

CONSUMERS' CHOICE MODEL: AN ALTERNATIVE META-GOALS MODEL FOCUSED
ON COGNITIVE EFFORT, JUSTIFICATION, AND REGRET

by

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Abstract

Consumers' choice behaviors are influenced by multifaceted decision factors. Information processing theory (Bettman, 1979) predicts that consumers' decision processes are constructed at the time of a decision, and consumers' meta-goals model (Bettman, Luce, & Payne, 1998) posits that their choice behaviors are generally guided by the minimization of cognitive effort and negative emotion, and the maximization of accuracy and justification. Insightful as this model may be at describing how consumers' choices are shaped, it does not specify the interactions among the goals, assess the benefits of cognitive effort, or fairly evaluate the importance of emotion and justification in consumer decision making.

Thus, the current studies collectively propose an alternative meta-goals choice model. Particularly, the current studies speculate on the importance of *regret* in consumer decision making. Consistent with previous research, Study 1 shows that participants trade-off between cognitive effort and accuracy goals depending on the monetary value of the products at hand, suggesting that the cognitive effort-accuracy trade-off may be moderated by price. Study 2 investigated the impact of cognitive effort on the experience of regret, showing the effectiveness of cognitive effort in attenuating the experienced regret. This relationship is explored with respect to the role of cognitive effort as a means of the justification factor in Study 3. Results showed that unjustified (wasted) cognitive effort did not make a substantial difference in post-purchase regret, but under spent cognitive effort generated more post-purchase regret. Study 4 examined both anticipated and experienced regret in relation to cognitive effort and justification; results showed that an exertion of cognitive effort is helpful in reducing the experience of regret but the justification of the choice also affects this relationship especially when the choice during the decision search is incongruent with the final decision. These results from current studies suggest interrelations between consumers' four meta-goals. Based on these findings, an alternative meta-goals model is proposed which includes the benefits of cognitive effort exertion on consumer decision making, perhaps shedding light on how and when consumers choose to exert effort in an attempt to alleviate the potential future experience of regret.

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Chapter 1 - Introduction

Consumers' decision environment is complex, dynamic, and evolving. Copious decision factors function together to determine consumers' choices and multiple decision goals support or interfere with each other during a choice process. Further, new products and technologies develop presenting decision devices and creating decision environments that did not exist in the previous centuries (e.g., online shopping). In this constantly changing environment, and on a daily basis, consumers process abounding amount of information, make myriad choices, and experience diverse emotions before and after a decision has been made. These experiences are the building blocks for each consumer, and he or she may develop decision strategies that fit the purpose or the goal of the decision. Consumers learn from their past mistakes and successes and adapt themselves to the next decision task. In other words, in real life, consumers' decision making is a continuously-evolving process.

The assumptions and understanding of consumers' behaviors, judgments, and decision making evolved with the intellectual ambiance, social context, and philosophy of a specific time. The psychological study of consumers in United States dates back as early as 1896 with Harlow Gale, who investigated the value of attention in advertisement (Kuna, 1976). However, it was not until the seminal work of J. B. Watson and W. D. Scott that consumer research started to become more prevalent. Congruent with the dominant school of thought in the early 1900's, Watson and Scott were most interested in applying classical learning principles (e.g., classical conditioning and operant conditioning) to marketing and industrial decisions. Since the essential focus of these studies was observable behavioral changes, the beginning of consumer research was targeted to promote products, increase purchase intent, and eventually to increase purchase behavior (sales rate). For example, Watson used the media outlets of radio, newspaper, and magazine to advertise products, where he used attractive models to be positively associated with the target product. He noted that by using the right "appeals", he could alter consumers' instinctive judgments and this method could bring a "very direct bearing upon human behavior" (Watson to Meyer, April 9th, 1921, as cited in Buckley, p. 212). Watson recalled "...it can be just as thrilling to watch the growth of a sales curve of a new product as to watch the learning curve of animal and men" (Watson, 1936, as cited in Kreshel, 1990, p. 52). Watson (1922) also found that brand attractiveness is not necessarily dependent upon the function or quality of a product.

He argued that the indirect testimonial, when used effectively, promotes brand attractiveness and even the perceived quality of a product. This notion was later applied to brand conditioning which is one of the most important market positioning techniques used today (Kreshel, 1990).

