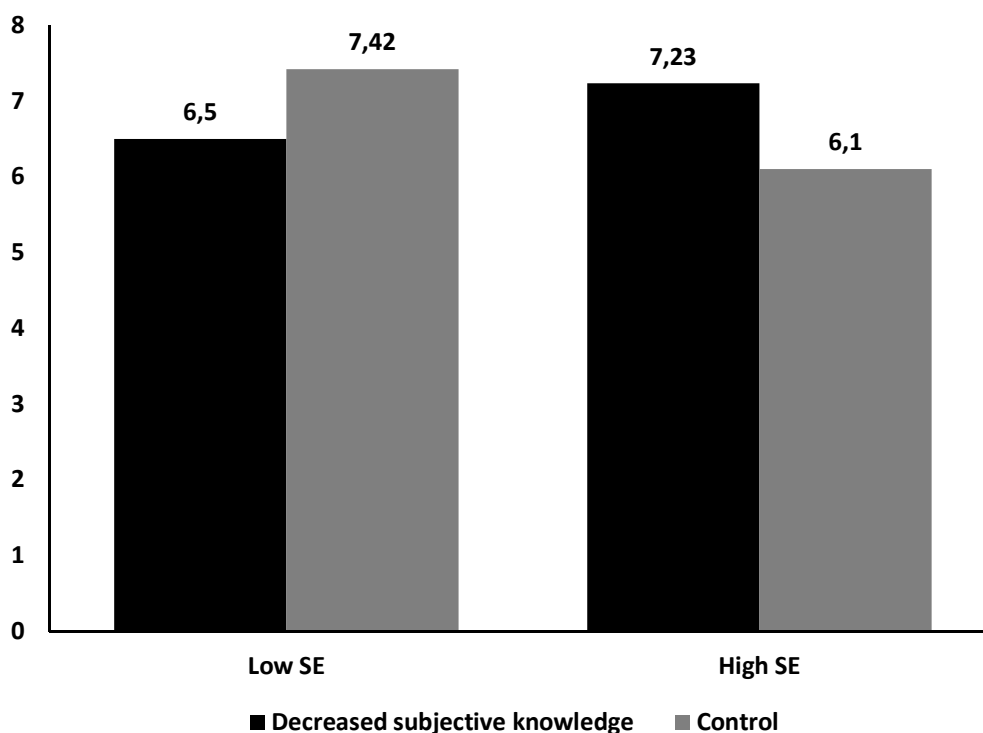
In addition, we re-ran our analysis linking self-esteem and subjective knowledge manipulation to memory performance, using self-esteem as a continuous rather than dichotomized variable, as recommended by Aiken and West (1991). In accordance with Aiken and West (1991), participants' self-esteem scores were mean-centered and conditions were recoded (control condition = –1, decrease subjective knowledge = 1). Recoded

conditions, self-esteem and their interaction terms were regressed simultaneously onto the dependent variable. A significant two-way interaction of subjective knowledge manipulation and self-esteem was found, β= .28, t(82) = 2.62, p < .01) as shown in Figure 18.

Figure 18: Total memory score for low and high self-esteem participants following subjective knowledge manipulation (study 2)
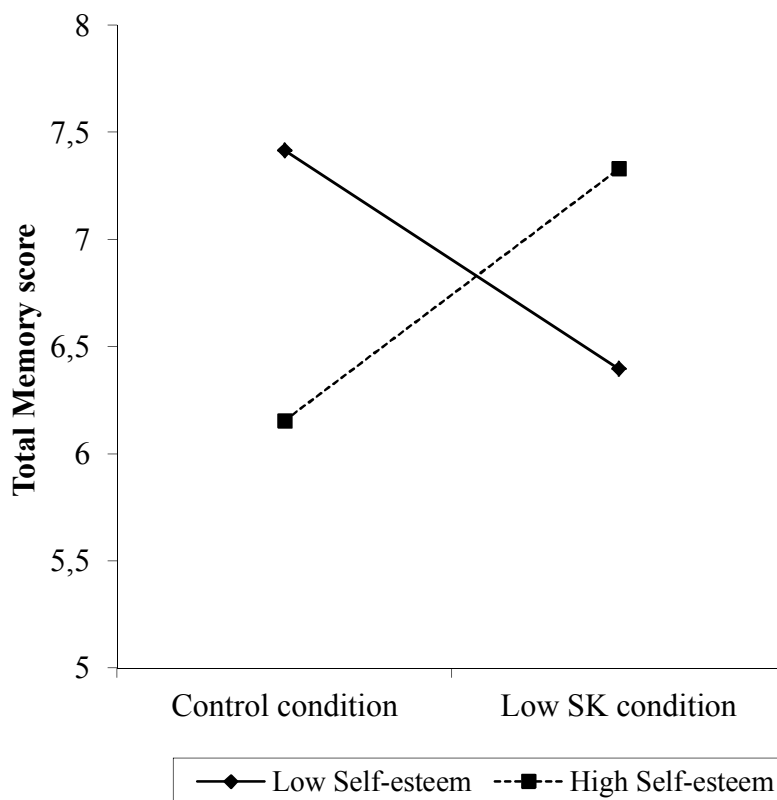
We probed the significant interaction of self-esteem and subjective knowledge manipulation. Therefore, we performed simple slope analyses at 1 standard deviation above and below the mean of the predictor self-esteem. The simple slope of memory score was significant for participants with relatively high self-esteem (+ 1 standard deviation), β = 0.59, t(82) = 1.96, p = .05, but only marginally significant for those with relatively low self-esteem (− 1 SD), β = -.51, t(82) = -1.69, p = .09). This result indicates that participants who reacted the most strongly to our subjective knowledge decrease condition were the ones with a high self-esteem. While participants with high self-esteem remembered more items under subjective knowledge decrease, participants with low self-esteem tended to remember more under control condition.

Implicit Association Task reaction time data were processed according to the procedures outlined in Greenwald, Nosek and Banaji (2003). This measure consists in dividing the differences between the test blocks by the standard deviation of all latencies in the two test blocks. Thus, these IAT measures are individually calibrated by each respondent's standard deviation of response latencies. The reason behind the use of this procedure stems from the fact that differences between experimental conditions are frequently linked to the variability of the data from which the means are calculated (Greenwald, Nosek & Banaji; 2003). Thus, using the standard deviation as a divisor enables to adjust differences between means for this effect of underlying variability. Procedures used to calculate the IAT score in addition to the distribution of IAT scores are described in Appendix XIII and XIV.

Our subjective knowledge decrease manipulation negatively affected the implicit self-esteem score of high self-esteem participants ($M_{subjective\ knowledge\ decrease}$ =.564, $M_{subjective\ knowledge\ control}$ = .752, p = .03, $\eta p2$ = .11), but not of low self-esteem participants ($M_{subjective\ knowledge\ decrease}$ = .609, $M_{subjective\ knowledge\ control}$ = .629, p = .87, $\eta p2$ = .001), as shown in Figure 19. This suggests that after subjective knowledge decrease, high self-esteem participants but not low self-esteem ones underwent ego-threat and put extra effort in memorizing domain-related information.

Figure 19: Self-esteem implicit association test score following subjective knowledge manipulation (study 2)
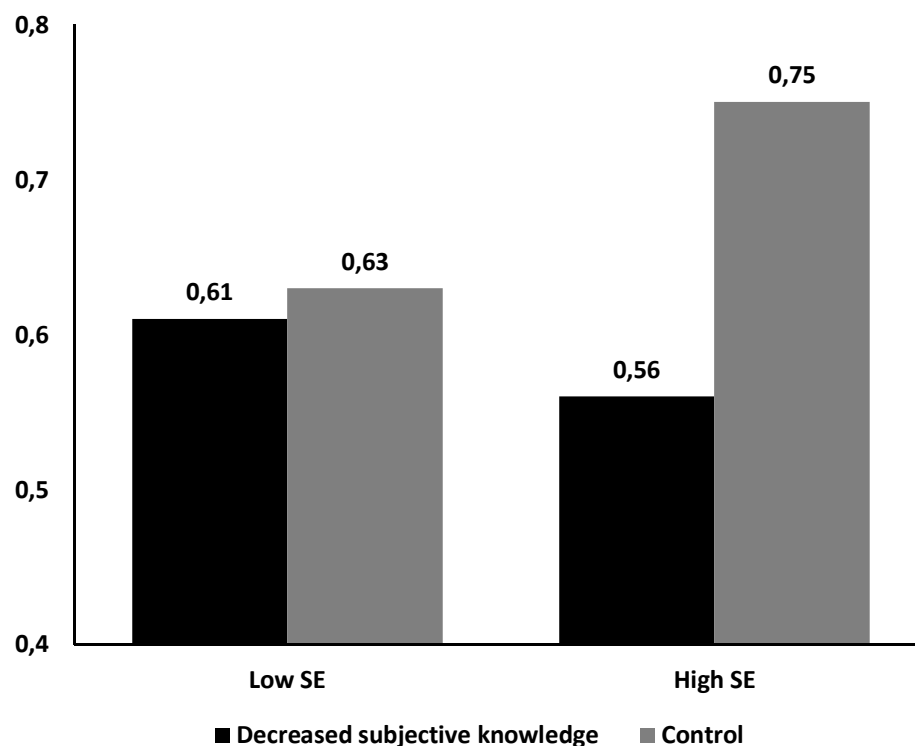
General Self-efficacy

Finally, we conducted additional analysis of our data using a 3 (subjective knowledge: increased, decreased, control) × 2 (general self-efficacy: low, high) design and a 2 (subjective knowledge: decreased, control) × 2 (general self-efficacy: low, high) design, and none of them reached statistical significance. This allows us to rule out general self-efficacy differences as an alternative personality trait influencing memorization following subjective knowledge manipulations.

Discussion

Thus, our second study brings further credit to the hypothesis of a moderating influence of self-esteem in the relationship between subjective knowledge and information processing. In support of hypotheses 6 and 7, whereas low self-esteem participants were discouraged by a decrease in their subjective knowledge, high self-esteem participants

memorized information better when their subjective knowledge had been threatened. Moreover, we found partial support for our hypothesis that subjective knowledge decrease could translate into decreased self-esteem (hypothesis 3 confirmed for high self-esteem participants), which in turn led high self-esteem participants to engage in self-enhancement activities. Indeed, the hypothesis of a self-enhancement mechanism at stake when high self-esteem participants' subjective knowledge has been threatened is supported by a decrease in their implicitly measured self-esteem following a decrease in subjective knowledge.

These findings have important social implications. Indeed, when marketers or salespeople decrease their consumers' perception of knowledge in an effort to boost the attention they will pay to the information they deliver, they may also affect these consumers' self-esteem. Given the functions served by self-esteem, as evidenced in the social psychology literature (e.g., buffer against death-related thoughts anxiety according to terror management theory (Pyszczynski et al., 2004), social monitoring device according to sociometer theory (Leary & Baumeister, 2000), any manipulation device likely to influence consumer self-esteem levels may have important consequences on consumers' life and their psychological well-being. In brief, as subjective knowledge manipulations can influence consumers' perception of self-worth and result in anxiety, marketers' techniques aimed at manipulating subjective knowledge should be subject to control by ethical commissions and codes, assessing the potential costs and benefits associated with such actions. We discuss more extensively the ethical consequences of subjective knowledge manipulations in the concluding part of this dissertation.

The fact that low self-esteem participants' self-esteem IAT scores were not affected by a subjective knowledge decrease (hypothesis 3 not supported for low self-esteem participants), is more intriguing but could be explained by a floor effect. Having an initial low level of self-esteem prior to any manipulation, the subjective knowledge manipulation may have confirmed their existing negative self-image rather than decrease it further. This does not mean however that our subjective knowledge manipulation had no effect on them: On the contrary, being reminded that their capacity was below average may have enhanced low self-esteem participants' tendency to give up processing any information further.

Finally, we have ruled out self-efficacy as a potential alternative mechanism at stake when subjective knowledge is decreased. This is in line with our initial assumption that self-efficacy should only be prevailing when the second task is aligned with the first one, which is not the case in our experimental design wherein a general knowledge quiz about computers is followed by a specific memory test about a computer ad. On the contrary, our general

theoretical framework putting the emphasis on the self-related needs fulfilled by information processing is strengthened. Following a decrease in their self-esteem driven by a subjective knowledge threat, high self-esteem participants may have felt the urge to pay attention to domain-related information in an effort to self-enhance.

Several limitations of our second study need to be highlighted. First, a key limitation is linked to our failure to induce an increase in subjective knowledge among low self-esteem participants. As previously stated, it was important for our subjective knowledge manipulations to be effective both on high and low self-esteem participants. Our incapability to boost subjective knowledge experimentally can be interpreted through the lens of self-motives. Low self-esteem consumers may have discarded the increase in subjective knowledge in an attempt to self-verify (Swann & Read, 1981). Given a positive feedback, low self-esteem participants may have decided to discard it as non-credible and continue to give credit to their initial subjective knowledge about computers, instead. Such a strategy would allow them to be protected against a potential disappointment, should a future situation (e.g., future feedback, facing a complex computer purchase situation, not being able to set up a new software…) confirm their initial self-belief at the expense of the positive feedback given to them in our study and possibly bringing "false hope". Another way of making sense of our inability to induce an increased subjective knowledge condition for every participant is to apply the loss aversion principle (Kahneman & Tversky, 1981) to our current experimental setting. According to the loss aversion principle, losses loom larger than gains. Thus, participants may have been more sensitive to a loss than a gain in subjective knowledge. Such a conclusion is in line with our hypothesis 1 and the previous finding of study 1 that it was more difficult to induce a gain (vs. a loss) in subjective knowledge using an experimental manipulation.

In addition, a key limitation of our first two studies is linked to the fact that we have not specified the scope of the identified memory effect. Indeed, in studies one and two, participants took part in the knowledge quiz (critical subjective knowledge manipulation) prior to exposure to the computer ad, which hints toward between-participants differences at the information encoding stage. So far, we have proposed that the difference between high and low self-esteem memorization performance had a motivational origin. Indeed, following a subjective knowledge decrease, high self-esteem consumers may have been more motivated to pay attention to incoming information in an effort to self-enhance, while low self-esteem consumers may have been discouraged by the negative feedback and decided to pay less attention to domain-related information in an effort to self-protect. However, a possible

alternative explanation to our findings could be that the higher performance of high self-esteem participants under subjective knowledge threat was not only due to greater motivation at encoding but also to differences between high and low self-esteem consumers at the information retrieval stage. Specifically, following a decrease in subjective knowledge, low self-esteem participants may have paid much attention to incoming information, but failed to retrieve it when asked to do so. This would be in line with the view that self-threat could negatively influence participants working memory. For instance, it has been shown that stereotype threat disrupted working memory (Schnader & Johns, 2003) and depleted cognitive resources (Inzlicht, McKay & Aronson, 2006). In the same stance, threat about one's performance may have depleted low self-esteem participants' cognitive resources, which would result in a failure to communicate the appropriate answer at the retrieval stage, despite similar motivation to process information at the encoding stage. In order to rule out this alternative explanation, an additional study changing the sequence of the experiment was conducted.

