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**The Role of Accessibility Experiences in Attitude Formation:
Effects of On-Line versus Memory-Based Processing**

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by

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ABSTRACT

The Role of Accessibility Experiences in Attitude Formation: Effects of On-Line versus Memory-Based Processing

By

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Most models of judgment formation and decision making focus on the implications of the information that comes most readily to mind. Such models fail to account for the subjective experiences that necessarily accompany thought processes. Past research has shown that accessibility experiences are informative in their own right and can qualify and even override the effect of thought content. Nevertheless, there is a conflict in the literature regarding the nature of the process involved in ease of processing effects. Schwarz (e.g., 1998, 2004) holds that ease of retrieval plays the role of a heuristic cue. Its effect should therefore disappear under high elaboration conditions. On the contrary, Petty and his colleagues (e.g., 2007, 2009) consider that ease effect occurs only when people attend their own thoughts and try to assess their validity. This process therefore requires a high level of elaboration to occur. There is empirical evidence for both conceptions of the role of ease of retrieval. It is therefore possible that ease of retrieval plays different roles depending on the conditions of attitude formation.

This dissertation investigates the moderating role of processing style (memory-based versus on-line) in an attempt to resolve conflicting views and evidence in the literature. Based on differences in experimental design, it is hypothesized that ease of processing should drive attitude for memory-based judgments only under low elaboration conditions (the

heuristic-cue hypothesis). On the contrary, for on-line judgments ease of retrieval should drive attitude when elaboration is high (the self-validation hypothesis).

Three experiments provide strong support for the pivotal role of processing style in determining the impact of ease of processing in attitude formation. Experiment 1 establishes that ease of retrieval serves different roles for memory-based and on-line judgments and verifies the expected boundary conditions for the heuristic-cue hypothesis and the self-validation hypothesis. Experiment 2, while providing convergent evidence for the hypothesized moderating role of processing style, offers more insight into the self-validation hypothesis by investigating the mediating role of thought confidence. Finally, in experiment 3 we successfully replicate the results of both experiments 1 and 2, extending them to a different type of ease of processing: processing fluency.

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DEDICATION

This work is dedicated to my family who believed in me unconditionally.

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CHAPTER ONE

INTRODUCTION

Enormous resources are spent on predicting, understanding, and influencing consumer behavior. For example, Nielsen reported more \$ 4.5 billion in world wide revenues from market research in 2008 (Honomichil 2009). The US advertising and marketing services industry includes about 35,000 companies with combined annual revenue of about \$75 billion (Advertising and marketing 2010). Consumers are bombarded by marketing communications appearing in traditional and new media (from television, radio, and print advertising to the Internet), as well as in various points of purchase. Nevertheless, to be effective marketing communication requires an in-depth understanding of the different stages involved in consumer information processing (Kardes, Cronley, and Cline 2011). Consumers acquire knowledge about products and services, evaluate these products and services, and ultimately make a purchase decision (Wyer 2008). This dissertation focuses on the evaluation stage of consumer information processing by uncovering some of the mechanisms underlying attitude formation.

Historically, research on attitude formation has focused on knowledge activation and accessibility of information at the time of judgment (Higgins 1996; Wyer and Srull 1989). These models of judgment and decision making primarily focus on the implications of the information that comes most readily to mind, but they fail to account for the subjective experiences that are inherent in retrieval and processing. Research has shown that such accessibility experiences are informative in their own right (Schwarz et al. 1991). People use the ease or difficulty of the experience as important input in

judgment tasks. For instance, if information is difficult to recall, it may be inferred that it is limited, of poor quality, or insufficient. These experiences can qualify and even override the effect of the actual thought content. Recent models of attitude formation therefore consider both accessible content and accessibility experiences as distinct sources of information when forming a judgment (Schwarz 1998).

Although the impact of accessibility experiences on attitude formation has been documented in a variety of domains, the underlying process involved is unclear. Schwarz (1998; 2004) proposes that accessibility experiences operate as heuristic cues, suggesting that the effect should be attenuated under high elaboration conditions. In contrast, Petty and colleagues (2007a; 2007b) find stronger effects when people attend to their own thoughts and try to assess their validity (the self-validation hypothesis), implying that accessibility experiences require greater thinking to be included as input for judgment. Not only do these two theories suggest different elaboration conditions needed for the effect to be observed, they also argue for different mediating mechanisms. For Schwarz the effect of ease should be mediated by the assumed number of thoughts still available in memory. People hold the naïve theory that, if some examples are easy to bring to mind, there should be a lot more existing examples (Schwarz 2004). For Petty, thoughts that are easy to bring to mind are held with more confidence. Therefore he argues the effect of ease is mediated by thought confidence (Petty et al. 2007b). Empirical support for both conceptualizations of accessibility experiences has been documented, indicating that each may operate under a different set of boundary conditions.

By introducing a new moderator – processing style – this dissertation attempts to solve this discrepancy. A review of the literature reveals experimental design differences

that may favor either memory based or on-line processing. Designs favoring memory based processing align with the heuristic cue explanation and those favoring on-line processing align with the self-validation hypothesis. Processing style might therefore play a crucial role in determining the ideal level of elaboration required for the ease of retrieval effect to be observed.

This dissertation by focusing on the evaluation stage of consumers' information processing aims at uncovering some of the mechanisms underlying attitude formation. Understanding how consumers process information helps managers develop more effective marketing strategies. An informed understanding of attitude formation provides an opportunity to influence attitudes and ultimately affect purchase decisions.

CHAPTER TWO

THEORETICAL FRAMEWORK

Attitudes involve large parts of our mental life and are thought both as one of the principal causes and consequences of important social problems (Maio and Haddock 2007). Attitudes fulfill a variety of functions (Katz 1960) including the object-appraisal function conceptualized by Smith and colleagues (1956). People are bombarded every day by a large number of stimuli including physical objects such as foods or clothing (Fazio 2000). Fazio argues the reason why we can manage all the decisions based on the appraisal of objects that we encounter every day, is by using attitudes as summary evaluations of objects. Attitudes as evaluative judgments play an important role in decision processes.

Accessibility and Metacognitive Experiences

The literature on judgment formation and decision making contains a large number of models both in psychology and marketing. Most models of judgment and decision making focus on the implications of the information that comes most readily to mind (for reviews, see Higgins 1996; Wyer and Srull 1989). Activating knowledge in order to evaluate a stimulus depends on a sequence of key factors: (1) its availability (presence in memory), (2) its accessibility (activation potential from memory), (3) its applicability (the relation between the features of stored knowledge and the features of the stimulus), and (4) its diagnosticity (relevance to apply the stored knowledge to the

stimulus) (Higgins 1996). Most models therefore concentrate on the content of the thoughts that come to mind in order to make predictions. For example, the accessibility-diagnosticity model (Feldman and Lynch 1988) states that the likelihood with which a particular piece of information is used as an input for a judgment depends on two things: the accessibility of the information and the relative diagnosticity of the information. The accessibility-diagnosticity model implies that any factor that increases the accessibility of a piece of information (e.g. priming, vividness, or salience) will increase its likelihood of having an impact on subsequent judgment. Yet, accessibility does not guarantee that a piece of information will be used. The information also needs to be considered as pertinent. As a result this model puts the emphasis on the relative accessibility of competing pieces of information and their relevance. The accessibility-diagnosticity model is therefore a useful tool to consider which piece of information is likely to have an impact on judgment.

This focus on “what comes to mind” fails to take into account that human thinking is accompanied by subjective experiences such as the ease or difficulty with which information can be retrieved from memory or the fluency with which a piece of information can be processed (Schwarz 2004, 2005). These metacognitive experiences associated with the thought process are informative in their own right and they are crucial to comprehending decision making processes beyond thought content. Accessibility experiences can help in explaining judgments and decisions that are opposite to the predictions derived from content-focused models (Schwarz 2004, 2005).

In their seminal work on the availability heuristic, Tversky and Kahneman (1973; 1974) demonstrated the importance of the ease with which relevant information comes to

mind when estimating probabilities and frequencies. People sometimes consider an instance more likely when it is easy to generate examples of its occurrence. For instance, participants were asked if it was more likely that a word -- selected at random from an English text -- would start with the letter K or that K would be its third letter (Tversky and Kahneman 1973, study 3). Participants exhibited a bias favoring the letter in the first position because it is easier to generate words that start with the letter K. Words with the letter K as their third letter are actually more common in the English language. By relying on availability participants drew an erroneous conclusion. Yet, availability can be a valid cue to assess frequency or likelihood because frequent events are in general easier to recall or imagine than infrequent ones. Nevertheless, a lot of other factors unrelated to actual frequency can have an impact on availability from memory such as familiarity. The availability heuristic can therefore lead to biased inferences as illustrated in the above example.

Schwarz et al. (1991) expanded on this work in an influential article on ease of retrieval using the context of self-reported assertiveness. They showed that accessibility experiences not only qualify predictions derived from the content of thoughts, but that such experiences can completely override thought content. Participants were asked to recall either six or twelve instances of their own assertive behavior. According to content-focused models, judgments are based on the implications of the amount and strength of accessible declarative knowledge. Recalling twelve instances of assertive behavior renders many examples of assertive behavior accessible in memory. As a consequence, participants who are asked to recall twelve examples should rate themselves as more assertive because more information is better than less information.

Empirically, the exact opposite was observed. Participants who were asked to recall only six examples of their assertive behavior rated themselves as more assertive than participants who were asked to recall twelve. So, why is “less” better than “more”?

According to the availability heuristic, the ease of retrieval from memory can be used as a cue for the frequency of assertive behavior. In the context of Schwarz et al. (1991), recalling six examples feels easy, leading to the inference that there are many more examples available from memory. Conversely, recalling twelve examples feels difficult. As a consequence, individuals assume that there are only a few additional examples of their assertive behavior and this behavior must be fairly rare. These results not only illustrate that people draw on ease or difficulty of recall to determine the frequency and typicality of a behavior, but also suggest that the ease effect alone can be a better predictor than the number of thoughts. In the context of Kahneman and Tversky’s work, it was easier to generate words starting with the letter K, but it is also likely that participants were able to generate more words starting with the letter K (Wänke, Schwarz, and Bless 1995). This makes it difficult to disentangle accessible knowledge (the number of words) from accessibility experiences (the ease of recall). Schwarz et al. showed that accessibility experiences have implications beyond content and can lead to results completely opposite to the predictions derived from thought content.