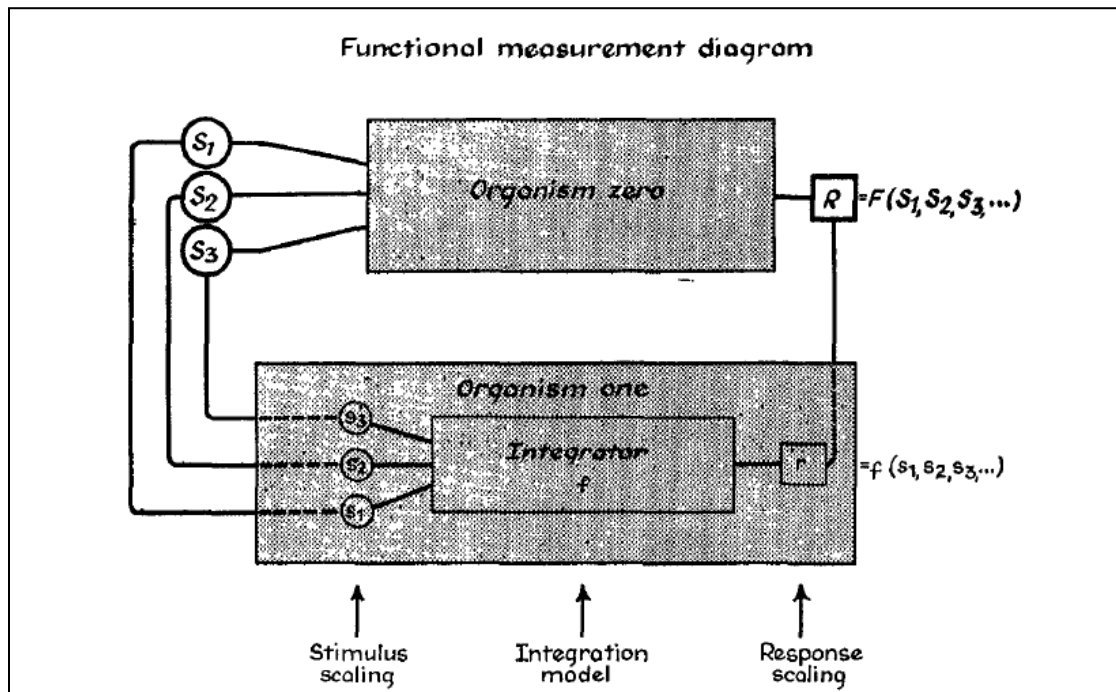
W. D. Scott held a slightly different viewpoint about methods to change consumer behavior but also made it clear that advertisements or signs (i.e., symbols) should incorporate psychological factors that make readers comfortable in order to achieve the desired effect (Scott, 1903). In *The Psychology of Advertising* (1908), Scott introduced topics such as memory, emotions, appeals, and consumers' (customers in his language) sympathy. His work was among the very first attempts to relate emotions and memory to consumer decision behavior. He believed that positive and negative emotions influenced consumers' attitude formation and demonstrated his points in street railway advertisement, and by using questionnaire methods he measured people's emotions regarding advertising (Scott, 1908). One of Scott's best known works is his idea of store coupons. He argued that coupons, not the product itself, had significant function because coupons also held psychological values that could lead to behavioral changes (Scott, 1903, 1908). For example, he used direct commands toward consumers such as 'cut this corner off' or 'fill out the coupon and bring it to the store', and provided specific and definitive tasks to potential customers. These commands were thought to facilitate consumers to take actions desirable to marketers (Scott, 1903).

As discussed above, consumers during this period were considered passive receivers of information, where the marketer, had an ultimate ability to shape and change consumers' behaviors by using the right techniques or procedures. From a behavioristic perspective, consumers were another agent whose *actual* behavior could be changed to be closer to the *target* behavior. For example, to Watson consumption was simply another type of buying 'behavior' and thus could be controlled and manipulated by using classical or operant conditioning processes (Buckley, 1982). Accordingly, Watson viewed the purpose of advertisement from the point of view of a creator and controller of consumption, rather than a source of information for the consumer (Buckley, 1982).

Cognitive emphasis in consumer research and information processing model

In the 1950's, the dominance of behaviorism in consumer research was slowly replaced by the ideas of cognitive psychology. With the rapid development in cognitive psychology, focal interests in behaviors slowly diverted to the research questions about how the human mind is conditioned and/ or organizes experiences. The study of cognition involves investigations of psychological entities which are not directly observable, and thus requires structural models of knowledge or models of information processing. For example, Anderson (1970) proposed an approach that would allow one to establish a functional model, which could then be used to determine subjective values people (consumers) placed on stimuli (products). In this model, the observed response is the final product of values of a given stimulus described in Figure 1.1. In this diagram, each stimulus holds a stimulus value which may or may not be the same as the subjective values assigned by the decision maker. Then, through the functional model, people reflect their inner subjective judgment which in the end is the observed response (Anderson, 1970). Information Integration Theory is a useful method to measure people's goal directed behavior (Anderson, 1982), and this approach conceptualized what are 'biases' in judgment (Anderson, 1991). It takes a person's subjective values and uses functional measurement to determine the relationship between a person's subjective values of a stimulus and the stimulus' *actual* values.

Figure 1.1 Functional Measurement Diagram (source: Taken from Anderson, 1970)



Anderson (1970, 1982, 1991) recognizes that multiple values are typically relevant and must be integrated in making any single decision. He also distinguishes between objective and subjective values, and focuses on the latter. Although functional measurement involves algebraic rules, he concomitantly warns that normative algebra has constrained thinking about how people make decisions and proposes a functional perspective focusing on the accomplishments of human cognition (Anderson, 1982, 1991). The information integration model is important in that it successfully describes the function of consumers' choices based on subjective values and judgments.