4.6 Study 3

To rule out the alternative explanation that differences in retrieval rather than encoding of incoming information drive the observed effects in the first two studies, study 3 replicated the design of study 1 with one major change; the experiment sequence was modified. Similarly to the second study of Wiersema et al. (2010), we changed the sequence of our experimental design by exposing participants to the ad prior to our critical subjective knowledge manipulation. Indeed, if in study 2's low self-esteem participants failed to memorize as much information as their high self-esteem counterparts due to retrieval failure, the effect should still hold when the ad is presented before the subjective knowledge manipulation; being challenged in their self-perception should still disturb low self-esteem consumers, disrupt their working memory and deplete their cognitive resources (Inzlicht, McKay & Aronson, 2006; Schnader & Johns, 2003). However, if participants' memorization performance is only driven by differences in motivation at the time of encoding, memory score should not be altered by a subjective knowledge manipulation occurring after exposure to the ad. Thus, should we be unable to replicate an interaction between subjective knowledge conditions and self-esteem on memory score in our study 3, our assumption that

memorization differences are driven by motivational factors at the time of encoding will be strengthened.

4.6.1 Method

Seventy-two college participants from the Ohio State University took part in the third study in exchange for an extra-credit in a marketing class. The study took place in a computer lab where participants were seated separately in front of a computer. Participants were asked to take part in a computerized task they were told would last 30 minutes on average. To this end, all the questionnaires and stimuli used in this study were entered using the dedicated software Medialab v2010.

The procedure used in this study was similar to the first study, with one notable exception; participants were exposed to the ad prior to our subjective knowledge manipulation. Thus, if differences in retrieval drive the observed effect, we should still observe an interaction between subjective knowledge and self-esteem on memory score when the domain-related ad is shown to participants prior to the subjective knowledge manipulation. However, if the effect on memory for information is driven by higher encoding of incoming information by high self-esteem participants when their knowledge is threatened, the interaction between subjective knowledge and self-esteem should not hold when they are exposed to the message prior to the subjective knowledge manipulation.

Thus, the procedure of study 3 consisted of four main steps: 1) Personality test (Appendix XV), including measure of subjective knowledge and self-esteem (using the Rosenberg (1965) scale); 2) Exposure to an ad about computers (Appendix XVI); 3) Knowledge quiz(Appendix XVII) followed by the critical subjective knowledge manipulation used in studies 1 and 2(Appendix XVIII); and 4) a memory quiz(Appendix XIX).

The computer ad was designed using the same procedures as in study 1 and 2 and was an adapted version from a computer description found on Internet (source: www.pcworld.com). The knowledge quiz (Appendix XVII) was a translated version of the one used in the first two studies and was proofread by two native English speakers and the memory quiz (Appendix XV) was developed following the same procedure as the one used in the first two studies. To this end, the memory quiz contained open-ended and close-ended question in addition to questions about information non-displayed in the original ad. A total memory score was computed by adding up those three memory measures.

4.6.2 Results and discussion

Descriptive statistics

On an average, participants reported a subjective knowledge score of 3.9 (SD = 0.69) and reached a score of 22.74 (SD = 3.96) points out of 40 on the objective knowledge quiz. Participants' self-esteem score was negatively skewed with a mean score of 5.75 (SD = .81). The correlation between SK and self-esteem was non-significant (r = .04, p = .75). Of the twelve memory questions presented to participants, the mean number of correct retrievals was 4.83 (SD = 2.04).

Manipulation check

Our subjective knowledge manipulation worked in the intended direction (F(1,70) = 10.1, p = .002, ηp2 = .13). Participants in the decreased subjective knowledge condition showed a decrease of – 1.1 of their subjective knowledge score relative to the initial measure of subjective knowledge, while participants' subjective knowledge score did not change significantly in the control condition.

Total Memory Score

Data were analyzed using a 2 (subjective knowledge: decreased, control) ×2 (self-esteem: low, high) between-participants design. The interaction between self-esteem and subjective knowledge manipulation did not reach significance (F(1,68) = .42, p = .52, ηp2 = .006). Subjective knowledge manipulation did not significantly influence participant total memory score, neither for high self-esteem participants (M$_{\text{subjective knowledge decrease}}$ = 4.17, M$_{\text{subjective knowledge control}}$ = 4.42, p = .66, ηp2 = .005) nor for low self-esteem consumers (M$_{\text{subjective knowledge decrease}}$ = 4.8, M$_{\text{subjective knowledge control}}$ = 4.1, p = .27, ηp2 = .038), as shown in Figure 20.

Figure 20: Memory score following subjective knowledge manipulation (study 3)
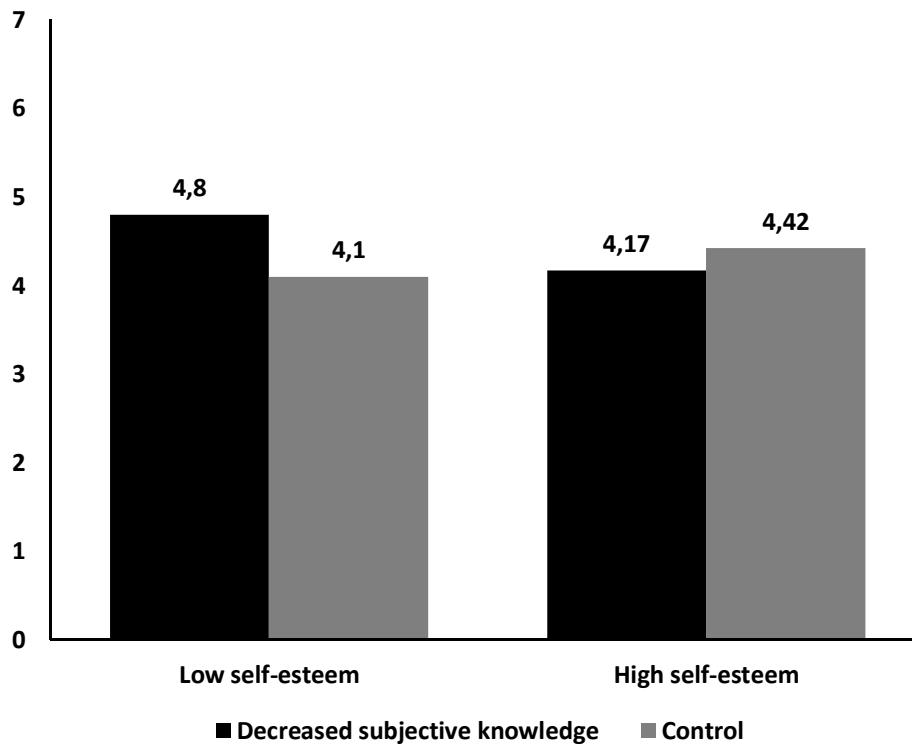
Discussion

Study 3 allowed us to rule out the possibility that differences in high and low self-esteem memory performance following a decrease in subjective knowledge are driven by retrieval rather than encoding divergences. If no retrieval differences could be observed between high and low self-esteem consumers following a decrease in subjective knowledge, then difference in encoding is confirmed as the key process at stake. When their subjective knowledge is threatened, high subjective knowledge consumers pay higher effort to encode incoming information. This conclusion is in line with the hypothesis of a self-enhancement motive at stake among high self-esteem consumers when their subjective knowledge is threatened.

Thus, subjective knowledge manipulations influence motivation to encode incoming information but not motivation to retrieve information already processed. The memory effect of subjective knowledge manipulations is thus limited to encoding but does not extend to

retrieval. Therefore, such manipulations can be useful if salespeople or advertisers wish to increase consumers' memory for the information they are just about to deliver. For instance, boosting low self-esteem consumers' perception of knowledge by using simple terms and easy to understand product information is likely to increase the attention these consumers will pay to an incoming domain-related message. However, subjective knowledge manipulations aiming at boosting consumers' retrieval of previously stored information are likely to fail. For example, decreasing high self-esteem consumers' perception of knowledge will not result in their putting extra effort in retrieving information previously stored in memory.

However, an objection that could be addressed at this stage is that our subjective knowledge manipulation could be unspecific and confounded with any kind of ego-threat. This is supported by the fact that many ego-threat studies have used false feedbacks to threaten participants' ego (e.g., Beauregard & Dunning, 1998; Heatherton & Vohs, 2000; Tafarodi et al., 2001; Vohs & Heatherton, 2001; Wiener, 1973). Therefore, a different manipulation of subjective knowledge was included in our study 4 to disentangle the potential effect of any ego-threat from those of a subjective knowledge manipulation.

Additionally, our manipulation worked well within a technical product domain (computer) wherein knowledge can be easily assessed using existing attributes. Thus, in an effort to increase the generalizability of our findings, we tested whether the effect observed in our first three studies would extend in a domain, such as luxury goods, in which identification of relevant attributes is arguably more difficult and subjective.

4.7 Study 4

To test whether our subjective knowledge manipulation is distinct from a self-threat manipulation, a new type of manipulation of subjective knowledge was introduced in our study 4. Additionally, to increase the external validity of our results, we focused on a new type of domain, namely knowledge of luxury. Finally, we checked whether narcissism could be another personality trait involved to explain differences in information processing following subjective knowledge decrease. Thus, the key goal of study 4 was to replicate hypothesis 6 and 7 using a different domain and a different subjective knowledge manipulation in order to increase the external and internal validity of our findings.

4.7.1 Choice of luxury domain

In an attempt to increase the external validity of our findings, we chose another knowledge domain, namely luxury. Indeed, it was important to replicate our findings in a domain wherein product attributes are less easy to identify and wherein knowledge is more difficult to assess. In this respect, the luxury domain had interesting features that made it worth further investigation. First, being both complex enough to allow us to set apart experts from novices and familiar enough to enable every participant to understand informational messages, it meets the two criteria of topic selection listed by Maheswaran and Sternthal (1990).

4.7.2 Narcissisms as another personality trait involved?

We investigated whether another personality trait, narcissism, could be involved to explain differences in information processing following SK decreases. Having a high but unstable sense of self-worth, narcissistic individuals have been shown to react aggressively to negative feedbacks and evaluations (Baumeister, Bushman, & Campbell, 2000). In the same vein, narcissistic consumers may be the most prone to have their ego threatened by a SK decrease and may have paid higher attention to threat-related information in an attempt to "fight back" the negative feedback. Thus, in order to ensure that we have not confounded self-esteem with narcissism, we included a measure of narcissism (i.e., the abridged NPI), in our experimental design prior to exposure to our critical subjective knowledge manipulation.

4.7.3 Method

Eighty-two participants from a large Midwestern University took part in the fourth study. The procedure of this study consisted of four main steps. First participants were asked to fill in a personality quiz (Appendix XXI), in which measures of trait self-esteem using the Rosenberg (1965) scale, narcissism using the 16-item Narcissistic Personality Inventory (Ames, Rose & Anderson, 2006) and knowledge about various topics, including the critical domain of luxury were included. In a second step, students were exposed to a computerized scenario. In this scenario, they were given the following instruction: "*On the next screen, you will be shown an extract from a lecture given by Prof. K. Samson, associate professor in marketing and branding in a US university*". The next screen included our subjective

knowledge manipulation: In the neutral condition, participants were given a text including well-known brands (Louis Vuitton, Rolex and Calvin Klein) in addition to references to well-known skills linked to the luxury domain. In the decreased subjective knowledge, participants were given the same text but the brand names were changed to include less well-known brands (Patek Philippe, Hermès and Balenciaga) in addition to references to more technical skills linked to the luxury domain (Appendix XXII). Brands and skills from the two conditions were chosen following interviews with Ohio State University students to be able to distinguish between famous (vs. niche) luxury brands and easy (vs. complex) luxury-related skills. We thus designed a subjective knowledge manipulation different from the ones used in studies 1-3. Whereas the subjective manipulations used in studies 1-3 were based on previous research inducing subjective knowledge change by giving false feedbacks to participants (e.g., Moorman et al., 2004; Park et al., 1988…), the subjective knowledge manipulation used in study 4 is built upon the notion that subjective knowledge can be altered by switching participants' reference point (e.g., Hadar et al. 2011; Heath & Tversky, 1991; See, 2009; Tversky & Fox, 1995…). Thus, in line with Hadar et al. (2011)'s third study, we hypothesized that altering the complexity and technicality of information provided to participants could influence their perception of knowledge about a given domain. The reason why it was important to develop a subjective knowledge manipulation different from the feedback based ones used in our first three studies was to ensure that our findings were driven specifically by subjective knowledge manipulations and not just any kind of ego-threat manipulation. To this end, we used a methodology distinct from the feedback based methodology typically used in the literature to threaten (vs. bolster) ego (e.g., Beauregard & Dunning, 1998; Harmon-Jones et al., 1997; Heatherton & Vohs, 2000; Vohs & Heatherton, 2001; Wiener, 1970, 1973…)

Following this step, participants were given two minutes to read carefully what was presented as the second extract from the same lecture. In this screen, participants were shown information about two different types of watch: a luxury watch and a non-luxury watch. The ads (Appendix XXIII) were adapted from descriptions found on an online store (http://www.ashford.com) and were designed following the same procedure as in study 1 to 3. To this end, the number of attribute data was limited to prevent participants from being overloaded with information in line with Miller (1956) and was similar for the two watches. Our goal was to test whether the attention paid to incoming information would be limited to the focal threat related information (luxury watch) or would also extend to surrounding information within the same category (non-luxury watch). Finally, after completing a state self-esteem measure (Heatherton & Polivy, 1991) participants were asked to complete a

memory quiz that included information about the two watches that had been shown during the last step of the computerized scenario.

4.7.4 Result and discussion

Descriptive statistics

On an average, participants reported a subjective knowledge score about luxury of 3.56 (SD = 1.41). Participants' mean self-esteem score was 5.83 (SD = .79). On an average, participants had a narcissism score of 5.87 (SD = 3.4) out of 16. Of the twelve memory questions presented to participants, the mean number of correct retrievals was 4.62 (SD = 2.1).

Manipulation checks

Our subjective knowledge manipulation worked in the intended direction ($F(1,80)$ = 12.3, $p < .001$, $\eta p2 = .13$). Participants in the decreased subjective knowledge condition reported a subjective knowledge score of 3.04 whereas participants in the neutral condition reported a score of 4.06. No significant correlation was found between SK and self-esteem (r = .01, $p = .90$).

In addition, to ensure that the two scenarios we designed did not affect significantly motivation to take the test seriously, we asked participants to rate how seriously they took the test (1= not seriously at all; 7 = extremely seriously). We ran a one-way ANOVA, which showed that scenario type (neutral vs. decreased condition) did not influence participants' ratings. In both conditions, participants took the experiment seriously (mean seriousness neutral condition = 4.78, SD=1.4, mean seriousness decrease SK condition = 4,83, SD= 1.02). This hints toward the fact that the credibility of the designed scenario did not differ between conditions, as motivation to participate and fill in the survey was relatively high in both conditions (mean seriousness = 4.8, SD = 1.23).