The results of this original study have been extended beyond self-related judgments to a diversity of domains (see Petty et al. 2007b; and Schwarz 2004 for reviews). The ease effect has been shown to have implications for a wide array of judgments. First, ease of recall impacts frequency and likelihood estimates. Students report using their bicycle more after recalling three rather than eight past occurrences of

using their bicycle (Aarts and Dijksterhuis 1999; see also Hirt, Kardes, and Markman 2004). Also, women estimate that they are more vulnerable to sexual assault after listing four rather than eight risk-increasing behaviors (Grayson and Schwarz 1999; see also Raghubir and Menon 1998; and Rothman and Schwarz 1998) . Second, and of particular interest for this dissertation, ease of retrieval has implications for attitudes. The easier it feels for people to generate positive thoughts about an object, the more people like the object (Sweeney and Kellaris 2008; Tormala, Petty, and Briñol 2002; Wänke, Bless, and Biller 1996; Wänke, Bohner, and Jurkowitsch 1997). For example, British students reported more favorable attitudes toward Tony Blair after listing fewer rather than more positive thoughts about him (Haddock 2002). Ease has even been shown to have an impact on implicit attitude measures (Gawronski and Bodenhausen 2005). Third, attitude certainty is also affected by ease of retrieval (Haddock, Rothman, and Schwarz 1996). Students who had to generate only a few arguments to support an attitude held the attitude with greater confidence than those who had to generate more arguments (Haddock et al. 1999).

Despite the observed robustness of the effect, ease of retrieval operates under a certain set of boundary conditions: ease of processing needs to be (1) perceived as diagnostic and (2) interpreted as a positive cue for the quality of the thoughts. For example, Schwarz et al. (1991, experiment 3) showed that the impact of ease of recall was eliminated when its informational value was discredited by a misattribution manipulation. Participants had to listen to background music while generating either six or twelve examples of assertive or unassertive behavior. In one condition, participants were told that the music would help the recall of examples of assertive behavior, whereas

in the other condition, they were told that the music would help the recall of examples of unassertive behavior. When the ease of retrieval was attributed to the music, the ease effect was eliminated. This misattribution of experienced ease renders the accessibility experience non-diagnostic and the ease effect disappears. Further, implications drawn on the ease experienced depend on the naïve theory used to explain them. Most of the time, the judgment task induces the naïve theory that “ease is good”(Schwarz 2004). But ease of processing can have the opposite implication depending on the naïve theory used to assess it. For example, Briñol, Petty, and Tormala (2006) manipulated the value of ease of processing by priming either “ease is good and difficulty is bad” or “ease is bad and difficulty is good.” In the latter condition, participants read a paragraph explaining that unintelligent people often experience a feeling of ease when thinking because their thoughts are not very complex and they have few neuronal connections. Because intelligent people generally have more complex thinking and more neuronal connections when thinking, they often experience a feeling of difficulty when generating thoughts about a new issue. If participants were primed with the theory that “ease is good”, the authors replicated a traditional ease effect. When participants were primed with the theory that “ease is bad”, the effect was reversed. These results suggest that the meaning of ease of retrieval is malleable.

Hence, the ease effect has been replicated in a variety of domains with clear implications for attitude formation and some of its limits are unequivocally documented. There are, however, divergent theories about the underlying mechanism of the ease of retrieval effect. And, the study of some moderators has led to conflicting empirical findings. For instance, some researchers assume that ease effects are more likely to occur

under low elaboration conditions (the heuristic-cue hypothesis) while others consider that ease effects should be expected under high elaboration conditions (the self-validation hypothesis).

The Heuristic-cue Hypothesis

Recall tasks render two distinct sources of information: the recalled content and the subjective experience with which content can be brought to mind (Schwarz 1998). As already mentioned, content and subjective ease can have opposite implications leading to the question of their relative influence on attitude formation.

Schwarz's original work on the ease of retrieval effect started from an attempt to explain the underlying mechanism behind the availability heuristic. It is therefore not surprising that Schwarz and colleagues (e.g., Schwarz et al. 1991; Wänke et al. 1995) conceptualized subjective ease as a heuristic cue. They thus predict that people are likely to use accessibility experiences as an input for judgment when they adopt a heuristic processing strategy. When a systematic processing strategy is adopted people should rely on accessible content (Schwarz 1998).

For example, Rothman and Schwarz (1998) directly tested the assumption that the ease of retrieval effect is more pronounced under low thinking conditions when heuristic processing is more likely (low elaboration). Participants had to generate either three or eight risk factors for heart disease. The level of elaboration was operationalized as personal relevance (participants' family history of heart disease and whether they were instructed to list risks for the "average man" or themselves). They found that low-

elaboration participants perceived a greater risk after generating three risk factors, demonstrating an ease effect: less information is better than more. On the contrary, high elaboration participants perceived a greater risk after generating eight risk factors, demonstrating a content effect: more information is better than less. These results suggest that low-elaboration participants did not have the motivation to attend to the content of their thoughts, relying on the ease of the generating process as a heuristic (see also Grayson and Schwarz 1999; Ruder and Bless 2003).

The heuristic-cue hypothesis therefore states that ease of retrieval is more likely to have an influence on attitude formation under low thinking conditions when people rely on a heuristic processing strategy. When thinking is high, people go beyond subjective experience and ultimately rely on accessible content to form a judgment. As a result, the ease effect should be empirically observed only when low levels of elaborating processing are likely. Nevertheless, there is empirical evidence that ease effects might be more likely to operate under high elaboration conditions.

The Self-validation Hypothesis

Petty and colleagues (Briñol and Petty 2009; Petty et al. 2007b) developed a comprehensive framework for the role of metacognition in judgment centered on the self-validation hypothesis. Metacognition refers to second-order thoughts or the thoughts we have about our own thoughts and thought processes. A crucial element of metacognitive thoughts is the degree of confidence people hold about their own thoughts (Petty et al. 2007b). The process by which this confidence level is assessed is referred to as self-

validation process (Petty, Briñol, and Tormala 2002). Because this type of second-order thought (assessing the validity of one's thoughts) require some motivation and ability to go beyond the primary level of cognition (the content of one's thoughts), evaluation of one's thoughts are more likely to influence judgment when elaborative processing is likely. People need to have the motivation and the ability to "attend and interpret their own cognitive experience" (Petty et al. 2007a). Conceptually the self-validation hypothesis suggests that the effect of metacognition is mediated by feelings of confidence or validity associated with a particular argument.

For example, Tormala et al. (2002) presented a persuasive message to participants (four arguments in favor of implementing a senior comprehensive exam policy in their university). They asked participants to generate either two or eight favorable or unfavorable thoughts. The level of elaboration was either measured as a stable personality trait using need for cognition (study 1) or manipulated (study 2). They found the ease effect under high elaboration: people were more influenced by their thoughts when they were easy rather than difficult to generate. The ease effect was not observed under low elaboration conditions. The easier it is to generate a list of supporting arguments, the more confident people are in the validity of the arguments generated. The authors also showed that this effect was mediated by confidence (study 3), providing support for the self-validation hypothesis.

Therefore there is empirical evidence supporting two different theories illustrating an obvious discrepancy in the literature concerning the role that accessibility experiences play in attitude formation. (1) Metacognitive experiences play the role of a heuristic cue more likely to impact attitudes when thinking is low (i.e. heuristic cue hypothesis); or (2)

metacognitive experiences play a role in attitude formation only when elaboration is high because it is effortful to consider more than thought content (self validation hypothesis). To resolve this discrepancy, one needs to consider the potential role of a moderator that has been overlooked in the literature: processing style (memory-based versus on-line).

Memory-based and On-line Processing

Hastie and Park (1986) in investigating the relationship between memory and judgment, introduced the distinction between memory-based and on-line (or stimulus based) judgment. On-line judgments are formed and revised as information is received, whereas memory-based judgments rely on the retrieval of information from long term memory and the later evaluation of that information. When judgments are made on-line, relevant pieces of information are spontaneously evaluated and integrated as they are encountered to form an overall evaluative judgment. This overall judgment can then be stored in memory and retrieved rapidly and easily when necessary. In contrast, memory-based judgments occur only after information has been presented and is based on the pieces of information that can be recalled from memory. When an evaluation is solicited, all relevant pieces of information first need to be retrieved from memory and only then can a judgment be formed (Carlston and Skowronski 1986). Because of these two stages, memory-based processing leads to slower responses (e.g., Fazio et al. 1986). Further, research has shown that on-line processing depends on an individual's motivation and ability to deliberate. On-line processing is therefore most likely when individuals have both the goal of forming and the ability to form an evaluation as they process relevant

information (Hastie and Park 1986). The distinction between on-line and memory-based attitudes is a crucial moderator of the relationship between recall and judgment (Hastie and Park 1986) or recall and attitude change (Mackie and Asuncion 1990). It also has implications for attitude strength. On-line attitudes are associated with more confidence, are better predictors of evaluative preferences, and have better predictive power for behavioral intent (Bizer et al. 2006).

This distinction between memory-based and on-line processing seems highly relevant to resolve the discrepancy about the role of accessibility experiences. There is an apparent distinction in the style of processing involved when ease is used as a cue rather than as part of a self validation process. Indeed, a closer look at experimental designs used by Schwarz vs. Petty reveals differences in the nature of the judgment tasks involved when ease of retrieval is studied to investigate the heuristic-cue hypothesis or the self-validation hypothesis. Petty and colleagues focus mainly on resistance to persuasion (e.g. Briñol and Petty 2009). Most of their experiments therefore involve reacting to and judging presented arguments (a persuasive message). Such a design favors the formation of an attitude on-line as participants are likely to evaluate each piece of information as they have the goal to form an attitude. On the contrary, the original Schwarz et al. (1991) and its subsequent conceptual replications mostly rely on tasks involving self-generated or recalled arguments without the presence of a stimulus. This implies that subsequently formed attitudes are memory-based. Determining if a judgment is on-line or memory-based consequently sheds new light on competing empirical evidence and offers an avenue to further investigate the role of accessibility experiences in attitude formation.

Predictions

Consistent with the Elaboration Likelihood Model (Petty and Cacioppo 1981), the same variable can have different roles under low and high elaboration (see Haugtvedt and Kasmer 2008; Petty and Wegener 1999). The Elaboration Likelihood Model (ELM) suggests that there are two different routes to persuasion: the central route and the peripheral route. Under high elaboration (high motivation and ability to elaborate), people are likely to systematically analyze information and follow the central route to persuasion. Under low elaboration (low motivation or ability to elaborate), people engage in minimal processing and simple inferencing and follow the peripheral route to persuasion. Here we expect that ease of retrieval can have different roles depending if the central or the peripheral route is used. Under low involvement, the ease of retrieval should be used as a heuristic cue while it can be used as a piece of information available to assess validity under high elaboration.

In the experiments investigating the self-validation hypothesis, the presence of a stimulus that participants have to agree or disagree with (persuasive message) favors on-line processing. On the contrary, self-generated arguments in the absence of any stimulus entail memory-based processing. Introducing this new moderator leads to the following framework and pattern of predictions about the different drivers of attitude formation.

Table 1
Theoretical Framework

<u>Memory-Based</u>		<u>On-Line</u>	
Low Elaboration	High Elaboration	Low Elaboration	High Elaboration
Heuristic-Cue	Thought Content	Thought Content	Self-Validation

On the basis of this theoretical framework, the use of accessibility experiences as a heuristic cue should be observed for memory-based processing. People will form more positive attitudes when it is easy (vs. difficult) to generate positive thoughts about a product or service only when elaboration is low. Under high elaboration conditions, people will rely on thought content and will form more positive attitudes when they generate more (vs. less) positive thoughts about a product or a service.