During this span in history, consumer research also started to investigate the cognitive structures of memory, attention, attitude, and information processing. For example, consumer research witnessed a great theoretical development in attitude formations, maintenance, and changes (Fishbein & Ajzen, 1975). In the earlier models of Attitude Formation Theory (Fishbein & Ajzen, 1975), the process of classical conditioning was used to explain not only behavioral changes but also attitudinal changes towards a brand or a product. Attitudinal changes were largely ignored previously, because the entity of attitude was thought to be too difficult to measure. Thus, Fishbein and Ajzen (1975) contributed in consumer research by conceptually

separating belief, attitude, and intention. In addition, research interests expanded to study the effects of consumers' prior knowledge, experience, memory, and information processing on judgment and decision making (Cohen & Chakravarti, 1990).

In particular, the understanding of consumer decision making encountered a significant conceptual change with the proposal of an information processing model (Bettman, 1979). In the information processing model, consumers are no longer passive learners who produce stimulus-response reactions. Instead, the model focuses on how inputs from the decision environment is processed through consumers' cognitive system (e.g., attention, memory, attitude, emotions, and preferences) and then leads to final choice behaviors (Bettman, 1979). Consumers' cognition, which is the basis for their choice behaviors, is viewed as a complex and intricately woven system (e.g., schema) which fabricates final decisions (Olson, 1980).

The information processing model takes a different approach than the information integration model (Anderson, 1970) to explain consumers' judgment and decisions. The latter model assumes that consumers have decision strategies with predefined weights and values, and therefore was more aimed at finding a functional model that could describe consumers' subjective judgments (Anderson, 1982, 1991). On the other hand, the information processing model assumes limited cognition or bounded rationality (Simon, 1955), and focuses more on how consumers' decision processes are constrained by limited mental capacity (e.g., working memory). Thus, the choice processes and involved decision strategies are contingent to decision tasks. That is, "choice heuristics may not be stored in their entirety in memory, but may exist only as fragment—subparts which are put together constructively at the time of processing, at the time of making a decision or a choice" (Bettman, 1979, p.33). This approach had an influential impact on how researchers view consumers' decision process and choice behaviors. Particularly, it successfully adopts the notion of bounded rationality to the consumer research domain.

Emergence of decision models under bounded rationality

Rationality in consumer decision making

Prior to the information processing model, consumer research was based on the assumptions of the rational (or normative) choice model (Bettman, 1979; Johnson, 2008; Shafir et al., 1993). The normative choice model in the decision making literature, especially based on

economic rationality, assumes that decision makers have absolute rationality that enables them to find an optimal option based on the calculated maximum expected utility (von Neumann & Morgenstern, 1947). In addition, decision makers are believed to have a well-defined preference order that is independent from the choice set. For example, if a person prefers option A over option B, the same person cannot prefer option B over option A simultaneously. Thus, unless the expected value or the utility of an option changes, consumers' choice preference order should remain irreversible. The intransitivity in the choice preference is the fundamental building block of a rational decision (von Neumann & Morgenstern, 1947). The subjective expected utility model shares the fundamental premises of the expected utility model. It is assumed that decision makers have a complete view of all important information, including all the alternatives and consequences of those alternatives; however this model allows a subjective decision weight (Savage, 1954), and subjective probabilities (Edwards, 1954) to be assigned to each option.

However, normative models have been repeatedly refuted in the consumer research literature (e.g., Bettman, 1979; Payne, 1982; Payne, Bettman, & Johnson, 1992) because these models fail to accurately predict the actual choice behaviors of consumers. As has been amply documented (e.g., Bettman, 1979; Bettman & Park, 1980; Payne et al., 1992; Slovic, 1995; Tversky, Sattath, & Slovic, 1988), consumers do not have well-defined values for each attribute, and the preferences for attributes are constructed at the time of decision making rather than merely revealed. These models endorse the notion of bounded rationality (Simon, 1955, 1956).

Simon's (1955, 1956) work on bounded rationality is widely accepted and has been the basis for many choice models in the decision making literature (e.g., Bettman et al., 1998; Gigerenzer & Goldstein, 1996; Payne, 1982; Kaneman & Tversky, 1974). Bounded rationality in Simon's early work focuses on decision makers' constraints about informational processing and computational capabilities. Due to these limitations, decision makers yield selective attentional information processing, and many times are assumed to follow the satisficing principle, not the expected utility maximization principle (Simon, 1956). According to Simon's models of bounded rationality, decision makers select their options based on one or two criteria, and once those criteria are satisfied the option is chosen, thus terminating the search.

The notion of bounded rationality starts acknowledging decision costs (cognitive effort), such that the time and effort costs of decision making are weighed against potential benefits and costs of the decision outcomes. Bounded rationality is an alternative form of rationality (Simon,

1956) incorporating the effort-accuracy trade-off in decision making processes. This model of rationality can explain certain decision makers' preference reversals (Lichtenstein & Slovic, 1971; Slovic & Lichtenstein, 1983) and why their choices are constructed. Thus, bounded rationality and its satisficing principle seem to provide a more ecologically valid framework within which to predict and speculate consumers' choice behavior.