Memory Score

A 2 (subjective knowledge: decreased, control) × 2 (self-esteem: low, high) ANOVA was run with total memory score as a dependent variable. In line with study 2, the interaction

between self-esteem and subjective knowledge manipulation was significant ($F(1,77) = 12$, p = .001, $\eta p2 = .13$), as shown in Figure 21. Participants with high self-esteem were better in memorizing information following subjective knowledge decrease ($M_{subjective\ knowledge\ decrease}$ = 5.6, $M_{subjective\ knowledge\ control}$ = 3.8, p = .007, $\eta p2 = .16$) while the opposite pattern was found for low self-esteem participants ($M_{subjective\ knowledge\ decrease}$ = 4.15, $M_{subjective\ knowledge\ control}$ = 5.4, p = .04, $\eta p2 = .12$). When each memory score (luxury watch memory score, non-luxury watch memory score) was entered separately as a DV, converging pattern of results were found, both for the luxury watch ($F (1,77) = 5.1$, p = .03, $\eta p2 = .06$) and for the non-luxury watch ($F(1,77) = 10.9$, p = .001, $\eta p2 = .12$). In both cases, whereas high self-esteem consumers' memory score was better following a decrease in subjective knowledge, the opposite pattern of result was found for low self-esteem participants.

Figure 21: Memory score following subjective knowledge manipulation (study 4)
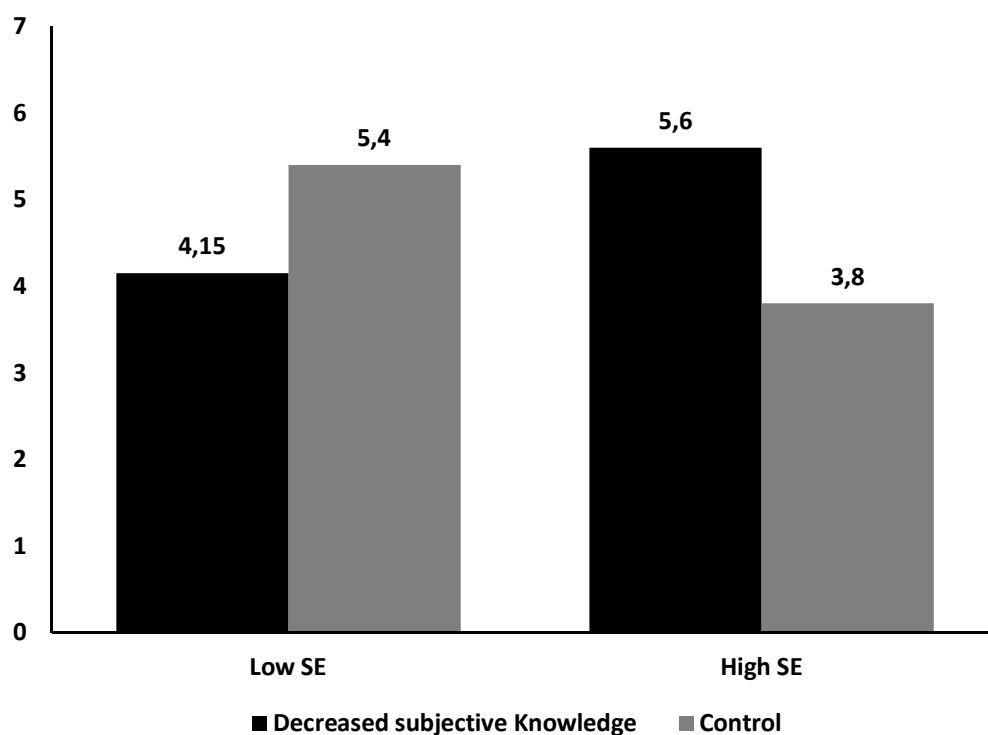
Finally, we re-ran our analysis linking self-esteem and subjective knowledge manipulation to memory performance, using self-esteem as a continuous rather than dichotomized variable, as recommended by Aiken & West (1991). Following Aiken and West

(1991), participants' self-esteem scores were mean-centered and condition was recoded (control condition = –1, decrease subjective knowledge = 1). Recoded conditions, self-esteem and their interaction terms were regressed simultaneously onto the dependent variable. A significant two-way interaction of subjective knowledge manipulation and self-esteem was found, β= .22, t(77) = -.2.01, p < .05), as shown in Figure 22.

Figure 22: Total memory score for low and high self-esteem participants following subjective knowledge manipulation (study 4)
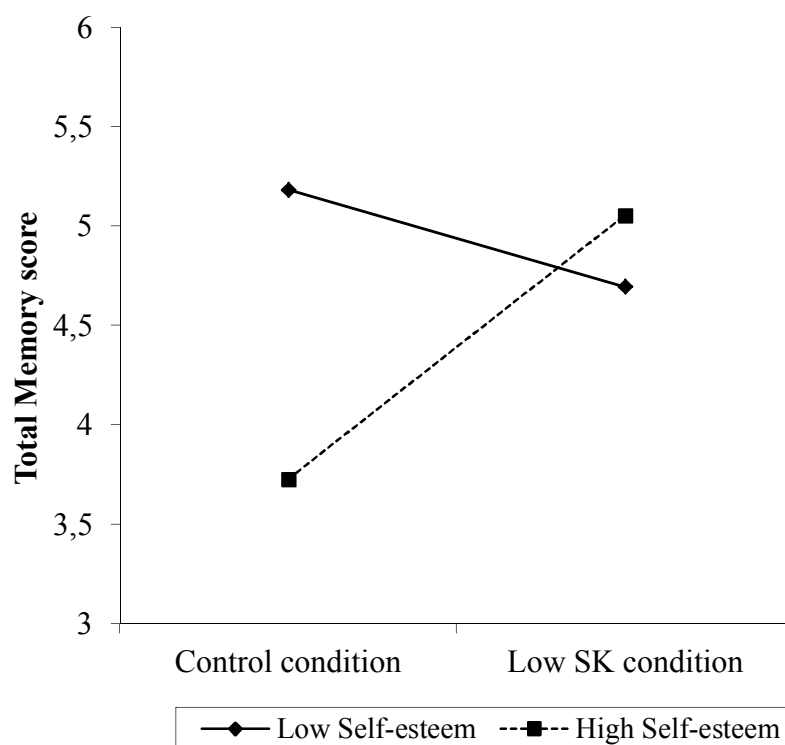
Furthermore, we probed the significant interaction of self-esteem and subjective knowledge manipulation. We intended to test whether the finding of study 2 that subjective knowledge decrease influences mainly high self-esteem participants' memory score could be replicated using another experimental setting. Therefore, we performed simple slope analyses at 1 standard deviation above and below the mean of the predictor self-esteem. In line with the result of our second study, the simple slope of memory score was significant for participants with relatively high self-esteem (+ 1 standard deviation), $\beta = .68$, t (77) =2.1, p = .04, but not significant for those with relatively low self-esteem (– 1 standard deviation), $\beta = -.23$, t(77) = -.73, p = .47). This result indicates that participants who reacted the most strongly to our subjective knowledge decrease condition were the high self-esteem participants.

Narcissism

Finally, we conducted additional analysis of our data using a 2 (subjective knowledge: decreased, control) × 2 (narcissism: low, high) with total memory score as a dependent variable, which did not reach statistical significance. This allows us to rule out narcissism differences as an alternative personality trait influencing memorization following subjective knowledge manipulations.

Discussion

Using a different methodology to manipulate subjective knowledge and focusing on a different topic, we managed to replicate our key findings. In line with hypothesis 6 and 7, following a decrease in their subjective knowledge, high self-esteem participants memorized better domain-related information, while low self-esteem participants showed the opposite pattern; weaker memorization of domain-related information following decrease in subjective knowledge. In addition, we ruled out narcissism as a trait potentially involved in memory performance following a subjective knowledge decrease. Indeed, we did not observe an interaction effect between narcissism and subjective knowledge condition on memorization performance.

A key limitation of our study is the potential artificialness of the scenarios that we have designed. Indeed, while scenario-based experiments have already been used in the

subjective knowledge literature, and though a manipulation check enabled us to ensure that participants took part seriously in the experiment in both conditions, future studies need to be conducted in real-life settings (i.e., a classroom) to test whether the experiments we designed in a lab can be extended outside the lab. For instance, it could be interesting to explore whether boosting subjective knowledge levels of low self-esteem students could be a strategy used to improve their capacity to pay attention more carefully to the course content provided to them.

Overall, the findings from study 4 strengthen our initial assumption that self-esteem is the key personality variable that needs to be taken into account when subjective knowledge is decreased. Indeed, depending on their self-worth perception, participants reacted differently to situations challenging their knowledge perception. Whereas high self-esteem participants tended to self-enhance by paying attention to domain-related information, low self-esteem participants paid weaker attention to domain-related information following subjective knowledge decrease.

Thus, this fourth study, using a different methodology to manipulate subjective knowledge and focusing on a different topic (i.e., luxury), extends the generalizability of the findings. Marketers and brand managers wishing to boost (vs. decrease) their consumers' subjective knowledge in an effort to increase memory for ad-related content have a wide range of available methods to reach this goal (e.g., feedbacks, reference point switching, altering the complexity of provided information…). We discuss the ethical implications of these findings in the general discussion section of this research.

Part 5: General discussion

Summary of our findings

Past research has extensively studied the effects of subjective and objective knowledge on consumer behavior, but has remained inconclusive about the exact impact of such subjective knowledge changes on consumer processing of domain-relevant informational messages. In this dissertation, building on self-related motive theories and self-esteem literature, we proposed that subjective knowledge could be related to consumer self-esteem. Decreases in subjective knowledge may function as ego threats, to which low vs. high self-esteem consumers could react differently to enhance or restore their ego. We proposed that memorization strategies with respect to incoming information represent means to such self-motives.

A set of four empirical studies support this hypothesis. Using two different methods to manipulate subjective knowledge in two different domains, our research sheds light on the important role played by self-esteem when consumers' subjective knowledge is manipulated. High (vs. low) self-esteem consumers memorize more (vs. less) domain-related information when their perception of knowledge was decreased. These processes seemed to be stronger for high (vs. low) self-esteem consumers. The scope of this memory effect mostly concerns the encoding of new information rather than the retrieval of new information. Finally, we ruled out general self-efficacy and narcissism as alternative personality traits potentially involved to account for our findings.

Theoretical implications

Our research broadens our understanding of the psychological mechanisms at stake when subjective knowledge is manipulated. High self-esteem consumers who are given the illusion that they know less than what they initially believed, memorize more information when exposed to a domain related message. We also found preliminary support for the hypothesis of self-state changes as an underlying mechanism. Indeed, high self-esteem consumers were highly sensitive to our subjective knowledge decrease manipulation, which affected negatively their implicit self-esteem scores and led to increased efforts to process

domain-related information. This is in line with the hypothesis of a self-enhancement mechanism at stake when high self-esteem consumers' subjective knowledge is threatened.

In addition, this research contributes to enrich our understanding on the cognitive outcomes of subjective knowledge manipulations. Whereas past studies manipulating subjective knowledge (e.g., Moorman et al., 2004; Park et al., 1988; See, 2009…) focused on selectivity of information search and weighting of information and cues, we were interested in the actual ability of consumers to memorize information, using various measurements of memory for information to enhance our construct validity. It appears that the relationship between change in subjective knowledge and memory for information is moderated by trait self-esteem. High self-esteem consumers who are given the illusion that they know less than they initially believed, memorized more information when exposed to a domain related message.

Our studies thus respond to the call for additional work in consumer psychology incorporating personality factors and psychological traits in order to understand consumer information-processing (Baumgartner 2002; Haugtvedt, Liu and Min 2008). Our research brings conceptual implications. Showing that self-esteem is a personality trait that needs to be taken into account to understand varying responses to subjective knowledge manipulation, we provide a potential explanation of the diverging results in past studies linking subjective knowledge and information processing. Potential differences in the relationship between the two constructs may be attributable to differential levels of self-esteem across the studied samples. Overall, we believe the present research project provides important insights for our understanding of the underlying mechanisms of the relationship between consumer subjective knowledge and information processing strategies.

Applied Contributions

Outside the laboratory, contexts wherein consumers' subjective knowledge are altered are pervasive. Indeed, consumer subjective knowledge can be manipulated using various means (e.g., social comparison, false feedbacks, altering the complexity of information given to consumers…). Thus, situations in which friends, salespeople, ads exert an influence on consumers' subjective knowledge occur frequently. In this respect, shedding light on the different responses consumers can give to these subjective knowledge manipulations, as a function of their self-esteem levels, is important. For instance, depending on their self-esteem levels, consumers might have different types of reactions towards a salesperson trying to

impress them with technical jargon. High self-esteem consumers may be tempted to listen more carefully in an effort to restore a feeling of competence aligned with their self-view. In contrast, a communication judged too complex might repel low self-esteem consumers, as it reveals their lack of expertise in the concerned product category. Thus, our findings can be useful in improving information retention in consumer settings, public policy and health-related communications. In the section below, we described possible applications of our results in several domains.

In a retailing environment, salespeople could adjust their behavior and speech, depending on their perception of their consumers' personality profile. Let us imagine, for instance, a shopping environment specialized in computer and electronics (e.g., Fnac, Virgin Megastore, Microcenter…), in which salespeople interact with their consumers face-to-face to give them advice and show them the products and their attributes. Based upon the salespersons' ability to calibrate their consumers' characteristics, they could adopt their speech to optimize consumers' attention. Should the consumer appear introverted and lacking of self-confidence, the salespeople could succeed in increasing this consumer's involvement and learning of new product information by showing him very simple product features (computer size, image quality, easy to use and intuitive software) and persuading him that he is not as novice as he initially believed. In contrast, should the prospective customer appear arrogant, pretending to know everything about the product category and endowed with a high level of self-confidence, the best strategy to increase this consumer's commitment within the sales context may be to show him complicated technical features (e.g., the type of RAM installed on the computer, technical labels, complicated software the consumer is likely not to have heard of…) or overwhelm him with sophisticated information in order to reduce this consumer's self-confidence and possibly increase the attention he pays to the salespeople's speech.

Second, in a time when consumers are overloaded with information coming from various sources (e.g., TV, radio, the Internet, Smartphones and touchscreen devices), a key issue for marketing practitioners is to increase the chance that the message they deliver to their target will be paid attention to and retain. In this respect, altering consumers' SK using the types of techniques proposed in our studies (e.g., giving consumers knowledge feedbacks, displaying complex (vs. simple) information) can be an efficient way to increase brand and product attributes' recall and recognition. A remaining challenge for practitioners will be to assess the extent to which such subjective knowledge manipulations can have backfire effects (e.g., turning low self-esteem consumers away from a product category judged too complex

for them, frustrating consumers who may decide to avoid the brand and its products discarded as "*too elitist*"). Overall, the finding that altering consumers' subjective knowledge can alter their memory for information included in a domain-relevant ad can have important implications for advertisers.

Within the field of public policy, health-related communication agencies could adapt their message to their target by modifying the complexity of their message. If their target group lacks confidence (e.g., in the domain of high technology products: a senior population likely to be overwhelmed by the alleged complexity of the product …), they could opt for delivering a simple message likely to increase the target's confidence and its motivation to pay attention to the message. On the contrary, if the target population is assumed to be overconfident (e.g., in HIV prevention campaign; young population known to engage in unprotected sex…), showing them they know less than what they thought may increase their attention to domain-related incoming information and possibly influence their attitudes and behaviors. In other words, the "illusion of not knowing effect" may be a potential answer to overconfident individuals' resting on their laurels.