For on-line processing, the self-validation hypothesis should hold. When elaboration is low, people will form more positive attitudes toward a product or service if they generate many relevant positive thoughts than if they generate only a few. Conversely, the impact of subjective ease will be observed under high elaboration: people will form more positive attitudes when it is easy to generate positive thoughts toward the product or service rather than when it is difficult.

Moreover, the self-validation hypothesis argues subjective feeling of ease increases the confidence people have in their own thoughts (Petty et al. 2007b). As a consequence thought confidence should mediate the effect of ease on attitude when elaboration is high.

CHAPTER THREE

EXPERIMENT 1

Overview

This experiment investigates the moderating role of processing style (memory-based vs. on-line) on the ease of retrieval effect. In this study we manipulate processing style using a processing goal manipulation which favors attitude formation either as attitude relevant information is received (on-line) or on the basis of retrieved attitude-relevant information (memory-based) (Mackie and Asuncion 1990). The level of elaboration is operationalized using two different levels of involvement: high involvement promotes high levels of elaboration whereas low involvement precludes elaboration (Petty, Cacioppo, and Schumann 1983). Finally, ease of retrieval is manipulated using a thought generation task (e.g., Schwarz et al. 1991) in which participants have to generate either a small number of thoughts (easy) or a large number of thoughts (difficult).

Our prediction is that the ease effect will be observed under a different set of boundary conditions for memory-based versus on-line processing style. We are expecting that the heuristic-cue hypothesis will hold for memory-based processing. This implies that the ease effect should be observed when involvement is low, but the number of thoughts (content) generated should drive attitude when involvement is high. Conversely, we are expecting that the self-validation hypothesis will hold for on-line processing. For on-line judgments, the ease effect should be observed under high

involvement conditions whereas content should predict attitude better than subjective ease under low involvement conditions.

Further, according to the self-validation hypothesis, confidence plays a central role in the impact of subjective ease. We therefore anticipate the level of confidence to mediate the effect of ease of retrieval under the conditions in which the self-validation hypothesis is expected to be supported. More specifically, confidence should mediate the effect of the ease of retrieval when involvement is high and attitudes are formed on-line.

Method

Participants and Design. One hundred and seventy six undergraduate students from diverse business classes participated in the study in exchange for course extra credit. They were randomly assigned to one of the eight experimental conditions of the 2 (processing style) X 2 (level of involvement) X 2 (number of reasons) full factorial design. Three participants were excluded from subsequent analysis based on their age because they were more than three standard deviations from the mean ($M=22.6$, $sd=2.93$, the excluded subjects were respectively 33, 42, and 43 years old).

Procedure and material. Data were collected using Medialab 2006. Participants were seated at a computer station and were notified that the purpose of the study was to investigate consumers' attitudes and perceptions. They were informed that the description of a vacation package to Mexico followed. They were then given a set of instructions that included both the processing style manipulation and the involvement manipulation.

Next the vacation package was described using four different pieces of information presented on four different screens: the content of the package, the location of the hotel, a description of the pool, and past users' ratings (see appendix A).

After reading the information, participants had to provide either two reasons or eight reasons for choosing the vacation package. Next, they filled out the dependent variables, the need for cognition scale (Cacioppo, Petty, and Kao 1984), and the need to evaluate scale (Jarvis and Petty 1996). Finally, participants had to perform a memory test (Please list as much as you can remember from the vacation package description), and had to justify their evaluation. Basic demographics and reported subjective knowledge about the stimulus were also collected.

Independent Variables. Processing style was represented using a manipulation of processing goal adapted from Mackie and Asuncion (1990). In the memory-based condition participants were asked to memorize as much of the description as they could and were told that a memory test would be provided at the end of the study. This was intended to prevent attitude formation as relevant information was received. Participants when asked to evaluate would therefore have to first remember attitude-relevant information before they could form an attitude based on these retrieved elements. In the on-line condition, the instructions were designed to induce an evaluative mind-set: "It is important to think about and have a well defined attitude toward the vacation package presented since your opinion might shape the way it will be advertised in the future." This was designed to promote attitude formation at the same time as attitude-relevant information was encountered. Participants in the on-line condition could therefore

retrieve their already formed overall attitude when asked to evaluate the vacation package.

Involvement was manipulated using an accountability manipulation (e.g., Tetlock and Kim 1987). Participants assigned to the high involvement condition were informed that because only a few students were participating in the survey, their responses were extremely important and that they would be asked to justify their responses to the experimenter. In the low involvement condition, they were told that their answers were confidential and would be averaged with the responses of hundreds of students.

Immediately following the information about the vacation, participants were told to provide either two or eight reasons for choosing the vacation package (as determined by random assignment). Participants used the computer keyboard to enter their reasons in separate boxes that appeared on a single screen. This thought generation task was used to induce a subjective feeling of ease (two reasons) or a subjective feeling of difficulty (eight reasons) (e.g., Tormala, Petty, and Briñol 2002).

Participants filled out two scales to capture two personality traits that could interfere with experimental manipulations: need for cognition and need to evaluate. Need for cognition (Cacioppo and Petty 1982) captures the chronic tendency of an individual to “engage and enjoy thinking”. It has been used in numerous studies as a stable individual difference assessment of elaboration. It is possible that this personality trait interferes with our manipulation of the level of elaboration via involvement. Need to evaluate (Jarvis and Petty 1996) is defined as “the chronic tendency to engage in evaluative responding”. Need to evaluate (NTE) was shown to have an important role in memory-based vs. on-line processing (Tormala and Petty 2001). Because they form attitudes in a

spontaneous on-line fashion, individuals high in NTE might be more likely to form attitudes on-line even if they are assigned to the memory-based condition.

Dependent Measures. Judgment of the vacation package was captured using three items: overall evaluation, overall impression, and overall assessment measured on seven-point Likert scales anchored on 1 (Extremely Bad/Extremely Unfavorable) and 7 (Extremely Good/Extremely Favorable). These three items showed high internal consistency ($\alpha = .909$) and were therefore combined into an attitude score.

Confidence was measured using four different questions: “How certain are you of your evaluation of the vacation?”; “How sure are you that your evaluation of the vacation is right?”; “How firm is your evaluation of the vacation?”; and “How much confidence do you have in your evaluation of the vacation?” For each question, participants rated their confidence on a seven-point Likert scale ranging from 1 (not at all) to 7 (extremely). A confidence score was computed based on these four items ($\alpha = .937$).

Additionally, the time students took to generate reasons for choosing the vacation was captured from the beginning of generation task to the time students chose to move to next screen.

Results

Manipulation checks and checks for confound. The three items capturing subjective reported knowledge ($\alpha = .803$) were combined into a knowledge score. An ANOVA using the summated score as the dependent variable revealed no difference between the experimental conditions.

A 2 (processing style) X 2 (involvement) X 2 (number of reasons) ANOVA on the time used to generate the reasons showed a significant main effect of the number of reasons to generate ($F(1,164)= 159.61, p< .001$). Participants that had to generate eight reasons took more time than participants that were asked to generate only two ($M= 106.59$ sec. vs. 36.69 sec.). The three-way interaction was marginally significant ($F(1, 164)= 3.80, p= .053$). Nevertheless, post-hoc tests did not show any difference between experimental conditions aside from the main effect of the number of reasons (all $ts < 1, ns$). The time spent to generate reasons can be used as a proxy for task difficulty. This suggests that generating eight reasons was more difficult than generating two.

Attitude. A 2 (processing style) X 2 (involvement) X 2 (number of reasons) ANOVA on the attitude score revealed a significant three-way interaction, $F(1,164)= 15.55, p< .001$ (see FIGURE 1).

FIGURE 1
EFFECT OF EASE OF RETRIEVAL AND INVOLVEMENT
FOR MEMORY-BASED AND ON-LINE PROCESSING

For memory-based processing, the ease effect was anticipated under low involvement but not high involvement because metacognitive experiences should be used as a heuristic cue. Under low involvement, participants that had to generate two reasons evaluated the vacation more positively than the participants that had to generate eight reasons ($M = 5.87$ vs. 5.35 , $t(39) = 2.38$, $p < .05$). Under high involvement, the opposite was observed: participants that had to list two reasons provided a more moderate evaluation of the vacation than participants that had to list eight ($M = 5.30$ vs. 5.70). This difference was marginally significant ($t(41) = 1.45$, $p = .154$). This reversal suggests that for memory-based processing, not only the ease effect disappears under high elaboration but thought content seems to drive attitude judgments. More reasons for choosing the package led to more positive attitudes, when involvement was high.

For on-line processing, an ease effect was observed under high involvement: participants that had to list two reasons evaluated the vacation package more positively than participants that had to list eight ($M = 5.80$ vs. 5.22 , $t(42) = 2.46$, $p < .05$). Under low involvement, the pattern was reversed and the difference marginally significant ($M = 5.38$ vs. 5.79 , $t(42) = 1.75$, $p = .088$). These results are consistent with the self-validation hypothesis. A content effect was observed under low involvement whereas an ease effect was observed under high involvement.

Confidence. A 2 (processing style) X 2 (involvement) X 2 (number of reasons) ANOVA was performed on the confidence score and did not reveal any significant difference between treatment groups. Ease of retrieval had a marginal main effect on confidence ($F(1, 164) = 2.96$, $p = .087$) with participants assigned to the easy generation

task feeling more confident than participants assigned to the difficult generation task ($M= 5.19$ vs. 4.86). Yet, since the self-validation hypothesis was expected to be supported only for on-line processing, analysis of the confidence judgment was especially relevant for on-line judgments. A 2 (involvement) X 2 (number of reasons) ANOVA within on-line cells revealed a main effect of the number of reasons to generate ($F(1,84)= 4.08, p<.05$). Confidence was higher when it was easy to generate reasons than when it was hard ($M= 5.35$ vs. 4.84). The level of involvement had a marginally significant effect on confidence ($F(1, 84)= 3.56, p= .063$) and confidence was higher under low involvement than under high involvement ($M= 5.34$ vs. 4.85).

FIGURE 2
EFFECT OF EASE OF RETRIEVAL AND INVOLVEMENT
ON CONFIDENCE FOR ON-LINE PROCESSING

It is interesting to notice that there is a significant difference for individuals under high involvement: people were more confident about their attitude when it was easy to

generate reasons for choosing the vacation than when it was difficult ($M= 5.24$ vs. 4.47 , $t(42)= 2.19$, $p< .05$). This difference disappears under low involvement ($t(42)= .71$, ns). In order to further test the self-validation hypothesis, a mediation analysis was performed for participants assigned to the on-line processing style (Baron and Kenny 1986). We performed a series of regressions in order to investigate the possible mediation of confidence on the effect of ease of retrieval on attitude for the high involvement condition (see FIGURE 3). We dummy coded the ease of retrieval (difficult = 0 and easy =1). Regression analyses showed that ease of retrieval predicted overall evaluations ($\beta= 0.576$, $t(43)= 2.46$, $p< .05$) and confidence ($\beta= .773$, $t(43)= 2.19$, $p< .05$). When Ease and Confidence were entered simultaneously, confidence was significant in predicting attitude ($\beta= .298$, $t(42)= 3.21$, $p< .005$), and the effect of ease of retrieval became non significant ($\beta= .346$, $t(42)= 1.55$, ns). A Sobel test was performed ($z= 1.94$, $p= .052$) and supported a partial mediation.