Another insightful approach to the study of consumers' choice behavior deals with the contingency model by Beach and Mitchell (1978), which states that people will make meta-decisions between different potential strategies (subjective expected utility maximizing, non-analytic strategy, satisficing, etc.). Beach and Mitchell constructed a model that relates the value of a correct decision and the costs of applying various decision strategies to the following eight variables: unfamiliarity or novelty of the decision task, ambiguity of goals, complexity, instability in task structure, irreversibility of response, significance of outcomes, accountability, and time and money constraints. It is assumed that the process selected will maximize the expected benefits of a correct decision (e.g., significance) against the cost of using the process (Beach & Mitchell, 1978). This strategy selection is based upon a cost/benefit compromise between decision makers' desire to make the best decision and their desire to avoid negative feelings about investing time and effort in the decision making process. The core of this argument is to note that judgment and decision making is part of a continuous process. If we consider certain points in time, decision makers may make errors of judgment; but, if the errors are considered as part of a process, these errors can be viewed as functional (Hogarth, 1981).

This argument can be applied to the consumer decision domain. Consumers might be inclined to stay with a decision option as long as it holds up to the maximum expected utility or brings successful experience for them. If the current option does not meet consumers' expectations, or the current option is thought of as an error, consumers may learn from their mistakes and refine/ revise their judgment process so that they may reach the optimal option in the next decision. Einhorn and Hogarth (1981) make note of the optimality of the goal in a continuous process. Therefore, the optimality option is defined as "decisions or judgments that maximize or minimize some explicit and measurable criterion (e.g., profits, errors, time) conditional on ... a specified time horizon" (p. 55) and is not viewed as one time decision task.

Framing effects in consumer decision making

Based on bounded rationality (Simon, 1955, 1956), the information processing model (Bettman, 1979) emphasizes the importance of the constructiveness of consumers' choice. The constructive choice approach postulates that consumers will show flexibility in their decision making process based on the presentation of decision tasks (Bettman et al., 1998). This effect of the presentation of tasks has its roots in a phenomenon known as the framing effect (Kahneman & Tversky, 1981).

Framing effects have also shown that decisions are influenced by seemingly irrelevant aspects of the situation (Kahneman & Tversky, 1981). However, Prospect Theory (Kahneman & Tversky, 1979) assumes that irrationality lies in the decision maker and not in the task, and argues that human decision making is bound to show irrational behaviors such as biases and fallacies. An example of *irrationality* caused by the framing effect is performance on the Asian disease problem: People are asked to choose between two mathematically equal options- Option A, that will save 200 for sure, and Option B with a 1/3 probability that 600 people would be saved and a 2/3 probability that none of the 600 would be saved. In this frame of question, 72% of the participants preferred the option A. Conversely, other participants were asked to choose between Option A that will lead to 400 people dying for sure, and Option B with a 1/3 probability that nobody would die and a 2/3 probability that 600 would die. When asked with this frame, 78% of the participant chose option B. Results show that people reverse their preference corresponding to the presentation of their decision problem, even when the expected values for both options are the same. Kahneman and Tversky (1981) argue that people show irrational behaviors because, when the two options with the same utility are framed in different ways, people violate the principle of intransitivity and thus cannot meet the high standards of rationality. Tversky and Kahneman (1981, 1988) also assert that people's choices may alter contingent on how a decision task is framed, and that people may even be negligent and ignorant of this effect. Since people are unaware of the framing-relevant information in a decision task, the framing effect is thought to persist (Tversky & Kahneman, 1981, 1988).

This perspective on human rationality, however, has been contested by many researchers. Jungerman (1983) makes the important point that feedback and redundancy are common aspects of everyday decision environments, but not included in the laboratory decision tasks. The lab

assumes a static decision environment, but participants may be assuming a dynamic one or, at least, have experience reacting only to a dynamic (real world) environment. Jungerman (1983) also argues that the framing effect may actually be very functional; the decision maker will use the first available information, knowing that there may be a point in the future that this judgment can be corrected.

Related refutation can be found in the fast-and-frugal framework as well (Gigerenzer & Goldstein, 1996). In this fast-and frugal approach, it is postulated that decision makers have evolved cognitive mechanisms which leverage the constraints of the environment in order to operate effectively in various decision environments. Gigerenzer and Goldstein (1996) reintroduce probabilistic mental models (PMM) as a means of demonstrating how people make decisions and do so rationally. Building on Simon's concept of bounded rationality (Simon, 1955, 1956), this fast-and-frugal framework notes that memory search is minimized and that there is no integration of information, but rather substitution. Further, not all information is taken into account and satisficing types of algorithms are at work. In a way, PMM is an inductive tool that uses only limited knowledge and is used to make quick inferences.

Traditionally, literature on consumer choice has supported an information processing based choice model of decision making, assuming a constructive choice paradigm (e.g., Payne, 1982; Bettman, 1979). However, major consumer decision making studies (e.g., Bettman et al., 1998; Payne et al., 1982) treat decision making as an independent event and do not acknowledge the importance of feedback or the desire to avoid negative feelings about investing time and effort in the continuous decision making process. The prevalent ideas in consumer decision making literature are based on a pessimistic view of rationality (see Jungerman, 1983); thus consumers are assumed to use less cognitively-demanding decision strategies with the increase in decision complexity leading to less accurate decisions (Bettman et al., 1998). It is also postulated that consumers will only spend cognitive resources to achieve the desired outcome (increase in accuracy of the decision).