Finally, within educational settings, the empirical finding that, in line with prospect theory's loss aversion principle, it is easier to decrease (vs. increase) subjective knowledge may have important implications. Should an academic institution decide to decrease temporarily its students' knowledge perception in an effort to challenge and possibly increase their commitment in learning new skills and knowledge, they have to bear in mind the long-term consequences of such knowledge manipulations. Indeed, once a target group's perception of knowledge has been decreased, restoring its original subjective knowledge level may be a long and difficult process, as consumers are more sensitive to losses (vs. gains) in subjective knowledge.

Ethical Implications

While this research is not unique in demonstrating that consumer knowledge can be manipulated using various methods, the finding that such knowledge manipulations can affect consumer self-esteem is, to our knowledge, novel within the consumer research field. Therefore, a thorough examination of the ethical implications of our findings is necessary. According to the principle of utility, actions are right if they produce the greatest balance of happiness over unhappiness (Mill, 1863). Therefore, a given marketing action or persuasive

device can be examined through the lens of its costs and benefits to consumers and society as a whole.

In some situations, subjective knowledge manipulations can be used for consumer's own good. For instance, for road safety ads, decreasing high self-esteem drivers' subjective knowledge about risky driving can be used to increase attention paid to the incoming information campaign. Such techniques are specifically useful when marketers can gather sociodemographic and personality-related measures about the target. Besides, as some consumer segments (e.g.., senior citizen, uneducated people, …) may keep away from information and actions due to a lack of confidence in their abilities (Park & Lessig, 1981), boosting subjective knowledge can serve a key purpose of democracy: ensuring that citizens are not dispossessed from their rights to pay attention to a message due to a lack of confidence in their capacities.

In contrast, subjective knowledge manipulations raise several important ethical concerns. First, from a deotonlogical perspective, one can wonder the extent to which a company or a public institution has the right to deceive an audience even if it is for their own good. Second, this dissertation has highlighted the fact that subjective knowledge manipulations can influence some consumers' self-esteem levels, which could have negative consequences for consumers. For instance, Terror Management Theory has shown that self-related threat increases the accessibility of death-related thought and can lead consumers to engage in defense of their cultural worldview and self-esteem relevant activities (Hayes, Schimel, Arndt & Faucher, 2010). To the extent that some of these self-esteem relevant activities involve physical risks for the consumer (e.g., sun tanning, risky driving, smoking…), decreasing some consumers' subjective knowledge could increase the likelihood they will engage in risky activities. For instance, decreasing high self-esteem citizens subjective knowledge about risky driving can decrease their self-esteem, and in turn boost their endorsement of risky driving, to the extent that such an activity is relevant to their self-esteem (Ben Ari, 1999; Jessop et al., 2008).

Thus, we call for a discussion of the consequences subjective knowledge manipulations, which should be open to a wide audience. Such open debate about the downstream consequences of subjective knowledge manipulations is necessary; given these techniques can be implemented using various and simple methods. For instance, Heath & Tversky, 1991, as well as Tversky and Fox, 1995 showed that switching participants' reference point can alter their knowledge perception. This implies that, rather than having to rely on complicated and hard to administer feedback-based methods, marketers can lead

consumers to question their perceived knowledge in a given domain using easy to administer methods, such as priming them with characters of varying expertise levels depending on the company's intention. For these reasons, we believe that the issue of using subjective knowledge manipulations in consumption contexts raises wide ethical implications, which calls for public debate.

Limitations

Though we tried to enhance the external validity of our findings by conducting our studies in Europe and in the United States, our population sample is limited to university students sharing common features (e.g., young, educated…). Thus, testing our hypothesis on different profiles, for instance among senior participants, would allow us to increase the external validity of our findings. In addition, our experiments are limited to Western students' samples and it would be interesting to test whether our effects hold irrespective of self-construal type (Markus & Kitayama, 1991) or whether self-construal type is an additional boundary condition to take into account. Indeed, our research was conducted within independent self-construal cultures (i.e., the United States and France) wherein consumers are sensitive to individual performance. Conducting this research within interdependent cultures (e.g., China, South Korea, Japan…) would allow us to check whether the memory effects we found extend to different types of cultures. Alternatively, we could imagine that within interdependent cultures, consumers would be more sensitive to collective subjective knowledge threat (e.g., "*Your knowledge about computers is average compared to students from your university, but ranks in the bottom third compared to a national student sample.*") Therefore, to extend the external validity of our findings, further studies need to be conducted within interdependent cultures. Besides, additional studies could be conducted within western contexts to assess to which extent types of self-construal (i.e., independent vs. interdependent) could moderate our findings. As operationalized by Cross, Bacon and Morris (2000), while interdependent self-construal individuals think of themselves in terms of relationship with others and consider their important relationships as closer and more committed, independent self-construal individuals do not include to such extent others when thinking of themselves. Thus, one could expect that while consumers with an interdependent self-construal will react strongly to a collective subjective knowledge threat (e.g., "*your group, your family, your colleagues know nothing about…*"), independent self-construal consumers will be more sensitive to an individual threat (e.g., "*you know nothing about...*" Such hypothesis could be

tested by designing an experiment in which type of subjective knowledge threat (individual versus collective) is manipulated and type of self-construal measured using the Relational-Interdependent Self-Construal (RISC) Scale (Cross et al., 2000).

Second, while we have ruled out several alternative accounts (i.e., narcissism and self-efficacy), a potentially complementary explanation remains to be tested. According to the energization theory of motivation (Bargh, Gollwitzer & Oettingen, 2010; Brehm & Self, 1989), individuals' readiness to persist in effort is determined by several factors, among which perceived task difficulty and potential motivation. As perceived task difficulty increases, individuals put higher effort in the task up to a certain point, when the task is perceived as unsolvable. Besides, motivation levels influence the threshold of effort expenditure. Under low motivation, people's tendency to surrender in the face of a difficult task is rapidly reached, while under high motivation, individuals tend to increase their efforts spent up to high levels of difficulty. Findings from the energization theory of motivation could be useful to understand the relationship between subjective knowledge and information-processing. Indeed, it can be assumed that subjective knowledge manipulations influence perceived complexity of the product category, which can in turn affects consumers' information processing strategies. In order to explore this possibility, we could add an additional variable in future studies, namely perceived complexity of the product category and see to which extent subjective knowledge manipulations influence this variable. It could be that subjective knowledge threats increase perceived complexity of the product category and lead high self-esteem consumers to engage in higher efforts of attention paid to domain related information. In contrast, low self-esteem consumers may reach more quickly the point where they judge the product category too complex to continue spending additional effort processing domain-related information. If so, the energization theory that has mainly been used to understand people's persistence in the face of a difficult task could bring interesting insights to understand the way consumers cope with information complexity.

Third, while we have identified and specified the scope of our memory effect (limited to encoding and not extended to retrieval), we would like to extend our investigation by including additional information-processing measures. In this respect, alternative measures could be used to assess information processing. The recent use of eye-tracking technologies in marketing research (e.g., Aribarg, Pieters & Wedel, 2010; Chandon, Hutchinson, Bradlow & Young, 2009; Pieters & Wedel, 2004…) offers a fascinating track for further investigation, which would allow us not only to measure the amount of information processed after

subjective knowledge threat but also the type of information processed by consumers under subjective knowledge threat, in addition to their adopted processing style.

Finally, whereas we identified and replicated memory effects, additional research needs to be conducted to test whether the memory effect we have identified leads to attitudinal and behavioral outcomes. Such links between memory effects and attitudes is complex. While past research showed that individuals can retrieve more easily attitudes-relevant knowledge in their memory (Holbrook et al., 2005; Wiersema et al., 2010), the reverse effect (i.e., memory driving attitudes) is not obvious. For instance, Thorson, Chi and Leavitt (1992)'s empirical study focusing on the effect of ads distinguished a memory branch from an attitudinal/conative branch and showed that those two roads did not correlate with each other. Similarly, greater memory for the informational content of a persuasive message should not result necessarily in more positive attitudes toward the product displayed in the ad and higher purchase intention, at least in the short run. However, the long-term attitudinal and behavioral consequences of higher memorization induced by subjective knowledge manipulations deserve further investigation. Noticeably, if decreasing subjective knowledge translates into stronger memorization for high self-esteem consumers, brand managers from the luxury industry targeting high self-esteem prospects could use this technique to be included in their prospects' consideration set in the long run. Indeed, decreasing high self-esteem non-users' perception of knowledge could be a strategy used by the brand to enhance the likelihood of being recalled and included in the consideration set when the consumer can afford buying products from the category in the future. Quite paradoxically, emphasizing the distance between the consumer subjective knowledge about luxury and what it takes to master the luxury codes and etiquettes the brand belongs to could be a strategy to build consumers' attention and increase brand accessibility in consumers' memory in the long run.

Part of the next section is dedicated to describe our research program aiming at investigating the possible downstream consequences of subjective knowledge manipulations on consumer attitudes.

Future Research

In the following section, we highlight two main tracks we will explore in future studies. The first one pertains to the attitudinal consequences of subjective knowledge manipulations. Second, we would like to run additional studies investigating the influence of subjective knowledge manipulations on senior consumers.

Attitudinal outcomes of subjective knowledge manipulations

While our research has focused on memory-related measures, assessing the potential influence of subjective knowledge manipulations on consumers' attitude toward products and policies is important. To this end, we have designed three main research directions related to the attitude research field.

First, in order to test whether subjective knowledge manipulations influence attitudes, an experiment including persuasive messages and argument strength manipulations will be designed to identify whether, under subjective knowledge decrease, high self-esteem consumers give more weight to argument quality when judging a persuasive message, which would be in line with the ELM model (Petty and Cacioppo 1986). Indeed, the ELM model posits that motivation and ability influence the extent of elaboration of a persuasive message. Thus, depending on their ability and motivation, consumers give more weight to the informational content of an ad or to peripheral cues (e.g., celebrity status, expert endorsement, source attractiveness…) To the extent that subjective knowledge manipulations interact with consumer self-esteem levels to influence motivation to process the ad, such manipulations could influence the extent of elaboration and the weight given to central arguments (vs. peripheral cues). In order to test these hypotheses, we will design an experiment in which argument quality will be manipulated using the procedures adopted in Petty, Cacioppo and Schumann (1983). Following pretesting of a variety of arguments, two different versions of ads will be designed; a strong arguments version versus a weak arguments version. Our goal is to test whether following a subjective knowledge decrease, high self-esteem consumers will be more sensitive to argument strength when evaluating the product displayed in the ad. This would allow us to test whether the information-processing effect we found in our studies can result in attitudinal outcomes. In other words, manipulating consumers' knowledge perception in a given product category could influence the extent to which consumers elaborate on a persuasive message and give weight to the informational content of an ad when judging a product.

Second, further studies need to be conducted to test the possible moderating role played by message source. Given their propensity to self-enhance in the face of self-threats (Hepper et al. 2010), high self-esteem consumers may only memorize and be persuaded by information coming from an expert source and rule out information coming from a novice source following subjective knowledge decrease, in an attempt to reassert the high perception

they have of themselves. In contrast, following subjective knowledge decrease, low self-esteem consumers may feel so discouraged that they would only process information coming from a novice source, perceived as more similar to them.

Thirdly, studies conducted by Haugtvedt (1994) and Haugtvedt, Shakarchi and Jarvis (2002), and reviewed in Haugtvedt, Shakarchi, Samuelsen, and Liu (2004), may be put in perspective with our own findings. First, Haugtvedt (1994) developed a measure that captures the extent to which individuals might vary in their tendency to think about their own prior experiences when exposed to persuasive materials, namely self-referencing. In their study, Haugtvedt et al. (2002) found that there exists an optimal level of self-referencing maximizing the persuasive effect of a communication. At a moderate level of self-referencing, degree of message-relevant elaboration was the highest. In contrast, at low and high self-referencing levels, participants' tendency to discriminate between strong and weak arguments messages was weaker. The authors speculated that low self-referencing individuals may not see the weakness in message arguments, while high self-referencing individuals were too focused on their own past experiences to fully pay attention to the informational content of the persuasive message. These results can be paralleled to our own findings related to subjective knowledge manipulations. We can indeed speculate that the highest level of message elaboration could be reached under moderate levels of subjective knowledge, as low subjective-knowledge consumers may deem themselves too novice to pay attention to the incoming information, while high subjective knowledge consumers may be too focused in their previously stored knowledge to fully pay attention to the incoming information. In other words, we propose that subjective knowledge manipulations may influence the level to which consumers engage in internal search versus pay attention to the incoming information contained in a persuasive message. In order to test this hypothesis, a study will be conducted using a 2 (strong versus weak arguments ad) x 3 (high, average, low subjective knowledge) factorial design. The extent to which individuals are focused on their previously stored knowledge during exposure to the ad will be measured and attitudes toward the product displayed in the ad will be the dependent measure. Our hypothesis is that highest level of elaboration should be reached at average levels of subjective knowledge, whereas at too high levels of subjective knowledge consumers become too distracted by their own stored knowledge to elaborate on the informational content of persuasive messages.

Age and Subjective Knowledge Manipulation

Given older consumers represent a growing proportion of markets, investigating the possible implication of our research for senior consumers represents an important stake. For instance, according to the INSEE, in 2035, 30.6% of the French Population will be made of people aged 60 against 20.8 % in 2005. Therefore, exploring the factors that can influence senior consumers information processing and memory for information is worthwhile.

In consumer research and social psychology, the topics of senior consumer information processing, decision-making and brand choice have received growing attention. For instance, it has been shown, in the perfume category, that older consumers tend to remain attached for a longer duration to the same brands (Lambert-Pandreau & Laurent, 2005). In addition, there is a consensus that age affects negatively performance on most memory tasks. Specifically, the reduced processing resources view suggests that a decrease in cognitive resources impairs senior consumers' ability to engage in cognitively complex encoding strategies facilitating later memory retrieval (Craik, 1983, 1986; Yoon & Cole, 2008). We believe that beyond this decrease in cognitive capacities, motivational factors may be at stake to explain reduced performance of senior consumers. Specifically; to our knowledge, no studies in consumer research have investigated, whether self-confidence and subjective knowledge may be at play to understand older consumer information processing and memory for product-related information.

Based upon the finding that self-esteem decreases after 60 (Orth et al. 2010) and becomes more unstable with age (Trzesniewski et al. 2003), we want to test the hypothesis whether senior consumer performance on memory and cognitive task can be increased by a boost in their confidence in their capacities, in line with the result of our subjective knowledge studies. Indeed, some senior consumers may suffer from a double burden when processing information related to certain types of product category (e.g., new technology, tasks requiring cognitive efforts…); being low in subjective knowledge and having a low and unstable self-esteem. The combination of those two factors may make them more prone to surrender in the face of negative feedbacks about their performance and give up processing information related to the product category. Thus, boosting their confidence thanks to positive feedbacks, easy to understand information or even scientific reports showing them that in many domains seniors are as cognitively proficient as younger consumers may restore their

confidence in their abilities. Such confidence boosts could encourage them to invest more time and effort processing information and possibly engage in activities related to the concerned product categories.