FIGURE 3
THE MEDIATING ROLE OF CONFIDENCE BETWEEN EASE AND ATTITUDE

For low involvement, ease of retrieval failed to predict confidence ($\beta= .213$, $t(42)= .71$, ns). These results provide further support of the self-validation hypothesis for

on-line processing style by showing that confidence mediates the effect of ease of retrieval on attitude only under high elaboration.

Additional findings. No participants assigned to the condition with the easy generation task failed to provide two reasons for choosing the vacation. It is also interesting to notice that even in the condition where participants were asked to generate eight reasons; only five participants (5.88%) were unable to provide the number of reasons required. Even if the task was more difficult, most participants succeeded at the generation task. Need to evaluate showed low reliability ($\alpha = .513$) and was therefore excluded from any further analysis. Need for cognition showed high internal consistency ($\alpha = .823$) and a NC score was computed based on the 16 items of the scale. NC was not affected by the experimental manipulations (all F s < 1, *ns*). Yet, no significant results were found using NC as a predictor. Since the level of elaboration was manipulated via the level of involvement, this suggests that the experimental manipulation overrode the personality trait. Situational variables prevailed over chronic tendencies.

Discussion

In experiment 1, we successfully replicated previous findings by demonstrating that subjective feelings of ease or difficulty have implications for judgment and attitude formation. Further, the introduction of processing style as a new moderator of the ease effect illustrates how metacognitive experiences can serve different roles in attitude formation.

When judgment was memory-based, ease of retrieval was used as a heuristic cue. Ease or difficulty of recall drove attitude only when involvement was low. This supports the conceptualization of ease of retrieval as a cognitive heuristic that is less likely to operate when involvement is high. The heuristic-cue hypothesis was consequently supported for memory-based processing. On the contrary, when judgment was on-line, ease of retrieval was driving attitude only if involvement was high. This illustrates that in the context of stimulus based judgments, it actually required more effort to consider ease or difficulty of retrieval than first-order cognition alone. This suggests that a self-validation process is more likely when a judgment is formed on-line. The self-validation hypothesis was further supported since confidence seems to play a central role in the mechanism of the ease effect for on-line judgments under high involvement. Considering the role of processing style therefore provides support for both conceptualizations of the ease of retrieval (heuristic-cue and self-validation) and offers an opportunity to reconcile conflicting empirical findings.

The results of this experiment are limited however. First, it does not allow investigating the effect of difficulty when the task generation actually results in failing to provide the number of reasons. If the task at hand is really difficult, it is likely that thought content will be unable to compensate for the feeling of difficulty. This experiment is also limited by the fact that we captured only overall attitude confidence. The self-validation process argues that ease should be mediated by the confidence people have in their own thoughts (Petty et al. 2007b). In order to provide a more direct test of the self-validation hypothesis, we need to capture thought confidence. Experiment 2 will

therefore employ a stronger manipulation to contrast ease and difficulty and will measure thought confidence instead of overall confidence.

CHAPTER FOUR

EXPERIMENT 2

Overview

This experiment further investigates the moderating role of memory-based vs. on-line processing on the ease of retrieval effect. Consistent with experiment 1, we expect that the heuristic-cue hypothesis will be supported for memory-based judgment whereas the self validation hypothesis will hold for on-line judgments. In order to provide more direct evidence for the self-validation hypothesis thought confidence (instead of overall confidence as in experiment 1) is captured. Similar to experiment 1, the independent variables (processing style, level of elaboration, and ease of retrieval) are manipulated. Different manipulations and operationalizations are used, however, to provide converging evidence for the moderating role of processing style.

First, processing style is represented via a processing goal manipulation. An evaluative mindset was induced with the same manipulation as in experiment 1 for the on-line condition. The memory-based condition was modified, however. Instead of instructing participants to memorize as much as possible from the stimulus, the goal was to distract them from the quality of arguments to preclude them from evaluating the information given to them. One way to achieve this goal is to make participants focus on the form (e.g., asking them to proof read a text) rather than on the content (Hastie and Park 1986).

Second, the level of elaboration is operationalized by the level of motivation: high vs. low situational need for cognitive closure. Webster (1993) showed how the need to have (or avoid) closure affects observer's tendency to display attributional bias. When people were motivated to avoid closure, attributional bias was reduced, whereas the motivation to reach closure led to more attributional bias. These results suggest general motivational boundaries for inferential bias. In two studies, Webster manipulated motivational state situationally. To manipulate motivation, she created different expectations. All participants were told that they would have to perform a second unrelated task upon completion of the first task (the attributional task). In one condition, the second task was presented as relatively more attractive than the first task, thus inducing the motivation to go fast through the first task (the high need for closure condition). In the other condition, participants were led to believe that the second task would be less attractive than the attributional task and therefore were motivated to avoid closure. Webster found evidence that participants motivated to reach closure actually completed the attributional task faster than participants who were expecting a less attractive second task. By adapting this manipulation we want to show that motivational state (high vs. low need to reach closure) will conceptually have the same implications as involvement for the level of elaboration. The motivation to get to a second more attractive task should be accompanied by low elaboration, mapping on the low involvement condition of experiment 1. Conversely, the desire to avoid the second less attractive task should lead to more careful processing during the first task, similar to the high involvement condition of experiment 1.

Further, to test the robustness of the ease effect across conditions, a variation of the manipulation used in experiment 1 will be used: providing one (vs. ten) reasons to choose (Wänke et al. 1997). Such a manipulation presents the advantage of increasing the simplicity of the easy task while increasing the difficulty of the hard task. As a consequence, the difference in the subjective feelings experienced is intensified. Plus, most participants in experiment 1 did not fail to provide eight reasons for choosing the vacation package. It is interesting to observe the results on both attitude and thought confidence when a larger proportion of the sample fails to generate the number of reasons asked.

Experiment 2 is also an opportunity to investigate a new type of stimulus. The stimulus used in experiment 1 was a highly experiential service. In order to provide generalizability, experiment 2 uses a 3D HDTV. First, this stimulus is a concrete product. Second, since the product was not available at the time of data collection, it was unlikely that participants had any pre-existing attitude toward the product and it was therefore impossible for them to have firsthand experience. In this way, the experiment better controls for prior knowledge and prior experience.

As in experiment 1, specific personality traits that might interfere with the manipulations are captured. Given that the manipulation of the level of elaboration induces need to have or to avoid closure, need for cognitive closure as a chronic variable (Webster and Kruglanski 1994) is likely to have an impact beyond the experimental manipulation.

Method

Participants and design. One hundred and seventy five undergraduate students participating in the study in exchange for course extra-credit were randomly assigned to one condition of a 2 (processing style) X 2 (motivational state) X 2 (number of reasons) between subjects full factorial design.

Material and procedure. Data was collected using Medialab 2006. Participants were seated at individual computer stations and were informed that they would complete two unrelated task. Next, the instruction set included both the motivational manipulation and the processing style manipulation.

Then the information about the 3D HDTV was presented as information provided by the manufacturer. Four separate screens provided information about the capabilities of the TV, the technology used, the sound quality, and Expert's rating (see appendix B) The manufacturer was referred to as brand X in order to avoid interference of possible preexisting attitude toward the brand. It was however presented as a well known manufacturer which name could not be disclosed because of confidentiality issues.

After reading the information, participants had to provide either one reason (easy condition) or ten reasons (difficult condition) for choosing the 3D HDTV. Then, they filled out the dependent variables (attitude and confidence measures), and the need for cognitive closure scale (Kruglanski, Webster, and Klem 1993). Confounding variables (such as prior knowledge about HDTV and TV usage) were also collected along with basic demographics. Finally, participants performed the alleged second task.

Independent variables. First motivational state was manipulated by manipulating the expectations about an alleged study 2 (Webster 1993). Participants assigned to the high motivation to reach closure condition (high NFCC) were be informed that the second study was a joint study with the Electronic Media Division of CCM and investigated the role of humor in new media. In the low motivation to reach closure condition (low NFCC), participants were told that the second study was a joint study with the mathematics department of the University of Cincinnati and investigated students' awareness of advanced mathematical notions.

Then, processing style was manipulated using a manipulation of processing goal adapted from Hastie and Park (1986). In the memory-based condition participants were asked to consider the number of grammatical and spelling mistakes contained in the description in order to prevent them from evaluating the information. In the on-line condition, the instructions were similar to experiment 1: "It is important to think about and have a well a defined attitude toward the 3D HDTV since your opinion might shape the way it will be advertized in the future." The intent was to induce an evaluative mindset.

Immediately following the description of the 3D HDTV, participants were asked to provide one or ten reasons for choosing the TV. This generation task constituted the manipulation of the ease of retrieval.

Need for cognitive closure was measured using the six item scale that Kardes et al. (2007) adapted from the original scale (Webster and Kruglanski 1994).

Dependent variables. Attitude was captured using the same three items than in experiment 1 (overall evaluation, impression, and assessment). These three items showed high internal consistency ($\alpha = .894$) and were combined into an attitude score.

Confidence captured the confidence participants have in the thoughts they generated (contrary to experiment 1 that measured overall confidence they had in their own attitude). The measures of thought confidence were adapted from Briñol et al. (2004). Participants rated their thought confidence on seven point Likert scales (anchored at “not at all” and “extremely”) including confident, certain and valid. These items appear to comprise a single structured ($\alpha = .925$) and ratings were averaged to obtain a thought confidence score.

Additional measures: The total time to go through the first task was measured as a manipulation check of the motivational manipulation. When the alleged task two was attractive (high NFCC) participants were expected to go faster through the first task. To insure that this measure was not corrupted by the difference in length of the generation task, time to complete the generation task was controlled for. Also in the memory-based condition, we asked participants how many misspelling and grammatical mistakes they found in order to be consistent with the cover story. Because this additional question did not exist for the on-line condition, its timing was excluded from computing the overall completion time of the first task.

An additional timing measure captured the time it took participants to answer the first attitude item (Bizer et al. 2006). This time should allow to check if the judgment was constructed (consistent with memory-based processing) or spontaneous (consistent with on-line processing). Memory-based processing entails a two stage process

(retrieving relevant information from memory and forming the attitude) and should therefore lead to a slower reaction time than on-line processing that entails only retrieving relevant attitude from memory.