However in real life, decision task complexity is closely related to the importance of a decision and it is common to observe consumers' inclinations to put forth more cognitive resources and effort toward more important decisions. The invested cognitive resources can be useful for a future decision which is contingent on consumers' preferences. Preferences occur as a result of experiences and consumers may actively seek experiences to learn more about their

preferences. Current preferences are developed over time based on the feedback they receive from previous experiences. At the same time, the current choices imply the anticipation of future preferences. Additionally, invested cognitive resources can actually be functional when consumers are open to considering further information and, thus, save mental energy to clarify possible uncertainty or ambiguity in the future.

In a similar vein, the satisficing model predicts that learning and experience change people's memory and may evoke different reaction patterns to the newly presented stimulus (March & Simon, 1958). Applying this to consumer decision making, each decision task may induce the use of a different strategy (different behavior) resulting in a contingency of choices rather than optimized choice behaviors (March & Simon, 1958). Compared to the dominant choice model in consumer decision making (e.g., Bettman et al., 1998; Payne et al., 1982), March and Simon's model (1958) provides a more ecologically valid answer of why consumers change their decision strategy depending on the decision task, resulting in a consumer's variant choices in a continuous process.

The discussion on the limitations of choice-based consumer decision process (e.g., Bettman et al., 1998) raises the need for an alternative model that evaluates the consumer's choice process with more emphasis on (1) the importance of feedback, (2) the desire to avoid negative feelings about investing time and effort in the continuous decision making process, and (3) re-evaluating the potential contribution of cognitive effort in consumers decision making. Feedback, defined here, refers to a gain in knowledge about a decision. This feedback may result in the desire to avoid negative feelings about investing time and effort toward the same decision option in future decision tasks.

Prior to further advancing our argument, it is important to define the nature of mental effort and how we define the construct. Mental effort has a long and venerable history as a theoretical construct in cognitive psychology and in the context of decision making there are many different conceptions of decision effort (Johnson & Payne, 1985). Cognitive effort has many names, and has been referred to in a diversity of constructs such as mental effort, mental cost, decision cost, or decision effort (Einhorn, 1980; Johnson & Payne, 1985; Navon & Gopher, 1979; Payne, 2008; Tversky & Kahneman, 1973). As a theoretical construct in the context of decision making, there are diverse perspectives on cognitive effort.

Perspectives on cognitive effort in decision making

The role of cognitive effort in decision making is debated, and perspectives on cognitive effort in general vary across different disciplines (Johnson, 2008). Recent studies from diverse psychological approaches (e.g., cognitive, social, developmental) have focused on investigating the neural representation of human and animal behaviors to find a connection between physiological aspects and behavioral changes. Studies in the neurocognitive domain have investigated how decision costs are registered in our brain (Allen et al., 2007; McGuire & Botvinick, 2010). Results show that the decision-related cognitive costs are processed in the lateral prefrontal cortex (McGuire & Botvinick, 2010), and that the activity in the dorsolateral prefrontal cortex increases when participants engage in more significant cognitive memory (Allen et al., 2007). The latter study also suggested the possibility that, based on the physiological evidence, decision costs are generated not from the performance feedback (bottom-up process) but are controlled more meta-cognitively, a top-down process (Allen et al., 2007). Applied to consumers' choice processes, this finding supports postulation of a meta-goals-driven choice model (e.g., Bettman et al., 1998) in which consumers' choices are regulated by the meta-goals.

Decision cost is by and large neglected in economics. In economics, the ultimate goal in decision making is to find an optimal option with maximum expected utility (von Neumann & Morgenstern, 1947). Moreover, people are assumed to be capable of making rational and logical decisions in any given situation that will maximize the expected utility function. The search cost (cognitive effort) is not much of a concern and is thought of as a pre-decisional investment which will be paid off when the optimal resolution is found (Gabaix, Laibson, Moloche, & Weinberg, 2006). In this perspective, cognitive effort is compensated by the benefits which cognitive effort generates.

On the other extreme, cognitive effort is thought to be highly expensive in terms of processing, and that the decision maker therefore uses it at the minimum level; in essence the decision makers are "cognitive misers" (Fiske & Taylor, 1984, p.12). Russo and Doshier (1983) define cognitive effort as the total cognitive resources used in the decision process, and others (Johnson & Payne, 1985; Newell & Simon, 1972; Shugan, 1980) define cognitive effort as the cost of thinking. In this perspective, the smallest unit of decision cost is the amount of cognition

required to compare two alternatives on one attribute (Shugan, 1980; Johnson & Payne, 1985) or the minimum amount of information processing used to choose one option (Newell & Simon, 1972). This definition of cognitive effort is more focused on the costs and neglects the benefits from used effort. On the other hand, this approach provides a method to estimate the decision costs by decomposing decision processes into basic units (e.g., cognitive effort needed to compare two attributes).