In an attempt to investigate those possibilities, we are currently starting a new research project, aiming at investigating the effect of a confidence boost (vs. threat) regarding cognitive performance on senior consumers' memory performance. The study that we have conceived is based on a 2 x 2 factorial design (confidence boost vs. threat, self-esteem: low vs. high). The procedure we have designed is as follows. First, a sample of senior consumers will fill in a booklet related to personality measures (e.g., self-esteem, general self-efficacy…). Next, participants will be exposed to our confidence manipulation, which could be scenario-based. In one condition, participants will be given a text in which a cognitive science researcher emphasizes the cognitive decline associated with age. In contrast, in the increased confidence condition, participants will read an article wherein the same scientist puts into question the negative effects of aging on cognitive performance and shows that, in many memory and cognitive-related tasks, senior citizens are as competent as younger ones. Pretests will be conducted to ensure that the two texts do not differ in involvement, source credibility and liking. Next, participants' confidence about their capacities in various tasks will be measured. The dependent variable could be a shopping list participants will have to remember. In order to test whether the confidence manipulation affects encoding (vs. retrieval) memory performance, participants will be given the shopping list before (retrieval) or after (encoding) the critical confidence manipulations. Following this step, participants will complete a memory quiz, related to the shopping list they were given previously. Finally, participants will be fully debriefed regarding the purpose of the study.

We believe such studies can have important social implications. Indeed, if such confidence manipulations succeed in boosting senior consumer cognitive performance and information processing, they can increase these consumers' involvement in domains, such as new technology and computers, where stereotypes may hinder their participation. For instance, against stereotypes, it has been shown that older adults appear interested in using new technologies but that learning to use those new technological products represents a challenge for them (Rogers & Fisk, 2000; Yoon & Cole, 2008). Developing methods and communications aiming at boosting senior consumers' confidence in their capacities to use new technologies may be beneficial to those consumers. Those who might otherwise feel "overwhelmed" by the alleged complexity of new technologies could thus be given the

confidence they need to engage efforts aimed at learning new skills. Such hypothesis would be in line with the above mentioned energization theory of motivation (Brehm & Self, 1989) When a task is perceived as unsolvable, people stop engaging effort; shifting the perceived complexity of the task from unsolvable to reachable could thus increase senior consumers' participation levels in those domains.

Overall, we believe this dissertation calls for additional work investigating the role of personality traits to account for diverging reactions to persuasive attempts from marketers and agencies. While for convenient purpose it might be easier to design a unique message delivered to a broad audience, our research would suggest that taking into account the key psychological personality traits of their key targeted segment may help marketers designing impactful messages, likely to be processed carefully. While the focus of this research has been put on the interaction between self-esteem and subjective knowledge manipulation on memory for information, additional psychological traits may be paid attention to in future consumer psychology research. In this respect, narcissism may be an interesting psychological trait to investigate in future consumer research. As some product categories may be used as a vehicle for self-enhancement (e.g., skin care & beauty product, fitness products…), it may be interesting for instance to assess what could be the reaction of narcissists (vs. non narcissists) to a consumer ad threatening (vs. bolstering) their self-image (for instance: *because you need it to hide your imperfections* versus *because you are worth it* as in L'Oreal commercials).

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Appendix I: Self-esteem scale

TEST DE PERSONNALITE

Ce questionnaire a pour but de mesurer certains aspects de votre personnalité. Il n'y a pas de bonnes ou de mauvaises réponses en soi. La meilleure réponse est celle qui correspond à ce que vous pensez.

Pour chacune des descriptions suivantes, indiquez à quel point elle correspond à votre personnalité :

Ne correspond   **Correspond**

pas du tout   **tout à fait**

    1   **7**

1	**Je pense que je suis une personne de valeur, au moins égale à n'importe qui d'autre.**	1	2	3	4	5	6	7
2	**Je pense que je possède un certain nombre de belles qualités.**	1	2	3	4	5	6	7
3	**Tout bien considéré, je suis porté(e) à me considérer comme un(e) raté(e).**	1	2	3	4	5	6	7
4	**Je suis capable de faire les choses aussi bien que la majorité des gens.**	1	2	3	4	5	6	7
5	**Je sens peu de raisons d'être fier(e) de moi**	1	2	3	4	5	6	7
6	**J'ai une attitude positive vis-à-vis moi-même.**	1	2	3	4	5	6	7
7	**Dans l'ensemble, je suis satisfait(e) de moi.**	1	2	3	4	5	6	7
8	**J'aimerais avoir plus de respect pour moi-même.**	1	2	3	4	5	6	7
9	**Parfois je me sens vraiment inutile.**	1	2	3	4	5	6	7
10	**Il m'arrive de penser que je suis un(e) bon(ne) à rien.**	1	2	3	4	5	6	7

Appendix II: subjective knowledge assessment (pilot study and study 1)

De manière générale, quelle est votre perception de votre niveau de connaissances en matière d'ordinateurs?

Je ne m'y connais pas du tout	1	2	3	4	5	6	7	Je m'y connais extrêmement bien

Merci d'évaluer votre degré de connaissance en matière d'ordinateur, comparé à un individu moyen.

Je fais partie de ceux qui connaissent le moins	1	2	3	4	5	6	7	Je fais partie de ceux qui s'y connaissent le plus

Merci d'entourer le nombre qui correspond le mieux à votre degré de familiarité avec les ordinateurs.

Je ne suis pas familier du tout avec les ordinateurs	1	2	3	4	5	6	7	J'ai un degré de familiarité très élevé avec les ordinateurs

Appendix III: Knowledge quiz (pilot study, study 1 and 2)

TEST DE CONNAISSANCE SUR LES ORDINATEURS

Merci d'entourer la réponse correcte. Vous disposez de 7 minutes pour compléter ce test.

1) Quelle est l'unité de stockage qui peut contenir le plus d'information ?
a) Une disquette
b) Un DVD
c) Un CD-ROM

2) Quelle commande dois-je taper dans le menu démarrer de windows, si je veux obtenir des informations sur mon ordinateur ?
a) Dxdiag
b) Info
c) Sys.info
d) Computerinfo
e) System

3) Quelle est la quantité maximal que Windows 64 bit Ultimate supporte ?
a) 2 GB
b) 4 GB
c) 128 GB
d) 64 GB
e) 1 GB

4) Parmi ces 4 possibilités, laquelle correspond à une adresse email
a) http://vianet.com/index.htm
b) D:\\Email\Standard
c) joesmart@billme.com
d) Chaminade.org/teachers/mailaddresses

5) Sur un clavier, quelle est la touche qui se situe à droite du D

a) Z

b) X

c) H

d) F

e) A

6) Laquelle de ces applications est développée par Microsoft ?

a) Powerpoint

b) Acrobat reader

c) Winamp

d) Skype

7) Quel raccourci clavier doit-on taper pour copier un document ?

a) Control V

b) Control H

c) Control C

d) Control ALT SUPPR

8) Quel est la dernière version de Windows disponible ?

a) Windows XP

b) Windows Vista

c) Windows 95

d) Windows 2000pro

9) Quel est le type de RAM, le plus couramment utilisé dans les PC aujourd'hui ?

a) DD2

b) DDR

c) SD-DDR

d) SO-DIMM

e) DIMM

10) Quel est l'élément qui doit être compatible avec tous les autres éléments dans un ordinateur,

a) CPU

b) RAM

c) Le disque dur

d) La Carte mère

11) Quel logiciel peut-on utiliser pour ouvrir des documents au format PDF ?

a) Word

b) Excel

c) Acrobat Reader

d) Access

12) Que signifie UPS ?

a) Using professional Sound

b) Uninterrupted Power Supply

c) Used Professional Software

d) Universal Power Switch

13) Laquelle de ces applications est dédiée à l'écoute de la musique sur ordinateur ?

a) Winamp

b) Skype

c) Paint

d) Msn messenger

14) Dans quel langage écririez-vous un document DHTML ?

a) D++

b) Javascript

c) Programming ++

d) C++

15) Dans la plupart des cartes mères récentes, quelle est la vitesse normale du port internet

a) 1 GB

b) 10 MB

c) 100 GB

d) 10 GB

e) 100GB

16) Quelle fonction doit-on utiliser dans Powerpoint pour retrancher les extrémités d'une image ?

a) Elaguer

b) Rogner

c) Découper

d) Trancher

17) Combien de partitions primaires peut-il y avoir ?

a) 4

b) 16

c) 8

d) 2

e) 1

18) Quelle fonction doit-on utiliser dans Microsoft word pour vérifier le rendu d'un document que l'on souhaite imprimer ?

a) Aperçu avant impression

b) Imprimer

c) Rendu avant impression

d) Impression rapide

19) Quelle est la fonction principale de la Graphical User Interface (GUI) ?
a) La GUI permet de changer les options des programmes graphiques
b) La GUI permet de changer des paramètres de composants graphiques, tel que la résolution
c) Permet d'homogénéiser l'apparence et le mode de fonctionnement de tous les programmes
d) Permet à l'utilisateur d'installer de nouveau moniteurs avec les paramètres spécifiques souhaités.

20) Parmi ces différentes possibilités, quelle est celle la plus adaptée pour une entreprise souhaitant disposer d'un réseau en ligne sécurisé pour ses employés ?
a) Intranet
b) Internet
c) Extranet
d) Outranet

Appendix IV: Knowledge manipulation, easy condition (pilot study, study 1 and 2)

<u>Grille des solutions</u>

1	B	11	C
2	A	12	B
3	C	13	A
4	C	14	B
5	D	15	A
6	A	16	B
7	C	17	E
8	B	18	A
9	A	19	C
10	D	20	C

Merci de calculer votre score de la façon suivante :

2 points par bonne réponse"

Sur la base d'un échantillon national, des étudiants en école de commerce :

Score	Position
Plus de 22 points	Votre score se situe dans les 15% meilleurs
Entre 16 et 22 points	Votre score se situe dans les 30% meilleurs
Entre 12 et 16 points	Votre score se situe dans la moyenne (entre le top 30% et les 30% les moins bons)
Entre 8 et 12 points	Votre score se situe dans les 30% les moins bons
En dessous de 8 points	Votre score se situe dans les 10% les moins bons

Pour votre information, lors de la session précédente, la moyenne des étudiants HEC (masters, grande école et Doctorat) est de **16,7 points**

En tenant compte du tableau des solutions ci-dessus, merci d'indiquer le nombre de points que vous avez obtenu.

→ J'ai obtenu _____réponses correctes

En vous référant au tableau des performances, merci d'indiquer le groupe auquel vous appartenez sur la base des réponses correctes que vous avez fourni :

Ma performance me place dans le _____top 15%

_____top 30%

_____entre le top 30% et les 30 % les moins bons

_____dans les 30% les moins bons

_____dans les 10% les moins bons

Appendix V: Knowledge manipulation, hard condition (pilot study, study 1 and 2)

<u>**Grille des réponses**</u>

1	B	11	C
2	A	12	B
3	C	13	A
4	C	14	B
5	D	15	A
6	A	16	B
7	C	17	E
8	B	18	A
9	A	19	C
10	D	20	C

Merci de calculer votre score de la façon suivante :

"2 points par bonne réponse"

"0 en cas d'absence de réponse ou de mauvaise réponse"

Sur la base d'un échantillon national, des étudiants en école de commerce :

Score	Position
Entre 36 et 40 points	Votre score se situe dans les 15% les meilleurs
Entre 31 et 35 points	Votre score se situe dans les 30% les meilleurs
Entre 30 et 35 points	Votre score se situe dans la moyenne (entre le top 30% et les 30% les moins bons)
Entre 25 et 30 points	Votre score se situe dans les 30% les moins bons
Moins de 25 points	Votre score se situe dans les 15% les moins bons

Pour votre information, lors de la session précédente,la moyenne des étudiants HEC (masters, grande école et Doctorat) est de **31,3 points**

En tenant compte du tableau des solutions ci-dessus, merci d'indiquer le nombre de points que vous avez obtenu.

→ J'ai obtenu _____ réponses correctes

En vous référant au tableau des performances, merci d'indiquer le groupe auquel vous appartenez sur la base des réponses correctes que vous avez fourni :

Ma performance me place dans le   _____ top 15%

_____ top 30%

_____ entre le top 30% et les 30 % les moins bons

_____ dans les 30% les moins bons

_____ dans les 15% les moins bons

Appendix VI: Computer ad (pilot study and study 1)

Ordinateur portable multimédia HP Pavilion série tx2500

Présentation générale

Doté de la puissance d'un PC portable pour les loisirs, de la polyvalence d'une tablette et de la convivialité d'un écran tactile, le modèle tx2500 possède tout ce que vous recherchez, avec en prime l'élégance de son design.

PRESENTATION

• Disposant de Windows Vista® Édition Familiale Basique ou Premium Authentique pour des fonctionnalités avancées et des loisirs numériques de qualité

• Avec son écran large haute définition de 12,1 pouces de diagonale et son convertisseur analogique/numérique pour l'écriture manuelle avec stylet rechargeable sans batterie, vous pouvez utiliser le modèle tx2500 comme un ordinateur portable.

• Les processeurs AMD bicœur et les graphiques ATI Mobility Radeon HD 3200 offrent la vitesse dont vous avez besoin en déplacement.

• Avec trois modes de fonctionnement (ordinateur portable, TV et tablette pour l'affichage de vidéos/photos et l'écriture manuelle ou les jeux), le modèle tx2500 est réellement polyvalent.

• Pesant à peine moins de deux kilos, le modèle tx2500 est étonnant. Il dispose de la finition Echo HP Imprint, une configuration pivotante pleine d'énergie à chaque sonnerie et connexion aux autres équipements

<u>Caractéristiques techniques</u>

Modèle	Principales caractéristiques
Ordinateur portable multimédia HP Pavilion tx2520	Windows Vista® Édition Familiale Premium authentique avec Service Pack 1 (32 bits) Processeur : processeur mobile Ultra Dual-Core AMD Turion™ X2 ZM-80, 2,10 GHz Mémoire vive :3072 Mo Disque dur : 250 Go Graveur DVD Lightscribe Super Multi (+/-R +/-RW) double couche Batterie Li-Ion (Lithium-Ion) 4 et 8 cellules Autonomie de base: 180 minutes 22,40 cm (L) x 30,60 cm (l) x 3,13 cm (H min) / 3,87 cm (H max) Réseau pre-n 802.11 Poids 1,963 kg Prix : 1299 euros

PENSEES DU MOMENT

Ce questionnaire a pour but de mesurer ce que vous pensez en ce moment. Il n'y a pas de bonnes ou de mauvaises réponses en soi. La meilleure réponse est celle qui correspond à ce que vous pensez actuellement. Assurez-vous de répondre à toutes les questions, même si vous n'êtes pas certain de vos réponses. Répondez à ces questions en fonction de votre ressenti ACTUEL.