Results

Manipulation checks and checks for confound. Multiple ANOVAs revealed that there was no significant difference between treatment groups in terms of ownership, interest, or knowledge of HDTV (all F s < 2, *ns.*). A 2 (processing style) X 2 (motivational state) X 2 (number of reasons) ANOVA was performed on the completion time for the generation task. It revealed a main effect for the number of reasons, $F(1,167)= 101.67, p< .001$; and a main effect for the motivational state, $F(1,167)= 6.64, p< .05$. Participants took more time to generate ten reasons than one reason ($M= 128$ sec. vs. 33 sec.). Participants went faster when the alleged study two was attractive ($M= 66$ sec. vs. 94 sec.). The analysis also revealed a two way interaction between the number of reasons and the motivational state, $F(1,167)= 4.04, p< .05$. When participants had to generate ten reasons, they were faster if they were expecting an attractive task rather than a boring task ($M= 106$ sec. vs. 149 sec., $t(86)= 2.36, p< .05$). When participants had to generate only one reason, motivational state did not have a significant impact on completion time ($M= 30$ sec. vs. 35 sec., $t(85)= 1.10, ns$). These results provide evidence that both the manipulation of the motivational state and the manipulation of ease of retrieval seem to have behaved as expected.

The total time of completion for the first task (excluding the timing of the generation task and the timing of the question specific to the memory-based condition) was submitted to a 2 (processing style) X 2 (motivational state) X 2 (number of reasons) ANOVA that showed a main effect for motivational state $F(1,167)= 101.67, p< .001$. As expected participants who were anticipating an attractive second task performed the first task faster than the participants who were anticipating a boring second task ($M= 126$ sec. vs. 135 sec.). This provides additional evidence that the motivational state manipulation was effective. The ANOVA also showed a main effect for processing style $F(1,167)= 101.67, p< .001$. Participants went faster in the on-line condition than in the memory-based condition ($M= 110$ sec. vs. 151 sec.). This seems to indicate that proof reading was a more demanding task than evaluating the information about the 3D HDTV.

Attitude. The attitude score was submitted to a 2 (processing style) X 2 (motivational state) X 2 (number of reasons) ANOVA. The analysis revealed a marginal main effect of processing style, $F(1,167)= 3.44, p= .065$. Attitude toward the TV was more positive for on-line than for memory-based, $M= 5.34$ vs. 5.11. As indicated by the completion time of the task, proof reading (memory-based condition) was more demanding than evaluating (on-line condition). This seems to have colored the evaluation of the 3D HDTV. The ANOVA also showed a main effect for ease, $F(1,167)= 4.67, p<.05$. Participants in the easy condition held more favorable attitude toward the stimulus than the participants in the difficult condition, $M= 5.37$ vs. 5.08. Using a manipulation that exacerbated the difference between the easy and difficult condition (one vs. ten reasons) resulted in an overall ease of retrieval effect. Both these

main effects were qualified by a three way interaction, $F(1,167)= 4.92, p< .05$ (see FIGURE 4).

FIGURE 4
EFFECT OF EASE OF RETRIEVAL AND MOTIVATIONAL STATE ON ATTITUDE
FOR MEMORY-BASED AND ON-LINE PROCESSING

According to our predictions, we were anticipating the heuristic-cue hypothesis to hold for the memory-based processing. As expected the ease effect was observed for high need for closure participants in the memory-based condition: the attitude toward the TV was more positive when the generation task was easy than when the generation task was hard ($M= 5.37$ vs. 4.92 , $t(42)= 2.19$, $p< .05$). The effect disappeared for low NFCC participants ($M= 5.11$ vs. 5.03 , $t(41)= .29$, ns). For on-line processing, we were expecting the self-validation hypothesis to be supported. Participants low in NFCC were subject to the ease of retrieval effect and held more positive attitudes toward the stimulus when they had to generate only one reason ($M= 5.67$ vs. 5.01 , $t(44)= 2.45$, $p< .05$). Consistent with the self-validation hypothesis, the ease effect disappeared for high NFCC participants ($M= 5.40$ vs. 5.30 , $t(40)= .38$, ns).

Interestingly, both for memory-based and on-line processing, content did not manage to override the effect of subjective difficulty. Because in the difficult condition a significant proportion of the participants failed to provide ten reasons (69 participants i.e. 78.41%), content was not able to efficiently counter balance the effect of subjective difficulty.

Thought Confidence. A 2 (processing style) X 2 (motivational state) X 2 (number of reasons) ANOVA was performed on the thought confidence score and revealed both a main effect for ease ($F(1,167)= 26.51$, $p< .001$) and a main effect for processing style ($F(1,167)= 43.31$, $p< .001$). Participants were more confident with the reasons they gave when they had to provide one than when they had to provide ten ($M= 5.26$ vs. 4.28). This effect can be explained by the fact that a majority of participants failed to provide ten reasons. Participants in the on-line condition reported higher levels of thought

confidence than the participants in the memory-based condition ($M= 5.39$ vs 4.13). This is one more piece of evidence supporting the fact that the manipulation of processing goal made the task in the memory-based condition more demanding than the on-line condition.

To investigate the self-validation hypothesis, we performed a 2 (motivational state) X 2 (number of reasons) ANOVA within the on-line condition (see FIGURE 5). This analysis revealed a main effect for ease of retrieval, $F(1,84)= 8.09$, $p< .01$. Participants reported a higher confidence in their thoughts when it was easy (vs. hard) to generate reasons ($M= 5.78$ vs. 5.01). No other effect was significant. Yet, it is interesting to notice that the difference between the easy vs. difficult condition was significant for low NFCC ($M= 5.89$ vs. 4.90 , $t(44)= 2.57$, $p< .05$) participants but was not significant for high NFCC ($M= 5.67$ vs. 5.14 , $t(40)= 1.43$, $p= .159$).

FIGURE 5
THE ROLE OF EASE OF RETRIEVAL AND MOTIVATIONAL STATE
FOR ON-LINE PROCESSING

We then performed a mediation analysis (see FIGURE 6) to test the hypothesis that thought confidence mediates the effect of ease of retrieval for high elaboration using a series of regressions (Baron and Kenny 1986). The ease of retrieval was dummy coded (easy=1 vs. difficult=0) and significantly predicted both thought confidence ($\beta = 0.991$, $t(44) = 2.57$, $p < .05$) and attitude ($\beta = 0.653$, $t(44) = 2.45$, $p < .05$). When ease and thought confidence were entered simultaneously in the model, the direct effect of ease on attitude became non significant ($\beta = 0.386$, $t(43) = 1.45$, $p = .155$) while thought confidence significantly predicted attitude ($\beta = 0.269$, $t(43) = 2.77$, $p < .01$). A Sobel test revealed that this mediation was significant ($z = 1.96$, $p = .050$). This supports the mediating role of thought confidence between ease of retrieval and attitude. For low elaboration, ease of retrieval failed to predict attitude. This provides further support for the self-validation hypothesis when judgments are formed online and elaboration is high.

FIGURE 6
THE MEDIATING ROLE OF THOUGHT CONFIDENCE
BETWEEN EASE AND ATTITUDE

Additional results. The six items of the need for cognitive closure scale seemed to suggest a single factor structure ($\alpha = .824$) and a trait NFCC score was computed. A 2 (processing style) X 2 (motivational state) X 2 (number of reasons) ANOVA was performed on the NFCC trait score. It revealed a marginal main effect for motivational state, $F(1,167) = 2.75, p = .099$. The situational manipulation of NFCC seems to have had an impact on the reported NFCC trait score. Participants in the high situational NFCC conditions reported marginally higher trait NFCC than the participants in the low situational NFCC condition ($M = 24.52$ vs. 23.20). No other manipulation had an impact on reported trait NFCC score. Because trait NFCC score was not independent from the experimental manipulations, it was not used any subsequent analysis.

Discussion

In experiment 2, we successfully replicated the results of experiment 1 by demonstrating that processing style (memory-based vs. on-line) plays a crucial role in the impact of accessibility experiences in attitude formation. The significant three way interaction demonstrates that metacognitive experiences play more than one role in attitude formation. Again, ease of retrieval was driving attitude under different levels of elaboration depending on processing style. Our results support the heuristic-cue hypothesis for memory-based processing: ease of retrieval was used as a heuristic cue and its impact on attitude disappeared when elaboration was high. For on-line judgments, the opposite was observed: ease of retrieval had an impact on judgment only when people had the motivation to elaborate. These results therefore support a self-validation process for on-line processing.

Moreover, this experiment extends the results of the first experiment in different ways. First, the mediating role of thought confidence for on-line judgments formed under high elaboration provides further support for the self-validation mechanism operating under these conditions. Thoughts that were easy to generate are held with a higher degree of confidence, and this higher level of confidence drives more positive attitudes toward the stimulus. Further, the actual failure of a significant proportion of the participants to complete the difficult task shows that strong experiences of difficulty have an impact on thought confidence regardless of the processing style or the level of elaboration. This confidence assessment is used in forming attitudes only under high elaboration conditions for on-line judgment, however. Considering thought confidence requires more cognitive processing and the self-validation process is not initiated if elaboration is low even if difficulty still had an impact on thought confidence.

Overall, by using a motivational state manipulation and a different product category, experiment 2 provides converging evidence for the impact of accessibility experiences in attitude formation. It would be interesting, however, to investigate other forms of metacognitive experiences beyond accessibility experiences and ease of retrieval. Experiment 3 will consider metacognitive experiences through the lens of processing fluency and investigate its impact when judgments are on-line vs. memory-based.

CHAPTER FIVE

EXPERIMENT THREE

Overview

The purpose of this experiment is to investigate if the results from experiment 1 and experiment 2 are generalizable beyond ease of retrieval to other forms of fluency. General processing fluency refers to the ease or difficulty with which information can be processed (Schwarz 2004).

Processing fluency and accessibility experiences are related phenomena tied to cognitive ease. Accessibility experience is applicable to the ease or difficulty with which thoughts can be generated or information can be recalled, while processing fluency is relevant to the processing of new and external information (Schwarz 2004). Every processing task can be described along a continuum from “effortless” to “highly effortful”, creating a range of metacognitive experiences from “fluent” to “disfluent” (Alter and Oppenheimer 2009). Processing fluency can be divided into different categories including conceptual fluency and perceptual fluency (Alter and Oppenheimer 2009; Lee and Labroo 2004). Theoretically, all types of fluency are related and any variable that can increase fluency should have the same effect (Alter and Oppenheimer 2009; Schwarz 2004). Conceptual fluency (e.g., Whittlesea 1993) and perceptual fluency (e.g., Reber and Schwarz 1999), even if they are manipulated in different ways (semantic priming and visual clarity respectively), lead people to rate fluent stimuli as more true or accurate than comparable less fluent stimuli. For instance, Reber and Schwarz (1999)

manipulated the fluency of written statements by varying the contrast between the statement's font and a white background. They asked the participants whether statements of the form "Osorno is in Chile" were true. Moderately visible statements (e.g., light blue or yellow) were judged as true at chance level, whereas highly visible statements (e.g., red or dark blue) were judged as true significantly above chance level.