Similarly, Query Theory also hypothesizes that decision makers have the fullest level of cognitive resources as a default and that depletion starts with the decision process (Johnson, Haubl, & Keinan, 2007; Weber et al., 2007). The formation of choice preference or the decomposition of valuation is only possible by using decision makers' memory. According to Query Theory, choice preference construction is founded on decision makers' memory retrieval during decision making, and the memory cues or aspects of knowledge that decision makers use varies depending on how the queries are framed (Johnson et al., 2007). For example, Query Theory predicts the discrepancy between willingness to pay (WTP) and willingness to accept (WTA) depending on "a series of queries," decision makers go through, such as "Why should or should I not make the trade?" (Johnson et al., 2007, p. 462).

Traditional views on the Influence of cognitive effort in consumer decision processes

Most of the consumer decision making literature views cognitive effort as a cost, and research is focused on how consumers use heuristics as they fail to hold up to the highest standards of rationality. Placing this view within the meta-goals choice framework (e.g., Bettman et al., 1998), the benefits of cognitive effort are largely ignored, and it is proposed that consumers have a meta-goal to reduce cognitive effort though they simultaneously have a goal to reach maximum accuracy. This is clearly a contradicting relationship between the two goals and could more appropriately be conceptualized in terms of a trade-off between the goals.

In another study, Mandler (1982) notes that the decision processes of categorization, assertion, and evaluation of alternatives may generate positive or negative evaluation of the given choice task. For instance, if there is greater incongruity between a given stimulus (food taste) and the expected value for that stimulus (food appearance), consumers reported more negative overall evaluation of the stimulus. Mandler (1982) explains that consumers wasted their

mental resource in the process of categorization and therefore evaluate the taste much lower than the case where their expectation and actual taste did not show much gap.

Stayman, Alden, and Smith (1992) found similar results examining the relationship between the expectation of a product and evaluation of the actual experience. As expected, negative evaluation was found when the experience of the product was largely incongruent with the expectation about the product. On the other hand, when the incongruence was moderate, experience with the product was rated more positively. It was concluded that the extra cognitive effort put forth to accommodate incongruencies resulted in a more negative evaluation of the stimulus (Mandler, 1982; Stayman et al., 1992).

In addition, copious studies have focused on the negative effects of cognitive effort on the overall evaluation of the consumer decision processes or decision outcome. For example, studies have shown that satisfaction decreased when the level of personal responsibility consumers felt for the choice increased (Botti & McGill, 2006), when the decision was made following prolonged conscious deliberation (Dijksterhuis & van Olden, 2006). Satisfaction with the chosen option was also decreased by an increased number or variety of items in the choice set (Iyengar & Lepper, 2000; Sagi & Friedland, 2007; Swait, & Adamowicz, 2001). Other studies demonstrated how spending additional time on deliberating decision alternatives decreased the perceived quality of the final option (Wilson & Schooler, 1991) and prolonged speculations among options made consumers feel like they are losing the foregone options (Carmon, Wertenbroch, & Zeelenberg, 2003).

Insights from the alternative views of cognitive effort

An alternative way to capture consumers' decision strategies in relation to cognitive effort can be borrowed from the adaptive toolbox model (Gigerenzer & Goldstein, 1996). In the probabilistic mental model (PMM), memory search for attributes is minimized by the use of satisficing algorithms and not all information is used. The benefit of this model is that it is an 'inductive tool' that uses limited mental capacity, makes quick inferences, and results in satisficing decision outcomes. According to this model, consumers will minimize the use of cognitive effort not because they set it as a goal, but because there is no need to expend decision costs greater than is needed to make a satisfactory decision.

The normative decision view, on the other hand, is that consumers have access to all information and act upon all of that information; this is the basis for the accuracy maximization goal. It is also importantly pointed out that most of the experiments conducted to lend support to either of these views have been single-shot studies of binary, hypothetical situations, and all the information is conveniently laid out for participants. Gigerenzer and Goldstein (1996) shows that the use of heuristics does not necessarily result in biases and errors in decision, and that irrationality sometimes lies in the nature of an experimental design or the stimuli used, and not necessarily in the nature of decision maker. On the contrary, this model predicts that consumers will exert more cognitive effort on a decision when it is needed or required. It is a goal of this paper to redefine the role of cognitive effort in the consumers' meta-goals model.

By and large, cognitive effort is mostly considered as a loss for consumers. It is even assumed that consumers are reluctant to use cognitive effort. However, there are benefits that consumers can gain from spending decision search time and cognitive effort. These two factors—search time and cognitive effort—are often neglected in consumer decision research. One evident reason for cognitive exertion is to increase the returns or benefits from the decision so as to increase accuracy (Johnson & Payne, 1985; Payne, 1982), either to find the best resolution to the decision task or to reduce the uncertainties of the decisions (Garbarino & Edell, 1997).