Pour chacune des descriptions suivantes, indiquez à quel point elle correspond à votre ressenti actuel :

Ne correspond

Correspond

pas du tout   **tout à**

fait

    1   **7**

		1	2	3	4	5	6	7
1	**Je me sens confiant(e) dans mes aptitudes.**	1	2	3	4	5	6	7
2	**Je m'inquiète d'être considéré(e) comme un(e) gagnant(e) ou un perdant(e).**	1	2	3	4	5	6	7
3	**En ce moment, je me sens satisfait(e) par mon apparence physique.**	1	2	3	4	5	6	7
4	**Je me sens frustré(e) ou déçu(e) par ma performance.**	1	2	3	4	5	6	7
5	**J'ai l'impression d'avoir des problèmes de compréhension de ce que je lis.**	1	2	3	4	5	6	7
6	**J'ai l'impression que les autres me respectent et m'admirent.**	1	2	3	4	5	6	7
7	**Je ne suis pas satisfait(e) par mon poids.**	1	2	3	4	5	6	7
8	**Je me sens embarrassé(e), gêné(e).**	1	2	3	4	5	6	7
9	**Je me sens aussi intelligent(e) que les autres.**	1	2	3	4	5	6	7
10	**Je suis mécontent(e) de moi même.**	1	2	3	4	5	6	7

11	Je me sens satisfait(e) de moi.	1	2	3	4	5	6	7
12	Je suis satisfait(e) par mon apparence actuelle.	1	2	3	4	5	6	7
13	Je m'inquiète de ce que les gens pensent de moi.	1	2	3	4	5	6	7
14	Je suis confiant(e) en mes aptitudes de compréhension.	1	2	3	4	5	6	7
15	Je me sens inférieur(e) aux autres en ce moment.	1	2	3	4	5	6	7
16	Je ne me sens pas attirant(e).	1	2	3	4	5	6	7
17	J'attache de l'importance à l'impression que je donne.	1	2	3	4	5	6	7
18	J'ai l'impression d'avoir moins d'aptitude scolaire que les autres.	1	2	3	4	5	6	7
19	J'ai le sentiment de ne pas bien faire.	1	2	3	4	5	6	7
20	J'ai peur de passer pour un(e) idiot(e).	1	2	3	4	5	6	7

Appendix VIII: Product memory quiz (study 1)

VOTRE NUMERO DE PARTICIPANT : ……..

QUESTIONNAIRE SUR l'ORDINATEUR HP PAVILION SERIE TX 2500

Quel est le poids de cet ordinateur ?

____Kg

Quelle est la capacité de la mémoire vive?

a) 3072

b) 4096

c) 1024

d) 2048

e) Aucune de ces options

f) Information non fournie

Quelle est la capacité du disque dur?

____Go

Quelle est la taille de l'écran

a) 15,4''

b) 14,1''

c) 12,1''

d) 17''

e) Aucune de ces propositions

f) Information non fournie

Quelle est l'autonomie de base de sa batterie ?

____minutes

Quel est le processeur de cet ordinateur ?

a) Intel Dual Core 1,86 GHz

b) AMD Dual Core 2,6 GHz

c) Intel Dual Core 2,13 GHz

d) AMD Dual Core 3,1 GHz

e) Aucune de ces options

f) Information non fournie

Combien de port USB dispose cet ordinateur?

a) 2 ports USB

b) 4 ports USB

c) 1 port USB

d) 6 ports USB

e) Aucune de ces options

f) Information non fournie

Quel est le système d'exploitation fourni ?

a) Vista Professionnal

b) Vista Home

c) XP Familial

d) XP Professional

e) Linux

f) Aucune de ces options

g) Information non fournie

Quel est le nombre de cellules de la batterie (plusieurs réponses possibles)?

a) 4

b) 6

c) 8

d) 2

e) Aucune de ces options

f) Information non fournie

Quel est le prix exact de cet ordinateur ?

____euros

Quel est le lecteur fourni ?

a) Pas de lecteur mutimédia

b) Un lecteur DVD

c) Un lecteur CD-Rom

d) Un Lecteur Blu-Ray

e) Un Lecteur de disquette

f) b) + c)

g) b) + d)

h) c) + d)

Quelle est la capacité de la carte graphique

a) Jusqu'à 128 Mo

b) Entre 128 et 256 Mo

c) Enter 256 et 512

d) Plus de 512Mo

e) Aucune de ces options

f) Information non fournie

Appendix IX: Distribution of subjective knowledge changes (study 1)
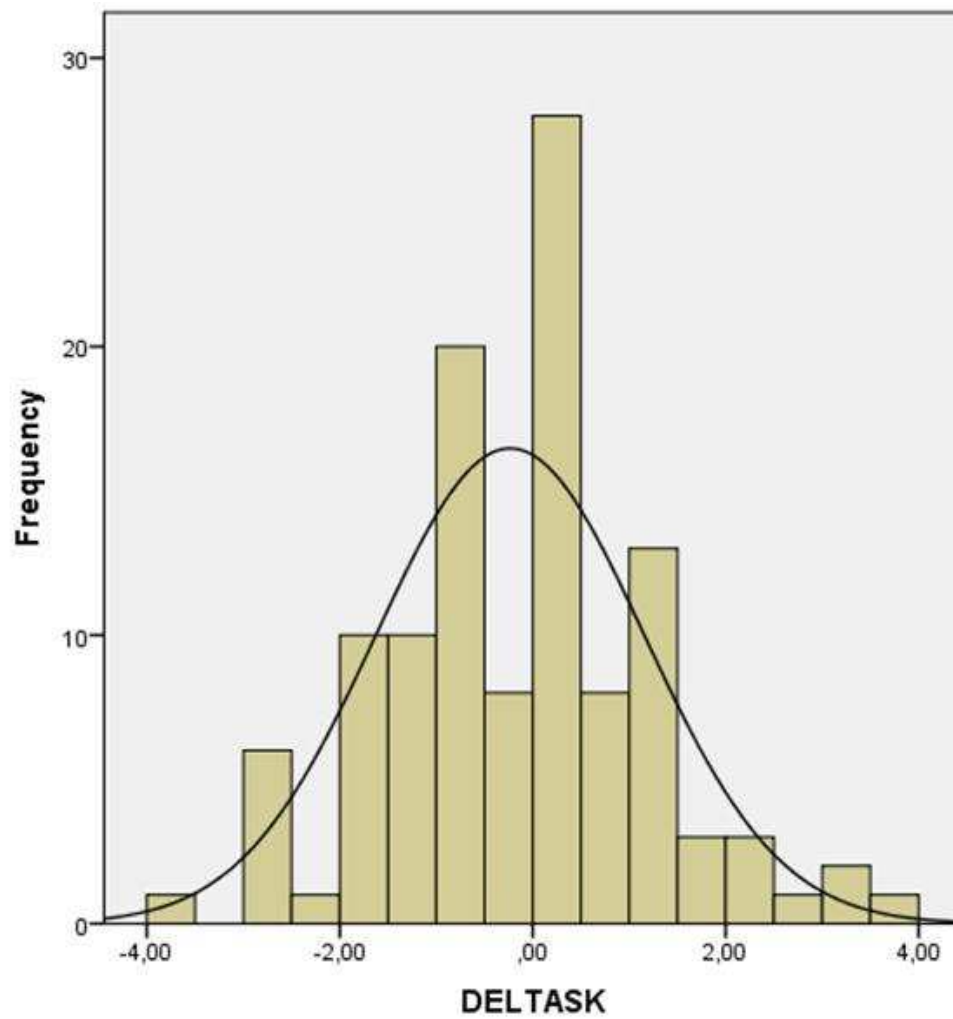
Numéro de participant : _____

TEST DE PERSONNALITE

Ce questionnaire a pour but de mesurer certains aspects de votre personalité. Il n'y a pas de bonnes ou de mauvaises réponses en soi. La meilleure réponse est celle qui correspond à ce que vous pensez.

Pour chacune des descriptions suivantes, indiquez à quel point elle correspond à votre personnalité :

Ne Correspond

Correspond

  pas du tout   **tout à fait**

    1   **7**

1	**Je pense que je suis une personne de valeur, au moins égale à n'importe qui d'autre.**	1	2	3	4	5	6	7
2	**Je pense que je possède un certain nombre de belles qualités.**	1	2	3	4	5	6	7
3	**Tout bien considéré, je suis porté(e) à me considérer comme un(e) raté(e).**	1	2	3	4	5	6	7
4	**Je suis capable de faire les choses aussi bien que la majorité des gens.**	1	2	3	4	5	6	7
5	**Je sens peu de raisons d'être fier(e) de moi**	1	2	3	4	5	6	7
6	**J'ai une attitude positive vis-à-vis moi-même.**	1	2	3	4	5	6	7
7	**Dans l'ensemble, je suis satisfait(e) de moi.**	1	2	3	4	5	6	7
8	**J'aimerais avoir plus de respect pour moi-même.**	1	2	3	4	5	6	7
9	**Parfois je me sens vraiment inutile.**	1	2	3	4	5	6	7
10	**Il m'arrive de penser que je suis un(e) bon(ne) à rien.**	1	2	3	4	5	6	7

A présent nous sommes intéressés par d'autres aspects de votre personnalité. Merci de lire chaque description attentivement et d'indiquer à quel point elle vous correspond en entourant le numéro approprié.

Ne Correspond Pas du tout
1

Correspond Tout à Fait
7

1	Je peux toujours résoudre des problèmes difficiles si je m'en donne la peine.	1	2	3	4	5	6	7
2	Si quelqu'un s'oppose à moi, je peux trouver les moyens d'obtenir ce que je veux.	1	2	3	4	5	6	7
3	Il m'est facile de rester fidèle à mes objectifs et de les accomplir.	1	2	3	4	5	6	7
4	Je suis confiant en mon aptitude à faire face à des évènements inattendus qui pourraient subvenir.	1	2	3	4	5	6	7
5	Grâce à ma débrouillardise, je sais gérer des situations imprévisibles.	1	2	3	4	5	6	7
6	Je peux résoudre la plupart des problèmes si j'y mets les efforts nécessaires.	1	2	3	4	5	6	7
7	Lorsque je rencontre des difficultés, je sais rester calme grâce à mes aptitudes à faire face.	1	2	3	4	5	6	7
8	En général, lorsque je suis confronté à un problème, je peux trouver plusieurs solutions.	1	2	3	4	5	6	7
9	Si je suis en difficulté, j'arrive en général à penser à une solution.	1	2	3	4	5	6	7
10	J'arrive à gérer ce à quoi je suis confronté.	1	2	3	4	5	6	7

Enfin nous souhaiterions connaître votre perception de niveau de connaissance dans plusieurs domaines. Merci de lire chaque description attentivement et d'indiquer à quel point elle vous correspond en entourant le numéro approprié.

1	En matière d'ordinateur je ne m'y connais pas du tout.	1	2	3	4	5	6	7
2	Comparé à l'ensemble de la population, je fais partie de ceux qui s'y connaissent le plus en matière d'actualités.	1	2	3	4	5	6	7
3	Comparé à l'individu moyen, en matière d'ordinateur je fais partie de ceux qui s'y connaissent le plus	1	2	3	4	5	6	7
4	Comparé à l'individu moyen, j'ai un niveau d'anglais supérieur.	1	2	3	4	5	6	7
5	En mathématique, j'ai un degré de familiarité très élevé.	1	2	3	4	5	6	7
6	En mathématique, j'ai un niveau nettement supérieur à la population française.	1	2	3	4	5	6	7
7	En matière de voiture, comparé à l'individu moyen, je fais partie de ceux qui s'y connaissent le moins.	1	2	3	4	5	6	7
8	En matière de voitures je m'y connais extrêmement bien.	1	2	3	4	5	6	7
9	J'ai un degré de familiarité élevé avec les ordinateurs.	1	2	3	4	5	6	7
10	J'ai un degré de familiarité élevé avec les voitures.	1	2	3	4	5	6	7
11	J'ai un niveau extrêmement faible en anglais.	1	2	3	4	5	6	7
12	Je ne m'y connais pas du tout en matière d'actualités.	1	2	3	4	5	6	7

Appendix XI: Computer ad (study 2)

Ordinateur portable Aspire 5715Z-4A3G25Mi - ACER

Description

L'Acer Aspire 5715Z est la balance parfaite entre performance et style. Conçu à partir du Design Aspire Gemstone, il est équipé du processeur Intel® Pentium Dual avec un écran large 15.4' pouces. Ce portable est l'un des meilleurs compromis Acer entre positionnement prix & performance.

Design & Performance

L'Aspire 5715Z possède le design Gemstone, un écran large & lumineux 15.4' pouces, il est l'outil parfait pour gérer tous ces dossiers multimédias.

Conçu pour le divertissement

L'Aspire 5715Z est un outil multimédia à part entière. Grâce à Acer Arcade?, vous pourrez accéder directement à vos films, musiques, photos et faire vos propres créations. La Webcam Acer CrystalEye (disponible suivant les modèles) intégrée à l'écran 15.4" CrystalBrite transformera votre portable en un véritable outil communicant.

Caractéristiques techniques

Système d'exploitation : Windows Vista? Home Premium

Processeur : Intel® Pentium® Dual-Core T2390 (1,86 Ghz)

Mémoire : 3072 Mo (1024+2048) DDR2 667 MHz (dual-channel)

Disque Dur : 250Go ATA (5400 TPM)

Lecteur: DVD SuperMulti Double Couche

Écran : 15.4" WXGA Acer CrystalBrite? (format 16:10, 220 nits) + Acer GridVista? *

Résolution: 1280 x 800

Caméra : Acer CrystalEye? 0,3MP

Carte Graphique : Intel® Graphics Media Accelerator X3100 (jusqu'à 358Mo - TGM)

Audio : 2 enceintes stéreo (2 W), son Intel® Haute Définition audio

Interface Ethernet : LAN 10/100, Wake-on-LAN ready

Connectivités : 3xUSB, ExpressCard?54, VGA, RJ-45, RJ-11, Firewire, S-video/TV-out,

Prise haut-Parleur/Casque/sortie son, Wifi 802.11b/g + Acer SignalUp? *

Batterie : 6 cellules (44 W 4000 mAh Li-ion)

Dimensions & Poids : 366 (W) x 274 (D) x 33.6/42.6 (H) mm/ 2.80 kg

Autonomie: 2 heures (suivant utilisation)

Garantie: 1 an de garantie voyageur international (ITW)