Processing fluency has been shown to have an impact beyond truth judgment, to liking or confidence judgment. Lee and Labroo (2004) for example, showed that when a brand is conceptually fluent, people develop a more favorable attitude toward the brand. Perceptual disfluency weakens people's confidence in their judgments (e.g., Simmons and Nelson 2006). Processing fluency also has implications for other domain specific judgments (see Alter and Oppenheimer 2009 for a comprehensive review) including valuation judgments (Alter and Oppenheimer 2008). They showed that people use familiarity and fluency to determine an item's value. Participants attributed more purchasing power to a familiar form of currency rather than an unfamiliar one (e.g., a \$1 bills vs. a \$1 coin). Alter and Oppenheimer (2006) were even able to predict short term stock fluctuations by using processing fluency.

Based on the empirical demonstrations discussed above, we expect processing fluency to provide similar results to the ones observed with ease of retrieval in the two previous experiments. Thus, our main prediction is that the effect of processing fluency will have an impact on attitude formation under the same boundary conditions than ease of retrieval. For memory-based judgments, ease of processing will lead to more positive attitudes toward the stimulus under low elaboration (heuristic-cue hypothesis). For on-line judgments, ease of processing will lead to more positive attitudes only when

elaboration is high (self-validation hypothesis). The three independent variables: processing style, level of elaboration, and processing fluency are manipulated in this experiment.

Processing style is manipulated using the same manipulation of processing goal as in experiment 1. Participants are asked to either evaluate the information presented (on-line condition) or memorize as much of the information as they can (memory-based condition).

The level of elaboration is manipulated using a choice task before the main evaluation task. A demanding or effortless task performed before the main task has implications for the amount of cognitive resources still available to perform the focal evaluation task. Performing a choice task requires the mobilization of cognitive resources. Yet, as with any cognitive task, the amount of cognitive resources required is variable. An easy choice should therefore have minimal impact on the amount of cognitive resources still available at the end of the comparison task and should favor high elaboration for the focal task. On the contrary, a demanding choice should behave as a cognitive load manipulation by tapping heavily into available cognitive resources and is likely to induce low elaboration for the focal task.

To make a choice, people construct preferences by drawing comparisons(e.g., Medin, Goldstone, and Markman 1995). Comparisons help to determine the commonalities of a pair of options as well as the features that are distinctive to each option. Common features are true for both options and therefore distinctive features matter more when making a choice. Alignability of attributes between objects is an important factor in comparison(Markman and Loewenstein 2010). Alignable differences

refer to differences that are directly comparable including for example, the readiness with which the attributes of one brand can be mapped on to those of another brand (Zhang, Kardes, and Cronley 2002). Nonalignable differences are elements in one option that have no correspondence in the other option. The structural alignment model of comparison (Gentner 1983; Gentner and Markman 1997) suggests that alignable differences are noticed more easily making comparisons simpler.

Comparing products on alignable dimensions requires minimum effort without tapping heavily into available cognitive resources. As a consequence more cognitive resources will be available for the focal task, promoting high levels of elaboration. On the contrary, comparing two products on dimensions that are not alignable, because it is more demanding, will behave as a cognitive load manipulation. As a result, less cognitive resources will be available for the main task inducing low levels of elaboration. The level of elaboration in this experiment is therefore manipulated using a comparison of two products on either alignable dimensions (favoring high levels of elaboration for the subsequent task) or non alignable dimensions (favoring low levels of elaboration for the following task). The advantage of using such a manipulation over more classical cognitive load or distraction manipulations is its sequential nature. Hence the difficulty experienced during the choice task is not confounded with difficulty of processing.

The ease of processing is manipulated by using different figure-ground contrasts and is directly borrowed from Briñol, Petty, and Tormala (2006). After receiving the information about the stimulus, participants are asked to generate the same number of reasons across all conditions. Nevertheless, the contrast between what they are tipping and the background is manipulated in order to make it more or less effortful to process.

Finally, the stimulus used for this experiment is a cell phone plan. A cell phone plan provides a balance between an experiential service and a concrete product. Also, because we are using a student sample, most participants should be highly familiar with this product category. Contrary to the previous experiment in which none of the participants could have had first hand experience, it is very likely that most (if not all) of the participants had first hand experience with the stimulus. Criteria to judge the stimulus are therefore more likely to be based on personal knowledge.

Method

Participants and design. One hundred and fifty nine undergraduate students from an introductory marketing class participated in this experiment in exchange for extra course credit. They were randomly assigned to one of the conditions of a 2 (processing style) X 2 (comparison) X 2 (processing fluency) full factorial between subjects design.

Procedure and material. Participants were seated at individual computer stations where they took part in the study using Medialab 2006. They were informed that the study was designed to investigate consumers' beliefs and opinions, and that they would perform two unrelated tasks.

First they performed the comparison task that constituted the manipulation for the level of elaboration. They had to compare two cars described on 16 dimensions (see appendix 3) and reported which car they preferred using a dichotomous variable (car A or car B).

Then the second and key task was introduced by an instruction set that included the manipulation for processing style and advised students that the description of a cell phone plan followed. The description of the cell phone plan used four pieces of information on four consecutive screens (see appendix C). In order to control for pre-existing brand attitude or loyalty no brand name was used and the plan avoided features that would indirectly remind one the existing cell phone providers.

They then provided four reasons for choosing the cell phone plan and filled out the dependent variables. Finally, they answered some basic demographic questions and were dismissed.

Independent variables. Processing style was manipulated using the same manipulation as in experiment 1. In the memory-based condition, participants were asked to memorize as much of the cell phone description as possible and told that a memory test would be provided at the end of the study. For on-line, participants were informed that it was important to have a well defined attitude toward the cell phone plan and that their opinion might shape the way it would be advertised in the future.

The level of elaboration was manipulated thanks to the comparison task between two cars. In the alignable condition, the comparison of the two cars induced a low amount of effort because all the dimensions were alignable and therefore all the attributes of both cars were directly comparable. In the non-alignable condition, the information about the two cars remained constant, but the order in which the attribute information was presented for each car was different making the dimensions for comparison non alignable. In both conditions “car A” clearly dominated on the majority of features in order to limit the number of trade-offs participants had to make.

Processing fluency was manipulated using a manipulation directly borrowed from Briñol, Petty, and Tormala (2006). Participants had to generate four reasons to choose the cell phone plan in all condition, but the contrast between the color of the font and the color of the screen background were manipulated. In the easy to process condition, participants had to generate thoughts using a traditional black-and white contrast. In the difficult to process condition, participants typed their thoughts in yellow font against a pink background. This combination of colors was intended to make the reasons given more difficult to process.

Dependent measures. Attitude was measured using the same three items than in experiment 1 and 2 (evaluation, impression, and assessment) measured on 7-point Likert scales. These three items showed high internal consistency ($\alpha = .876$) and were averaged to create an overall attitude score.

Thought confidence was subsequently captured using the same three items than in experiment 2 (confident, certain, and valid) (Briñol et al. 2004). These three items seemed to comprise a single factor structure ($\alpha = .910$) and were combined to form a thought confidence score.

Results

Attitude. We submitted the attitude score to a 2 (processing style) X 2 (comparison) X 2 (processing fluency) ANOVA. The analysis revealed a main effect for processing fluency, $F(1,151) = 5.43, p < .05$. Attitudes toward the cell phone plan were more positive when the reasons generated were easy to process ($M = 5.69$) than when

reasons were difficult to process ($M = 5.46$). This effect was qualified by the anticipated three-way interaction, $F(1,151) = 4.09, p < .05$. For memory-based processing in the non-alignable condition, participants reported marginally more favorable attitudes toward the cell phone plan when self-generated thoughts were easy to process than when thoughts were difficult to process ($M = 5.76$ vs. $5.30, t(38) = 2.01, p = .052$). In the alignable condition, processing fluency did not have an impact on attitude ($M = 5.65$ vs. $5.63, t(39) = .105, ns$). The ease effect was therefore present for the non-alignable condition, but not for the alignable condition. These results support the heuristic-cue hypothesis since evidence of the impact of ease of processing was found under low-elaboration, but not under high elaboration.

For-online processing the pattern reversed. Processing fluency did not influence attitude when the comparison was non-alignable ($M = 5.58$ vs. $5.53, t(41) = .22, ns$). In contrast, when the comparison was alignable, participants attitude toward the cell phone plan were marginally more favorable when the thoughts were generated in the high fluency condition than when they were generated in the low fluency condition ($M = 5.81$ vs. $5.37, t(33) = 2.01, p = .052$). These results provide support for the self-validation hypothesis.

FIGURE 7
EFFECT OF EASE OF PROCESSING AND ALIGNABILITY ON ATTITUDE
FOR MEMORY-BASED AND ON-LINE PROCESSING

Thought confidence. Thought confidence was subjected to a 2 (processing style) X 2 (comparison) X 2 (processing fluency) ANOVA that revealed a main effect for ease of processing, $F(1,151) = 6.59, p < .05$. This main effect was qualified by an interaction between fluency and processing style, $F(1,151) = 4.55, p < .05$. The effect of processing fluency on thought confidence was significant for on-line judgments, $t(76) = 3.37, p < .005$, with higher levels of confidence reported for the easy to process condition ($M = 5.99$ vs. 5.27). For memory-based, processing fluency did not have an impact on thought confidence, $t(79) = .30, ns$. We also performed a 2 (comparison) X 2 (processing fluency) ANOVA on the thought confidence score of the participants assigned to the on-line condition. It showed a main effect for ease, $F(1,74) = 11.35, p < .005$. No other effect was significant.

To investigate the self-validation hypothesis, we performed a mediation analysis separately for the alignable comparison (high elaboration) and the non-alignable comparison (low elaboration). Following Baron and Kenny (1986), we ran a series of regressions in which ease of processing was dummy coded (0=difficult and 1=easy). Under high elaboration, ease significantly predicted both attitude ($\beta = .444, t(33) = 2.01, p = 0.052$) and thought confidence ($\beta = .887, t(33) = 2.56, p < .05$). Thought confidence was a significant predictor for attitude ($\beta = .352, t(33) = 3.99, p < .001$). When both thought confidence and ease were entered simultaneously in the model, the direct effect of ease on attitude became non significant ($\beta = .158, t(32) = .75, p = .461$) while thought confidence remained a significant predictor ($\beta = .322, t(32) = 3.31, p < .005$). A Sobel test revealed that this mediation was significant ($z = 2.03, p < .05$). Under low elaboration, ease failed to predict attitude.

All together these results illustrate the mediating role of thought confidence under the boundary conditions of the self-validation hypothesis.

FIGURE 8
THE MEDIATING ROLE OF THOUGHT CONFIDENCE
BETWEEN EASE AND ATTITUDE

Discussion

In experiment 3, we successfully replicated the results of experiment 1 and 2 using a perceptual fluency manipulation instead of an ease of retrieval manipulation. Once again, we obtained the ease effect for memory-based judgments when elaboration was low, but not when elaboration was high. We therefore found support for the heuristic-cue hypothesis for memory-based processing. For on-line judgment, we showed that ease of processing has a positive impact on judgment only when elaboration is high. Additionally, the effect of ease of processing under these conditions was mediated by thought confidence. Together these two results extend the results of experiment 1 and 2 in an important way because they suggest that general processing

fluency operates under the same boundary conditions than ease of retrieval. This important contribution shows that our earlier results are generalizable beyond memory processes to other forms of fluency.