Garbarino and Edell (1997) further explain this effect within an effort-accuracy trade-off. In this model, categorization of attributes and alternatives require expenditure of cognitive effort, which brings an increase in accuracy. If the categorization task is simple enough --that is, if the choice set is relatively simple-- the benefits outweigh the costs and lead to a positive evaluation of the product. On the other hand, if the search task becomes too complex the costs outweighs the benefits and lead to a negative evaluation of the product. Garbarino and Edell found that when participants put forth more cognitive effort to process a brand (e.g., more attributes, alternatives, and combinations), the brand from that complex choice set was less likely to be chosen unless it had dominant positive attributes. It was concluded that increased cognitive effort and increased work load at a given amount of time results in negative evaluation of the brand and decreases in the likelihood of it being purchased (Garbarino & Edell, 1997). This study clearly shows the importance of justification in relation to cognitive effort and choice behavior. When the search task becomes more complicated, the consumers are more likely to deliberate on the

justification of their behavior (Okada, 2005), yet justification is not considered as a crucial part of the decision process in this model.

This implies that consumers will not be averse to spend cognitive effort as judged appropriate. Using the language of the meta-goal framework, the exertion of cognitive effort can be a tool for consumers to help them be more proactive decision makers; a tool they can decide to use or not use, depending on the impending decision task. This is different from the commonly accepted premise in the literature on consumer and marketing research that consumers' bounded rationality leaves them with no choice but to use less taxing and less cognitively demanding decision strategies. It is not the argument to say that consumers do not make effort-accuracy trade-offs, nor that the effort-accuracy trade-off model is of no importance in predicting consumers' choice behavior. Rather, it is the current goal to involving more goals such as negative emotion reduction or justification within this framework.

The Effort-accuracy trade-off model

Basis of the effort-accuracy trade-off

Though accuracy maximization and cognitive effort minimization are proposed as two independent meta-goals (Bettman et al., 1998), consumers more often make a trade-off between the goals of accuracy and effort, and therefore the two goals are inversely related with each other. In the effort-accuracy trade-off model (Johnson & Payne, 1985; Payne, 1982), cognitive effort is a cost which contributes to the achieved accuracy— commonly defined as following the weighted additive model— of the decision. Thus, in this model, consumers construct decision strategies at the time of the decision process according to their perspectives of costs and benefits. This model explains why consumers sometimes use high cognitive effort-laden strategies and at other times use less demanding decision strategies (Payne, 1982) to monitor the accuracy of the decision.

The accuracy goal assumes that consumers have the ability and desire to perform complex algorithms and to find the alternative with the highest expected value. Consistency with accuracy goal is traditionally measured by the degree of using a weighted additive model (Bettman et al., 1998), a criterion which has been challenged by later studies due to complicated and artificial assignments of values and calculations (e.g., Shafir, Simonson, & Tversky, 1993).

Cognitive effort minimization goal reflects bounded rationality (Simon, 1955) and assumes that the consumers' choice is shaped in a way that saves cognitive effort.

However, it is common sense that nothing good comes without effort and consumer decision making is no exception. For example, a student looking for a textbook may search several websites to find the lowest price. In this case, search cost directly contributes to the budget cut, one of the most important goals to be achieved by college students with minimal financial resources. This may be a less artificial way to measure how cognitive effort or decision cost contributes to overall decision quality, and thus shows consumers' tendencies to make trade-offs between effort and accuracy goals. Under this premise, the decision to increase decision cost is postulated to depend on the decision task, the involved negative emotions due to uncertainty, and the reasons for the decision cost in the current studies. In other words, cognitive effort is proposed as a tool which helps consumers to become more proactive decision makers by allowing them the choice to utilize or limit the amount of invested effort.

Limitations of the effort-accuracy trade-off model in the consumer decision making

The effort-accuracy trade-off model can explain a great deal about consumers' decision processes, their use of diverse strategies, and their final choices. However, there are a few problems with the effort-accuracy trade-off model. First, in the actual world, the definition of accuracy of a decision is vague and ambiguous, due to difficulty in providing feedback about the accuracy of a decision (Einhorn, 1980). For example, it is a very rare situation where consumers receive feedback about how accurate a decision was in absolute terms. Furthermore, the term accuracy is not defined very concretely in consumer decision making literature. The commonly used definitions of the accuracy of a decision are "using the weighted adding model," "avoidance of choice patterns such as intransitivities," or the extent to which consumers follow the normative decision processes (Bettman et al., 1998, p. 195). However, these definitions are, to a certain extent, artificial and do not capture the notion of accuracy (i.e., accuracy of vision). If accuracy in essence is assessing the quality of being correct, there may not be a true accuracy in consumer decision domains, since it is very difficult to have a correct answer. Alternatively, it may be more ecologically valid to discuss accuracy in terms of the overall performance of the final option (e.g., satisfaction). Consumers often seek and receive feedback about their decisions in terms of their personal satisfaction or dissatisfaction, and compliments or criticism from others.

Though these are not equivalent terms with the consumers' accuracy goal, they can be used as alternate measures of overall decision quality. More studies are needed to disentangle the constructs of "accuracy" in consumer decision domain.

Second, the simple effort-accuracy trade-off has the accuracy goals as a default and assumes that all consumers have a desire to achieve the most accurate decision. Though the trade-off model explains the constructive preference order, it does not mention much about why the consumers have their goal as accuracy maximization. Intuitively, one can think of other goals of consumers such as "I want to find something quick and simple" or "I don't want to regret after this decision" from our everyday conversations, but it is rare to notice a consumer say, "I want to reach the highest accuracy in my decision."