599 euros

Appendix XII: Distribution of subjective knowledge changes (study 2)
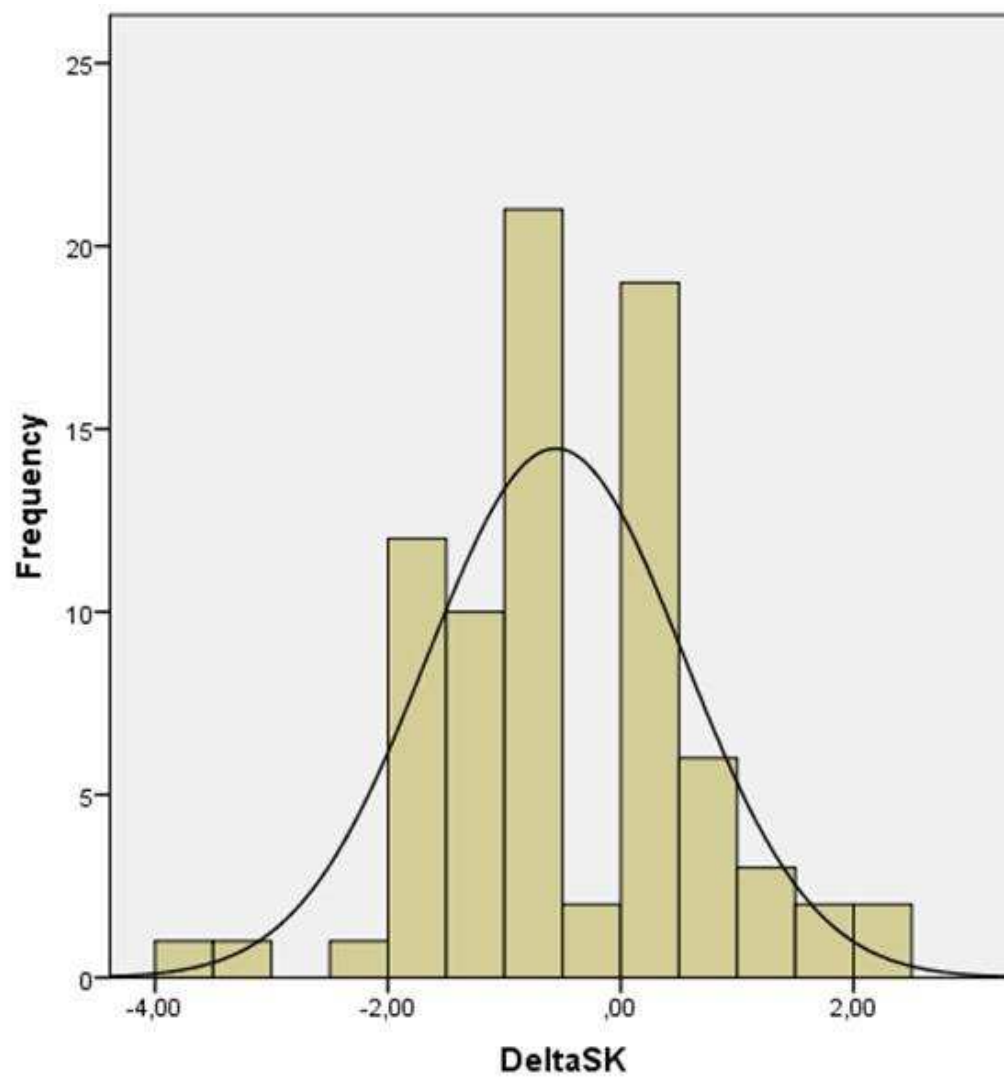
Appendix XIII: Calculation of IAT score using the procedure recommended by Greenwald et al. (2003)

Step	Procedure
1	Eliminate trials with latencies over 10, 000 s
2	Exclude data from participants with more than 10% of trials with latencies inferior to 300 ms
3	Compute one pooled SD for all trials in B3 & B6; another for B4 & B7
4	Compute separate means for trials in each of the Blocks 3, 4, 6, and 7.
5	Compute two mean differences (B6-B3 and B7-B4)
6	Divide each difference score by its associated standard deviation of Step 3
7	Average the two quotients from Step 6

Note. This table is adapted from Greenwald, Nosek and Banaji 2003 and Schnabel, Asendorpf & Greewald, 2007

Appendix XIV Distribution of IAT scores (study 2)
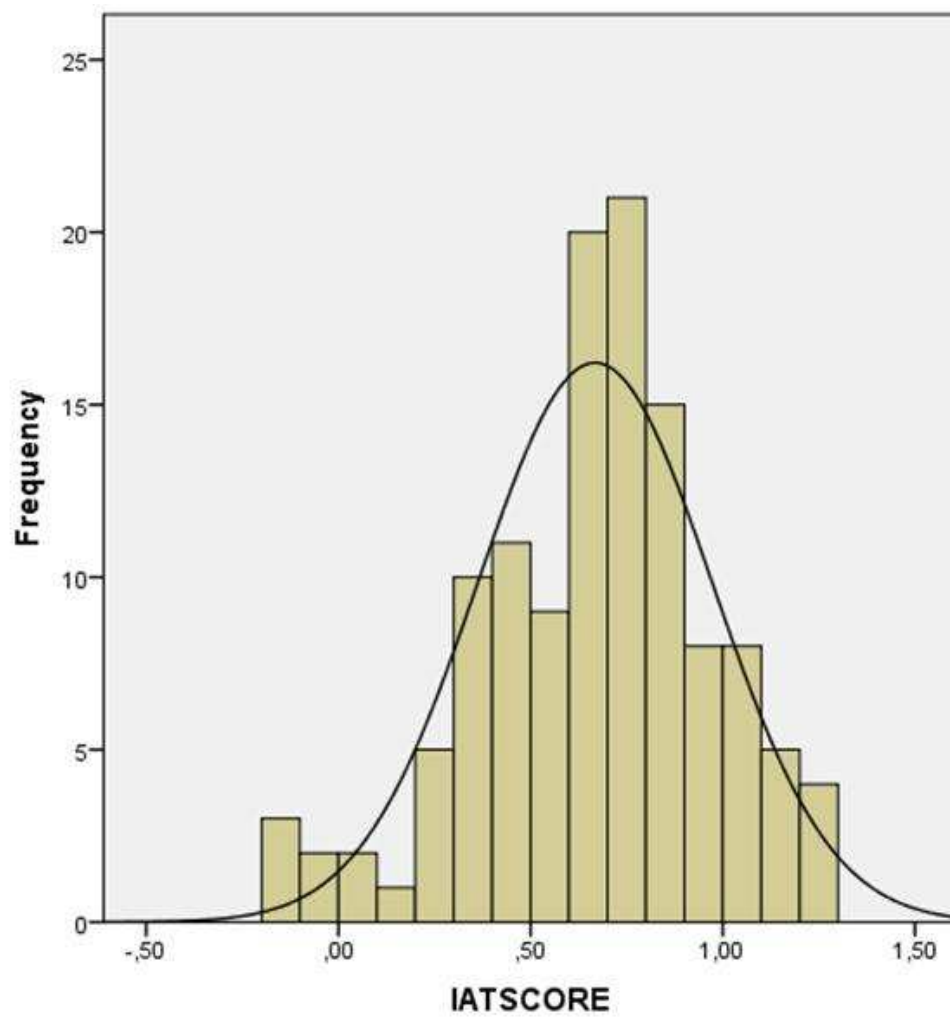
Participant n° :

PERSONALITY QUIZ

This questionnaire aims at measuring different aspects of your personality. There is no right or wrong answers.

Please read each of the following statements and indicate to which extent it fits with your own personality :

Does not fit   **Fits**
at all   **completely**
1   **7**

1	I feel that I am a person of worth, at least the equal of others.	1	2	3	4	5	6	7
2	I feel that I have a number of good qualities.	1	2	3	4	5	6	7
3	All in all, I am inclined to feel that I am a failure.	1	2	3	4	5	6	7
4	I am able to do things as well as most other people.	1	2	3	4	5	6	7
5	I feel I do not have much to be proud of.	1	2	3	4	5	6	7
6	I take a positive attitude toward myself.	1	2	3	4	5	6	7
	On the whole I am satisfied with myself.	1	2	3	4	5	6	7
8	I wish I could have more respect for myself.	1	2	3	4	5	6	7
9	I certainly feel useless at times.	1	2	3	4	5	6	7
10	At times I think that I am no good at all.	1	2	3	4	5	6	7

Next, we would like to know the perception you have of your own knowledge about various domains. For each statement listed below, circle the number that indicates the extent to which you feel it is characteristic of you. For example, if the statement is not at all like you, circle number 1 under "Extremely Uncharacteristic," or if the statement matches perfectly with you, circle number 7.

1	I don't know anything about computers.	1	2	3	4	5	6	7
2	Compared to the average person, I know a lot about financial news.	1	2	3	4	5	6	7
3	Compared to the average person, I know a lot about computers.	1	2	3	4	5	6	7
4	I am very familiar with mathematics.	1	2	3	4	5	6	7
5	My level in mathematics is largely above the average US population.	1	2	3	4	5	6	7
6	Compared to the average person, I know very little about car.	1	2	3	4	5	6	7
7	I am very knowledgeable about cars.	1	2	3	4	5	6	7
8	I am very familiar with computers.	1	2	3	4	5	6	7
9	I am very familiar with cars.	1	2	3	4	5	6	7
10	I don't know anything about financial news.	1	2	3	4	5	6	7

Appendix XVI: Computer ad (study 3)

TravelMate® 8572 Notebook

The TravelMate 8572TG has been designed to be a travel companion for professionals who occasionally need a bit more graphics performance.

It has a weight of about three kilograms at a size of 15.6 inches and comes with a 6 cell battery. It has a display with a reasonable desktop size and resolution and is suitable for professional use. The communication configuration is good and includes a RJ-11 modem port beside wireless and Ethernet modules.

The device's performance can be fairly well adapted to current performance, or rather battery life requirements. Acer's energy management tries to select the optimal settings independently in battery mode, which saves energy.

In addition, the device bids an attractive graphic performance with a enabled GeForce 330M graphic card, which even occasionally allows the one or other demanding 3D game when requirements on details and resolution aren't all too high.

Overall, the TravelMate 8572TG proves to be a timeless, elegant business device with modern hardware and adaptable performance. In any case, it can be called interesting in view of its value for money ratio.

Technical features

- Genuine Windows® 7 Professional with downgrade rights to Windows® XP Professional4

- Intel® Core™ i7-620M Mobile Processor (2.66GHz, 4MB Intel® Smart Cache)

- 4GB DDR3 1066 SDRAM

- 500GB SATA hard drive2

- Integrated Super-Multi DVD drive

- 5-in-1 media card reader

- 15.6" (1366 x 768) TFT display, Acer CrystalBrite™ technology3

- GeForce 330M graphic card

- 802.11b/g/n WLAN, Bluetooth, gigabit LAN, V.92 modem

- Webcam

- Fingerprint reader

- Interface Ports: 3xUSB, ExpressCard?54, VGA, RJ-45, RJ-11, Firewire

- Dimensions & Weight: 14.9" (379.0mm) W x 10.0" (253.0mm) D x 1.1" – 1.3" (27.7mm – 32.0mm) H -Weight :5.7 lb. (2.6kg)

- Six-cell lithium ion battery: up to 7.0 hours life with Acer ePower Management enabled and depending on configuration and usage

- Audio: integrated microphone, two integrated stereo speakers

- Price: $999.00

Appendix XVII: Computer quiz (study 3)

PARTICIPANT NUMBER: _____

COMPUTER QUIZ

Choose the correct answer.

1) Which is the largest storage unit?

a) A floppy disk

b) A DVD-ROM

c) A CD-ROM

d) A Blu-Ray

2) Which command should I type in the start menu of windows to obtain information about my computer?

a) Dxdiag

b) Info

c) Sys.info

d) Computerinfo

e) System

3) What is the largest quantity of GB that Windows 64 bit Ultimate can support ?

a) 2 GB

b) 4 GB

c) 128 GB

d) 64 GB

e) 1 GB

4) Among these four options, which is a correct email address?

a) http://vianet.com/index.htm

b) D:\\Email\Standard

c) joesmart@billme.com

d) Chaminade.org/teachers/mailaddresses

5) On a keyboard, which letter is positioned on the right of F?

a) Z

b) X

c) H

d) G

e) A

6) Which of these software is developed by Microsoft ?

a) Powerpoint

b) Acrobat reader

c) Winamp

d) Skype

7) Which command allows me to paste?

a) Ctrl V

b) Ctrl H

c) Ctrl C

d) Ctrl ALT SUPPR

8) Which is the latest version of Windows ?

a) Windows XP

b) Windows Vista

c) Windows 7

d) Windows 2010

9) Which kind of RAM is the most currently used on a PCs?

a) DD2

b) DDR

c) SD-DDR

d) SO-DIMM

e) DIMM

10) Which component has to be compatible with all the other parts of the computer?

a) CPU

b) RAM

c) The hard drive

d) The mother board

e) The central unit

11) Which software is used to open a PDF document?

a) Word

b) Excel

c) Acrobat Reader

d) Access

12) What does UPS stand for?

a) Using professional Sound

b) Uninterrupted Power Supply

c) Used Professional Software

d) Universal Power Switch

13) Which of these software is used to listen to music on computer?

a) Winamp

b) Skype

c) Paint

d) Msn messenger

14) In which language would you write a DHTML document?

a) D++

b) Javascript

c) Programming ++

d) C++

15) In most of the recent motherboards, what is the normal speed of the internet port?

a) 1 GB

b) 10 MB

c) 100 GB

d) 10 GB

e) 100GB

16) Which function of Powerpoint should be used to remove the extremity of an image?

a) Crop

b) Cut

c) Delete

d) Remove

17) How many primary partition can there be?

a) 4

b) 16

c) 8

d) 2

e) 1

18) Which function should be used on Microsoft word to check out the display of a document that you are about to print?

a) Print Preview

b) Print

c) Print Display

d) Quick Display

19) What is the main function of the Graphical User Interface (GUI) ?

a) The GUI allows to change the options of graphic programs.

b) The GUI allows to change parameters of graphical components, such as screen resolution.

c) The GUI Allows any graphics image to be displayed on screen.

d) The GUI Allows to install new screen on the computer

20) Among these options, which would you recommend for a company wishing to install a secured online network for its employees?

a) Intranet

b) Internet

c) Extranet

d) Outranet

<u>Feedback easy</u>

Your score is:___/40

Based upon a national sample of business college students, here is the distribution of scores:

Score	Position
More than 24 points	You ranked in the top 15%
Between 18 and 24 points	You ranked in the top 30%
Between 14 and 18 points	Your score is similar to the average (between the top 30% score and 30% lowest score)
Between 10 and 14 points	Your score belongs to the lowest 30%
Below 10 points	Your score belongs to the lowest 30%

For your information, during the last session, the average of Fisher college students was **18,7 points**

Taken into account the information given above please indicate where your score lies

My score ranks me among :   _____ the top 15%

_____the top 30%

_____between the top 30% and the 30 % lowest

_____the lowest 30%

_____the lowest 10%

Feedback HARD

Your score is :____/40

Based upon a national sample of business college students, here is the distribution of scores:

Score	Position
Between 36 and 40 points	You ranked in the top 15%
Between 31 and 35 points	You ranked in the top 30%
Between 30 and 35 points	Your score is similar to the average (between the top 30% score and 30% lowest score)
Between 25 and 30 points	Your score belongs to the lowest 30%
Less than 25 points	Your score belongs to the lowest 10%

For your information, during the last session, the average of Fisher college students was **31,3 points**

Taken into account the information given above please indicate where your score lies

My score is ranked among: _____ the top 15%

_____the top 30%

_____between the top 30% and the 30 % lowest

_____the lowest 30%

_____the lowest 10%

<u>Control condition</u>

Your score is:___/40

Appendix XVIII: subjective knowledge re-assessment (study 3)

Based upon the result you have had on the quiz, please re-assess your level of knowlege about computers.

Now, what is your perception of knowledge about computer ?