Additionally, our predictions hold even when participants are familiar with the product category providing convergent evidence for the robustness of our effect. The use of a cell phone plan – while controlling for brand loyalty – suggests that people still use ease of processing as an important input for evaluation even if they have better established criteria to judge the product.

The use of an alignability manipulation also provides insight into the use of processing fluency when evaluating a product or service. The choice task when dimensions were not alignable behaved as a cognitive load manipulation that prevented elaboration in the subsequent evaluation task. Replicating our previous results in these conditions is interesting because people are likely to make judgments in sequence and not in isolation while in a shopping situation.

Nevertheless, there is a possible alternative explanation for the results presented. The fluency manipulation might have behaved as a manipulation of the affective state or mood of the participants. The disfluent condition because it was using an unusual and ostensibly difficult to read contrast, might have put people in a state of frustration or anger. This bad mood could have colored attitude judgments. Since mood was not directly captured, there is no direct way to rule out this alternative explanation.

Overall, experiment 3 provides convergent evidence that subjective ease can serve different roles in attitude formation depending on the style of processing and the level of elaboration.

CHAPTER SIX

GENERAL DISCUSSION

This dissertation's main theoretical contribution is to offer a solution to an existing discrepancy in the literature by introducing a new moderator. Up to now, research on metacognitive experiences has failed to provide a comprehensive framework to predict the impact of ease of processing on attitude formation. There is strong support in the marketing, psychology, and social psychology literature suggesting any variable that makes processing easier (ease of retrieval or general processing fluency) has a positive impact on attitude as long as this ease is perceived as diagnostic. Yet, both the self-validation hypothesis and the heuristic-cue hypothesis received empirical support while they actually predict opposite outcomes given a specific level of elaboration. It has been recognized that ease of retrieval might have different roles and that these different roles could account for the discrepancy in the literature (Briñol and Petty 2009). Nevertheless, no moderator that could account for the different roles of ease of processing was been documented, prior to this dissertation.

Across three experiments using different stimuli and a variety of manipulations, we showed that processing style is a crucial factor explaining the role of ease of processing. Experiment 1 established empirical support for a heuristic-cue account of the ease effect for memory-based judgments. The ease of retrieval was observed under low elaboration, but disappeared under high elaboration. This is consistent with ease of retrieval being used as a heuristic cue: when elaboration is high, thought content matters more than ease of retrieval. For on-line judgments, experiment 1 showed that a self-validation account of the ease effect better predicts judgment. The ease effect was

observed when elaboration was high. Yet, when elaboration was low, the number of arguments was a better predictor of attitude. This conforms to the notion that self-assessment of one's thoughts requires cognitive effort and is more likely to happen under high elaboration.

Experiment 2 provided additional insight into the mechanism of the ease effect. Not only did we replicate the results of the first experiment using a manipulation of motivational state, but a mediation analysis suggested that the impact of ease on thought confidence plays a central role in on-line judgments. This further supports a self-validation account of the ease of processing effect when judgments are formed on-line. Also, experiment 2 helped establish some of the limits of the effect for both memory-based and on-line judgments by investigating the impact of failing to provide the required number of thoughts. Thought content was not able to counter balance the effect of the accessibility experience when difficulty was too salient (failure to complete the task). Subjective feelings of difficulty can therefore completely overwhelm the impact of thought content.

Experiment 3 extends the results of experiments 1 and 2 by showing that the effect observed for ease of retrieval are generalizable to another type of ease of processing. As a result, distinguishing between memory-based and on-line processing is relevant beyond understanding the role of ease of retrieval in attitude formation. The theoretical framework established by considering level of involvement, processing style, and ease of processing therefore provides understanding for the mechanism of a wide array of ease effects including perceptual fluency.

A possible explanation for the different roles of ease of processing contingent on processing style, resides in the timing of the subjective experience in relation to a given stage of attitude formation. Considering the timing of a given phenomenon can be highly instructive in comprehend its impact on judgment and decision making (e.g., Briñol et al. 2007). Tormala, Brinol, and Petty (2007) for example, showed that source credibility can have different roles under high elaboration depending on timing. Indeed, source credibility affects attitude via thought confidence when source information follows, rather than precedes, a persuasive message. On the contrary, if source information precedes a message, it has an impact on attitude by affecting the valence of issue-relevant thinking. Accessibility experiences happen at different stages of the evaluation process for memory-based and on-line judgments, and this difference might account for the different roles of accessibility experience. When judgments are formed on-line people evaluate information as they encounter it. Specifically, in the case of our three experiments, participants spontaneously evaluated the vacation package, the HD TV, and the cell phone plan, before they had to provide reasons for choosing the product or service. Therefore by the time participants experienced ease or difficulty they already had an initial attitude formed. On the contrary, for memory-based judgments people first have to remember relevant pieces of information to form a judgment. In our three experiments, it means that participants did not form an attitude before they had to provide reasons for choosing the stimulus. This means that they experienced subjective ease or difficulty before they had a chance to form an attitude.

This can be understood as an anchoring and adjustment type of mechanism (Tversky and Kahneman 1974). Anchoring and adjustment refers to a cognitive process

by which people initially focus on an anchor and then adjust toward a final opinion. The influence of the anchor is reduced when people have both the motivation and ability to revise their initial judgment based on new information. In the case of on-line processing, the initial attitude is spontaneously formed based on the information provided as it is encountered. This initial attitude plays the role of an anchor. Adjustment can take place only if people have both the motivation and ability to revise their judgment. As a consequence, people only revise their initial attitude using subjective experience of ease when elaboration is high consistent with the self-validation hypothesis. For memory-based judgments, no initial judgment exists by the time the generation task occurs. Subjective experience is this time playing the role of the anchor and is the basis for an initial impression. Participants therefore went behind this first impression based on ease or difficulty only when elaboration was high. Consistent with the heuristic-cue hypothesis, people anchor on ease of processing and adjust using thought content only when they have the motivation and ability to elaborate.

Taking into account this sequential aspect of subjective ease relative to content also has implications for choice. Choice difficulty is relevant to both which alternative will be chosen and the inferences drawn from the decisions process itself. Van de Ven, Gilovich, and Zeelenberg (2010) showed that delay in a decision process is usually interpreted as doubt. In two studies they showed that if people are induced to delay their decision, they interpret this delay as difficulty for choosing and are less likely to pick the option they would normally chose. Research on effort and choice has also shown that decision process difficulty is informative about the magnitude of preference. For example, if it is very difficult to choose between two products, people infer the two

products are very similar. On the contrary, if choosing feels easy people infer from ease that there was a clearly superior product and an objectively better alternative (Liberian and Forster 2006). Choice difficulty has been shown to have implications for post-decisional dissonance. Cognitive dissonance theory (Festinger 1957) predicts a post-decisional spread of the alternative: liking more the chosen alternative and liking less the rejected ones. IFDD (Inferences from decision difficulty) predicts a different pattern if a choice is difficult. When a choice is difficult people infer that the two alternatives were very comparable. Therefore, if they have the occasion to repeat the choice in the future they will consider the rejected alternative as a viable option (Liberian and Forster 2006). Our framework becomes relevant for studying choice especially if the experience of ease or difficulty is independently of content. The subjective ease or difficulty if it precedes processing of the different attributes should play the role of a heuristic. On the contrary, if the choice is rendered difficult after the content of the possible choice alternatives has been processed, ease will be used only under high elaboration. Yet, choice can be based on side by side comparison of attributes and the comparison task itself can feel easy or difficult. When a choice is attribute-based, it becomes impossible to disentangle ease from content since content itself makes the choice difficult. This suggests that experience of difficulty might be used both as a heuristic cue when elaboration is low and as a substantive piece of evidence when elaboration is high.

Managerial Implications

Better understanding attitude formation has implication for marketing communication. It provides an opportunity for process matching. Persuasive message have more impact when they match the way consumers naturally process information (e.g., Petty and Wegener 1998). Considering the different mechanisms at play when integrating ease of processing provides an opportunity to design more efficient marketing communication. The theoretical framework we offer provides insight on how to leverage ease of retrieval and processing fluency as a strategic tool.

Another implication of our results is the relevance of our theoretical framework to predict and understand the role of ease of processing for different judgments of interest to marketing managers. Different types of judgment are in nature more on-line or more memory-based. Whereas satisfaction, for example, tends to be memory-based, variables like brand experience tend to be formed spontaneously as the interaction with a given product or service unfolds over time. To understand information collected from customers about satisfaction or brand experience, managers need to consider how ease of processing may have colored these two types of judgments.

Overall, this dissertation adds to a growing body of literature showing the pivotal role of the distinction of memory-based and on-line judgments for marketers (Cronley 2000, Cronley et al. 2010). Memory-based and on-line judgments are usually confounded when they are measured in surveys. Attitude questions typically consist of Likert scales and are usually averaged without being able to distinguish. Yet, they are different in nature and have different implications. Knowing if a judgment is memory-

based or on-line could therefore increase the amount of information extracted from consumer surveys.

Limitations and Future Research

Some of the limits of our results include the absence of a direct test for the mechanism of the heuristic-cue hypothesis. The heuristic-cue hypothesis argues that the key mediating variable between ease of processing and attitude is the number of reasons assumed to still be available from memory. If we found evidence that subjective ease was used as a heuristic-cue for memory-based processing, we do not provide support for the hypothesized mediation.

The absence of a measure of mood does not allow completely ruling out a mood account of the results of experiment 3. The manipulation of processing fluency might have induced a negative mood. Nevertheless, the convergent evidence from three different experiments with different manipulations provides indirect evidence that our results are likely due to the effect of processing fluency.

Also there is an existing opportunity to investigate other forms of fluency to see if our results are generalizeable to conceptual fluency or even linguistic fluency (Alter and Oppenheimer 2009). Experiment 3 suggests that our framework should apply to any form of fluency, but only provides direct support for perceptual fluency.

Finally, future research should also consider whether our framework is applicable beyond attitude formation to other types of judgments on which ease of processing has

been shown to have an impact. For example, it would be interesting to consider if our framework could help predict judgments such as frequency and likelihood estimates.

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APPENDIX A

Manipulations and Measures for Experiment 1

INSTRUCTIONAL SET

(Memory-Based / High Involvement condition)

Please Read Before Proceeding

The description of a vacation package to Mexico follows.

Make sure you memorize as much of the description as you can. A memory test will be provided at the end of the questionnaire.

Because only a few students are participating in this survey, your responses are extremely important. At the end of the survey you'll be asked to explain your responses to the experimenter.

INSTRUCTIONAL SET

(On-Line / Low Involvement condition)

Please Read Before Proceeding

The description of a vacation package to Mexico follows.

It is important to think about and have a well a defined attitude toward the vacation package presented since your opinion might shape the way it will be advertised in the future.

Your responses are completely confidential and will be averaged with the responses of hundreds of students.

VACATION PACKAGE DESCRIPTION

(All conditions)

Screen 1

Screen 2

VACATION PACKAGE DESCRIPTION (Continued)

(All conditions)

Screen 3

Screen 4

THOUGHT GENERATION TASK

(Easy condition)

Give two reasons for choosing this vacation package

1.

2.

ATTITUDE MEASURES

(All conditions)

Please answer the following questions about the vacation package. Click on the number that indicates your best answer to the question or evaluation.

What is your overall evaluation of the vacation?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Bad Good

What is your overall impression of the vacation?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Unfavorable Favorable

What is your overall assessment of the vacation?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Unfavorable Favorable

CONFIDENCE MEASURES

(All conditions)

How certain are you of your evaluation of the vacation?

Not at all 1.....2.....3.....4.....5.....6.....7 Very
Certain Certain

How sure are you that your evaluation of the vacation is right?

Not Sure 1.....2.....3.....4.....5.....6.....7 Extremely
at all Sure

How firm is your evaluation of the vacation?

Not Firm 1.....2.....3.....4.....5.....6.....7 Extremely
at all Firm

How much confidence do you have in your evaluation of the vacation?

No Confidence 1.....2.....3.....4.....5.....6.....7 Very High
at all Confidence

APPENDIX B

Manipulations and Measures for Experiment 2

INSTRUCTIONAL SET

(Memory-Based / Low Need for Closure)

Please Read Before Proceeding

The description of a new technology HDTV that allows seeing programs in 3Ds follows.

This technology will be soon available on the market.

Please count the number of grammatical and spelling mistakes in the information presented about the 3D HDTV.

Study 2, is a joint study with the Mathematics department of UC and investigates students' awareness of advanced mathematical notions.

INSTRUCTIONAL SET

(On-line / High Need for Closure)

Please Read Before Proceeding

The description of a new technology HDTV that allows seeing programs in 3Ds follows.

This technology will be soon available on the market.

It is important to think about and have a well a defined attitude toward the 3D HDTV since your opinion might shape the way it will be advertised in the future.

Study 2, is a joint study with the Electronic Media Division of CCM and investigates the role of humor in new media.

3D HDTV DESCRIPTION

(On-Line condition)

Screen 1

Screen 2

3D HDTV DESCRIPTION (Continued)

(On-Line condition)

Screen 3

Screen 4

3D HDTV DESCRIPTION

(Memory-Based condition)

Screen 1

Screen 2

(Memory-Based condition)

Screen 3

Screen 4

THOUGHT GENERATION TASK

(Difficult condition)

Give ten reasons for choosing this 3D HDTV

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

ATTITUDE MEASURES

(All conditions)

Please answer the following questions about the vacation package. Click on the number that indicates your best answer to the question or evaluation.

What is your overall evaluation of the 3D HDTV?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Bad Good

What is your overall impression of the 3D HDTV?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Unfavorable Favorable

What is your overall assessment of the 3D HDTV?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Unfavorable Favorable

THOUGHT CONFIDENCE MEASURES

(Difficult condition)

How do you feel about the reasons you gave for choosing the 3D HDTV?

Not at all 1.....2.....3.....4.....5.....6.....7 Very
Confident Confident

How do you feel about the reasons you gave for choosing the 3D HDTV?

Not at all 1.....2.....3.....4.....5.....6.....7 Very
Certain Certain

How do you feel about the reasons you gave for choosing the 3D HDTV?

Not at all 1.....2.....3.....4.....5.....6.....7 Very
Valid Valid

ALLEGED STUDY 2

(High Need for Closure)

Please, describe your favorite ad using humor (remember as much as you can: brand, product, etc)

A large, empty rectangular box with a thin black border, intended for the user to write their response to the prompt above.

Have you ever looked for this specific ad on the internet (using youtube.com or equivalent)?

- ☐ Yes
- ☐ No

Have you ever searched for funny ads on the internet (using youtube.com or equivalent)?

- ☐ Yes
- ☐ No

ALLEGED STUDY 2

(Low Need for Closure)

You are going to see some equations, try to recognize them!

$$\pi = \frac{c}{d}$$

Have you ever seen this equation? if yes, do you know what it represents?

$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n$$

Have you ever seen this equation? if yes, do you know what it represents?

$$i\hbar \frac{\partial}{\partial t} \Psi(\mathbf{r}, t) = \hat{H} \Psi(\mathbf{r}, t)$$

Have you ever seen this equation? if yes, do you know what it represents?

APPENDIX C

Manipulations and Measures for Experiment 3

CHOICE TASK

(Alignable condition)

CAR A	CAR B
Predictable handling with noticeable oversteer	Responsive handling
Quiet interior	Road noise noticeable
Cartridge-loading CD player	6-disc in-dash CD player with MP3 player jack
Understated styling	Sporty styling
Decent highway mileage	Excellent all-around fuel economy
Minor complaints about electrical system reported	Reliable
Air conditioning standard	Dual-zone climate control
Remote keyless entry system with folding key fob	Key-less entry system and remote engine start

CHOICE TASK

(Non Alignable condition)

CAR A	CAR B
Stiff suspension	Lots of trunk space
Predictable handling with noticeable oversteer	Lifetime powertrain warranty
Slightly reluctant acceleration	Excellent all-around fuel economy
Quiet interior	Reliable
Factory stereo	Road noise noticeable
Cartridge-loading CD player	Dual-zone climate control
Roomy interior with adequate rear passenger leg room	Excellent bang-for-your buck
Understated styling	16-speaker stereo system
Relatively narrow powerband	Automatic transmission with crisp shifts
Decent highway mileage	Key-less entry system and remote engine start
75,000 mile powertrain warranty	Smooth ride
Minor complaints about electrical system reported	Spirited acceleration
Reasonably priced	6-disc in-dash CD player with MP3 player jack
Air conditioning standard	Seats 5, but rear seat tight
Adequate Trunk space	Sporty styling
Remote keyless entry system with folding key fob	Responsive handling

INSTRUCTIONAL SET

(Memory-Based condition)

STUDY 2

Please Read Before Proceeding

The description of a cell phone plan follows.

Make sure you memorize as much of the description as you can. A memory test will be provided at the end of the questionnaire.

INSTRUCTIONAL SET

(On-Line condition)

STUDY 2

Please Read Before Proceeding

The description of a cell phone plan follows.

It is important to think about and have a well a defined attitude toward the vacation package presented since your opinion might shape the way it will be advertised in the future.

CELL PHONE PLAN DESCRIPTION

(All conditions)

Screen 1

Screen 2

CELL PHONE PLAN DESCRIPTION

(All conditions)

Screen 3

Screen 4

ATTITUDE MEASURES

(All conditions)

Please answer the following questions about the vacation package. Click on the number that indicates your best answer to the question or evaluation.

What is your overall evaluation of the cell phone plan?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Bad Good

What is your overall impression of the cell phone plan?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Unfavorable Favorable

What is your overall assessment of the cell phone plan?

Extremely 1.....2.....3.....4.....5.....6.....7 Extremely
Unfavorable Favorable

THOUGHT CONFIDENCE MEASURES

(Difficult condition)

How do you feel about the reasons you gave for choosing the cell phone plan?

Not at all 1.....2.....3.....4.....5.....6.....7 Very
Confident Confident

How do you feel about the reasons you gave for choosing the cell phone plan?

Not at all 1.....2.....3.....4.....5.....6.....7 Very
Certain Certain

How do you feel about the reasons you gave for choosing the cell phone plan?

Not at all 1.....2.....3.....4.....5.....6.....7 Very
Valid Valid

APPENDIX D

Individual Difference Measures

NEED TO EVALUATE (Petty and Jarvis 1996)

(Experiment 1)

INSTRUCTION: For each of the statements below, please indicate whether or not the statement is characteristic of you or of what you believe. For example, if the statement is extremely uncharacteristic of you or of what you believe about yourself (not at all like you) please click "1" If the statement is extremely characteristic of you or of what you believe about yourself (very much like you) please click "5".

1 = extremely uncharacteristic of me
2 = somewhat uncharacteristic of me
3 = uncertain
4 = somewhat characteristic of me
5 = extremely characteristic of me

- _____ 1. I form opinions about everything.
- _____ 2. I prefer to avoid taking extreme positions.
- _____ 3. It is very important to me to hold strong opinions.
- _____ 4. I want to know exactly what is good and bad about everything.
- _____ 5. I often prefer to remain neutral about complex issues.
- _____ 6. If something does not affect me, I do not usually determine if it is good or bad.
- _____ 7. I enjoy strongly liking and disliking new things.
- _____ 8. There are many things for which I do not have a preference.
- _____ 9. It bothers me to remain neutral.
- _____ 10. I like to have strong opinions even when I am not personally involved.
- _____ 11. I have many more opinions than the average person.
- _____ 12. I would rather have a strong opinion than no opinion at all.
- _____ 13. I pay a lot of attention to whether things are good or bad.
- _____ 14. I only form strong opinions when I have to.
- _____ 15. I like to decide that new things are really good or really bad.
- _____ 16. I am pretty much indifferent to many important issues.

NEED FOR COGNITION

(Experiment 1)

INSTRUCTION: Here we are interested in your general likes and dislikes. Please indicate the degree to which you agree or disagree with each of the statements listed below:

1 = Strongly Disagree

...

7 = Strongly Agree

1. I really enjoy a task that involves coming up with solutions to problems.
2. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
3. Learning new ways to think doesn't excite me very much.
4. I usually end up deliberating about issues even when they do affect me personally.
5. The idea of relying on thought to get my way to the top does not appeal to me.
6. The notion of thinking abstractly is not appealing to me.
7. I only think as hard as I have to.
8. I like tasks that require little thought once I've learned them.
9. I prefer to think about, small daily projects to long-term ones.
10. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
11. I find little satisfaction in deliberating hard and for long hours.
12. I don't like to have the responsibility of handling a situation that requires a lot of thinking.
13. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.
14. Thinking is not my idea of fun.
15. I try to anticipate and avoid situations where there is a likely chance I'll have to think in depth about something.
16. I prefer my life to be filled with puzzles that I must solve.
17. I would prefer complex to simple problems.
18. It's enough for me that something gets the job done, I don't care how or why it works.

NEED FOR COGNITIVE CLOSURE

(Experiment 2)

INSTRUCTION: Read each of the following statements and decide how much you agree with each according to your beliefs and experiences. Please respond according to the following scale.

1 = Strongly disagree	4 = Slightly agree
2 = Moderately disagree	5 = Moderately agree
3 = Slightly disagree	6 = Strongly agree

- _____ 1. I find that a well ordered life with regular hours suits my temperament.
- _____ 2. I don't like to be with people who are capable of unexpected actions.
- _____ 3. I find that establishing a consistent routine enables me to enjoy life more.
- _____ 4. I enjoy having a clear and structured mode of life.
- _____ 5. I like to have a place for everything and everything in its place.
- _____ 6. I dislike unpredictable situations.