I know nothing at all about it	1	2	3	4	5	6	7	I am extremely knowledgeable about it

*Please **re-assess** your level of knowledge about computer, **compared to the average person***

I know very little about computers	1	2	3	4	5	6	7	I know a lot about computers

Please indicate the score which fits the most with your level of familiarity about computer, **based upon the results you obtained to the quiz**

I am not familiar at all about computer	1	2	3	4	5	6	7	I am extremely familiar about computer

Appendix XIX: Ad memorization quiz (study 3)

<u>QUESTIONNAIRE ABOUT THE COMPUTER DESCRIPTION THAT HAS JUST BEEN SHOWN</u>

Please answer as many questions as possible about the computer ad that has just been shown to you.

How heavy is the computer?

_____lb

What is the memory capacity?

a) 3 GB

b) 4 GB

c) 1 GB

d) 2 GB

e) None of the above options

f) Information non given

What is the hard drive storage capacity?

_____Go

What is the screen size?

a) 15,4''

b) 14,1''

c) 12,1''

d) 17''

e) None of the above options

f) Information non given

How long can the battery last?

_____hours

What is the processor of this computer?

a) Intel Dual Core 1,86 GHz

b) Intel iCore i5 2,4 GHz

c) AMD Dual Core 3,1 GHz

d) Intel iCore i7 2,4 GHZ

e) None of these options

f) Information non provided

How many USB port does this computer have ?

a) 2 ports USB

b) 4 ports USB

c) 1 port USB

d) 3 ports USB

e) None of the above options

f) Information non given

What is the OS included with the computer?

a) Vista Professionnal

b) XP Home

c) Windows 7 Home

d) Linux

e) None of the above options

f) Information non given

How many battery cells does it have?

 a) 4

b) 6

c) 8

d) 2

f) None of the above options

g) Information non given

How much does the computer cost?

____dollars

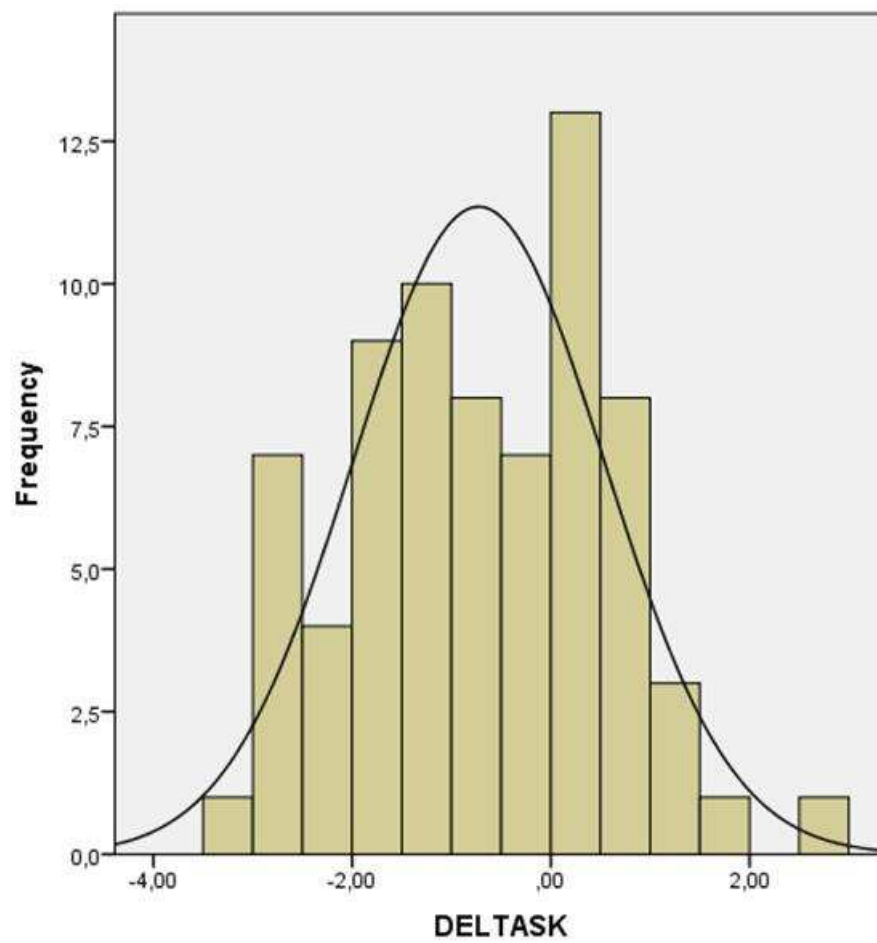**Which drive is included ?**

a)None

b) A DVD drive

c) A CD-Rom drive

d) A Blu-Ray drive

e) A floppy disk drive

f)   b) + e)

g) b) + d)

h) c) + d)

What is the capacity of the graphic card?

a) Up to 128 Mo

b) Between 128 and 256 Mo

c) Between 256 et 512

d) More than 512Mo

e) Information non included

Appendix XX: Distribution of subjective knowledge changes (study 3)

PERSONALITY QUIZ

This questionnaire aims at measuring different aspects of your personality. There is no right or wrong answers.

Please read each of the following statements and indicate to which extent it fits with your own personality :

Does not fit **Fits**

at all **completely**

1 **7**

1	I feel that I am a person of worth, at least the equal of others.	1	2	3	4	5	6	7
2	I feel that I have a number of good qualities.	1	2	3	4	5	6	7
3	All in all, I am inclined to feel that I am a failure.	1	2	3	4	5	6	7
4	I am able to do things as well as most other people.	1	2	3	4	5	6	7
5	I feel I do not have much to be proud of.	1	2	3	4	5	6	7
6	I take a positive attitude toward myself.	1	2	3	4	5	6	7
	On the whole I am satisfied with myself.	1	2	3	4	5	6	7
8	I wish I could have more respect for myself.	1	2	3	4	5	6	7
9	I certainly feel useless at times.	1	2	3	4	5	6	7
10	At times I think that I am no good at all.	1	2	3	4	5	6	7

Instructions: Here you'll find a list of 40 statements, one in Column A and the opposite in Column B. For each statement, choose the item from Column A or B that **best matches you** (even if it's not a perfect fit). Complete the quiz on your own and in one sitting, which takes most people between 5 and 10 minutes to finish. In most browsers, you can click anywhere on the item to choose it (you do not have to click in the radiobox itself). Answer all questions for the most accurate result.

1. A. I have a natural talent for influencing people.
   B. I am not good at influencing people.
2. A. Modesty doesn't become me.
   B. I am essentially a modest person.
3. A. I would do almost anything on a dare.
   B. I tend to be a fairly cautious person.
4. A. When people compliment me I sometimes get embarrassed.
   B. I know that I am good because everybody keeps telling me so.
5. A. The thought of ruling the world frightens the hell out of me.
   B. If I ruled the world it would be a better place.
6. A. I can usually talk my way out of anything.
   B. I try to accept the consequences of my behavior.
7. A. I prefer to blend in with the crowd.
   B. I like to be the center of attention.
8. A. I will be a success.
   B. I am not too concerned about success.
9. A. I am no better or worse than most people.
   B. I think I am a special person.
10. A. I am not sure if I would make a good leader.
    B. I see myself as a good leader.
11. A. I am assertive.
    B. I wish I were more assertive.
12. A. I like to have authority over other people.
    B. I don't mind following orders.
13. A. I find it easy to manipulate people.
    B. I don't like it when I find myself manipulating people.

14. A. I insist upon getting the respect that is due me.

B. I usually get the respect that I deserve.

15. A. I don't particularly like to show off my body.

B. I like to show off my body.

16. A. I can read people like a book.

B. People are sometimes hard to understand.

17. A. If I feel competent I am willing to take responsibility for making decisions.

B. I like to take responsibility for making decisions.

18. A. I just want to be reasonably happy.

B. I want to amount to something in the eyes of the world.

19. A. My body is nothing special.

B. I like to look at my body.

20. A. I try not to be a show off.

B. I will usually show off if I get the chance.

21. A. I always know what I am doing.

B. Sometimes I am not sure of what I am doing.

22. A. I sometimes depend on people to get things done.

B. I rarely depend on anyone else to get things done.

23. A. Sometimes I tell good stories.

B. Everybody likes to hear my stories.

24. A. I expect a great deal from other people.

B. I like to do things for other people.

25. A. I will never be satisfied until I get all that I deserve.

B. I take my satisfactions as they come.

26. A. Compliments embarrass me.

B. I like to be complimented.

27. A. I have a strong will to power.

B. Power for its own sake doesn't interest me.

28. A. I don't care about new fads and fashions.

B. I like to start new fads and fashions.

29. A. I like to look at myself in the mirror.

B. I am not particularly interested in looking at myself in the mirror.

30. A. I really like to be the center of attention.

B. It makes me uncomfortable to be the center of attention.

31. A. I can live my life in any way I want to.

B. People can't always live their lives in terms of what they want.

32. A. Being an authority doesn't mean that much to me.

B. People always seem to recognize my authority.

33. A. I would prefer to be a leader.

B. It makes little difference to me whether I am a leader or not.

34. A. I am going to be a great person.

B. I hope I am going to be successful.

35. A. People sometimes believe what I tell them.

B. I can make anybody believe anything I want them to.

36. A. I am a born leader.

B. Leadership is a quality that takes a long time to develop.

37. A. I wish somebody would someday write my biography.

B. I don't like people to pry into my life for any reason.

38. A. I get upset when people don't notice how I look when I go out in public.

B. I don't mind blending into the crowd when I go out in public.

39. A. I am more capable than other people.

B. There is a lot that I can learn from other people.

40. A. I am much like everybody else.

B. I am an extraordinary person

Finally, we would like to know the perception you have of your own knowledge about various domains. For each statement listed below, circle the number that indicates the extent to which you feel it is characteristic of you. For example, if the statement is not at all like you, circle number 1 under "Extremely Uncharacteristic," or if the statement matches perfectly with you, circle number 7.

1	I don't know anything about computers.	1	2	3	4	5	6	7
2	Compared to the average person, I know a lot about financial news.	1	2	3	4	5	6	7
3	Compared to the average person, I know a lot about computers.	1	2	3	4	5	6	7
4	I am very familiar with mathematics.	1	2	3	4	5	6	7
5	My level in mathematics is largely above the average US population.	1	2	3	4	5	6	7
6	Compared to the average person, I know very little about car.	1	2	3	4	5	6	7
7	I am very knowledgeable about cars.	1	2	3	4	5	6	7
8	I am very familiar with computers.	1	2	3	4	5	6	7
9	I am very familiar with cars.	1	2	3	4	5	6	7
10	I don't know anything about financial news.	1	2	3	4	5	6	7

Appendix XXII: Knowledge manipulation (study 4)

High subjective knowledge condition

On the next screen, you will be shown a passage of a lecture given by Prof. K. Samson, associate professor in marketing and branding in a US university

"Luxury is a booming industry.

I am sure all of you have heard about Rolex, for instance. This brand is exploding and is much more premium than Swatch and Calvin Klein, as most of you already know. If you have never at least heard of the Rolex brand name, you will need to work hard to catch up with my class!

In addition, I may not teach you anything new neither if I tell you that Louis Vuitton has been ranked as the top luxury brand worldwide, in the last 2011 ranking released by Luxury Institute, a US-based independent marketing research firm.

However, even if knowing brand names is very important in my class, I also expect from you additional skills. For instance, you should be able to distinguish a trendy and fashionable pair of jeans from a more classic and traditional pair of jeans."

Low subjective knowledge condition

On the next screen, you will be shown a passage of a lecture given by Prof. K. Samson, associate professor in marketing and branding in a US university

Here is a short passage of the lecture given by Professor K. Samson, associate professor of marketing and branding in a US university.

"Luxury is a booming industry!

I am sure all of you have heard about Jaeger Lecoultre and Patek Phillipe. These brands are becoming much more popular than Rolex and Tag Heuer, as most of you already know. If you have never at least heard of the Patek Phillipe brand name, you will need to work hard to catch up with my class!

In addition, I may not teach you anything new neither, if I tell you that Roberto Cavalli is ranked n°1 in the fashion category, above Hermes and Balenciaga in the last 2011 ranking released by Luxury Institute, a US-based independent marketing research firm."

However, even if knowing brand names is very important in my class, I also expect from you additional skills. For instance, you should be able to distinguish Escada denim flare Jeans from D&G bell bottom jeans, just looking at their cut and finishes."

Appendix XXIII: Watches shown in study 4

Luxury is about attention paid to details, as you can see with this example of two watches: one is luxury, the other is not !

NON LUXURY WATCH

Product details

- **Manufactured by Seiko**
- **Chronograph functions**
- **Black leather bracelet**
- **Reliable Japanese-quartz movement**
- **Strong Hardlex crystal protects dial from scratches**
- **Case diameter: 40.5 mm**
- **Stainless steel case; black dial; date function.**
- **Water resistant up to 330 feet (100 M)**
- **Alarm function and Date window**
- **Luminous hands and hour markers**
- **Manufacture suggested retail price : 325 US dollars**

LUXURY WATCH

Product details

- **Manufactured by Breitling**
- **Chronograph.**
- **Black rubber bracelet.**
- **Stainless steel case**
- **Stainless steel bezel.**
- **Grey dial with luminous hands and index hour markers.**
- **Day-date display at the 3 o'clock position.**
- **Chronograph - three sub-dials displaying**
- **Automatic movement.**
- **Scratch resistant sapphire crystal.**
- **Solid case back. Case diameter: 44.8 mm.**
- **Water resistant at 330 feet.**
- **Retail Price : 5761 USD**

Perceptions de connaissance et mémorisation d'information: dans quelles conditions se croire ignorant améliore nos performances de mémorisation?

La connaissance subjective renvoie à la perception que porte un individu sur sa connaissance dans un domaine donné. La recherche suivante étudie l'influence d'une manipulation de la connaissance subjective sur les stratégies de traitement et de mémorisation de l'information. Dans notre première étude, nous montrons que l'estime de soi du consommateur joue un rôle modérateur dans la relation entre manipulation de la connaissance subjective et différentes mesures de mémorisation de l'information. Dans une deuxième étude, nous identifions des mécanismes modérateurs et des limites aux effets identifiés. La troisième étude spécifie l'étendu de cet effet de mémorisation. Enfin, la dernière étude étend la validité de nos résultats en adoptant un autre type de manipulation de connaissance subjective et en s'intéressant à un autre domaine de connaissance. Les implications de ces résultats sont discutées et des pistes de recherches futures sont proposées.

Mots-clefs: connaissance objective; connaissance subjective, expertise, méta-cognition, estime de soi, mémoire, traitement de l'information

Personal Knowledge Perceptions and Memory for Information: When Does Feeling Ignorant Make Me Remember More?

Subjective knowledge refers to consumers' perceptions about how knowledgeable they are in a specific domain. The present research investigates the impact of manipulating subjective knowledge on information processing and retrieval strategies. In a first study, we show that consumer self-esteem moderates the relationship between subjective knowledge manipulations and different measures of memory for new information. In a second study, we identify moderating mechanisms and boundary effects for the hypothesized effects. The third study specifies the scope of the memory effect. Finally, the fourth study extends the generalizability of the findings by adopting another subjective knowledge manipulation and covering a different domain of knowledge. Implications of these results are discussed and future tracks for research are provided.

Keywords: objective knowledge, subjective knowledge, expertise, meta-cognition, self-esteem, memory