On a related topic, effort-accuracy trade-off models do not predict when people will exert more cognitive effort to increase the accuracy of a decision. It is typically assumed that intention to increase search cost is positively correlated with the importance of a task or associated monetary value (Bettman et al., 1998). What also increases with importance/cost of a task, however, is the level of anticipated regret. Each decision task that consumers face in a real-world situation is involved with different outcome values, and there are certain contingencies that relate actions to outcomes. Under these circumstances, consumers are uncertain about the consequences of the choice and thus decision tasks are bound to involve risky choice problems which consist of the values associated with the outcomes (Thorngate, 1980). Applied to consumer decision making domain, Thorngate's (1980) notion suggests that the values associated with the outcomes (i.e., the price of a product) will induce a varying degrees of risks associated with the decision. These risky choice problems are likely to generate anticipation of regret for those decisions (Bell, 1982). The role and significance of anticipation of regret will be discussed more in detail in a later chapter, but at this point it is important to note that people's decision paths also shift with an increase of anticipated regret, and they are more likely to postpone or be more judicious in their decisions as a result (Janis & Mann, 1977). In a sense, consumers may be willing to invest cognitive effort not only because they want to achieve more accuracy in their decisions (e.g., Bettman et al., 1998; Garbarino & Edall, 1997), but also because they want to avoid risk, regret, and other related negative emotions. In the current work, we propose a model that describes the trade-off between effort-accuracy goals and anticipation of regret, induced by values of a product, associated with a decision. Regret Theory (e.g.,

Zeelenberg & Pieters, 2007) and consumers' meta-goals choice model (Bettman et al., 1998) provide an appropriate framework to complement the effort-accuracy trade-off model. Thus, we set out to reexamine the effort-accuracy trade-off theory by considering the emotion of regret.

The seminal work on the effort-accuracy trade-off model in consumer research (e.g., Payne, 1982) predicts that consumers use less cognitively demanding strategies (e.g., elimination by aspects) as the decision complexity increases, in order to keep the balance between cost and benefit. This may be true in laboratory experiments. As the decision task involves a greater number of alternatives with more complex attributes, however, there are more combinations that need to be calculated to yield the utility of each and all of the choice alternatives. Therefore, to reach the same accuracy rate in a limited amount of time, it is logical to think that decision effort allocated to each alternative decreases as the decision complexity increases. In more natural decision making environments (i.e., real world), though, consumers can and will increase the amount of time to compare and research products, and will not try to save the decision effort. Accordingly, the effort-accuracy trade-off is not independent from other decision factors which can change the simple trade-off dynamic. For instance, Kuo, Chu, Hsu, and Hsieh (2004) found that the trade-off is mediated by the experience of a decision maker. They showed that people with a lower level of experience in Web searches showed similar traditional effort-accuracy trade-off relationship argued by Payne (1982). However, for the people who had more experience in web searches, the same degree of accuracy was reached by spending less amount of effort. This result suggests that the amount of effort needed to attain the same accuracy level may vary depending on the prior experience or knowledge related to the task (Kuo et al., 2004).

Another problem with this approach (e.g., Payne, 1982) is its failure to include the justification process. The ability to justify one's decision is important for decision makers and consumers (Inman & Zeelenberg, 2002). The more important question in real decision situations is whether or not consumers find justifiable reasons for trading-off between accuracy and effort. In the real decision processes, finding logical reasons that justify a current decision can be an important factor contributing to a purchase.

Lastly, the line of methods used to test the effort-accuracy trade-off (Payne, 1982) does not completely reflect how people search and make decisions in the real life. The amount of cognitive effort is measured by counting the number of artificial search rules or mental operations (e.g., read, compare, eliminate, choose; Johnson & Payne, 1985) which are

programmed to perform a search task. This search task defines efficiency as executing the minimum number of operations, and further assumes that addition, subtraction, multiplication, and comparison are all equally demanding (Bettman et al., 1998; Johnson & Payne, 1985; Payne, 1982). Even when participants were brought into the lab to perform the search task, they were forced to memorize the attributes of each alternative and not refer back to the information in the previous choice set (Bettman et al., 1998; Johnson & Payne, 1985; Payne, 1982). This does not reflect the decision process in more naturalistic environments. Although it may be true that performance accuracy decreases with more cognitively demanding tasks as defined and controlled in a lab, consumers' real-world decision processes are executed in different manner.

The effort-accuracy trade-off model and situational factors such as impending negative emotions or justifiable reasons are mostly considered separately. The integrated framework that combines these elements will have greater explanatory power which overcomes a few of the limitations mentioned earlier. One of the most cited models that attempt to integrate the effort-accuracy and the situational factors is Bettman et al.'s (1998) meta-goals-based choice model.

Chapter 2 - Consumers' constructive choice model based on four meta-goals

Consumers' constructive choice strategies

The theoretical basis of the meta-goal based choice model is consumers' bounded rationality (Simon, 1955, 1956). In this model, the preference order may show transitivity and decision strategies may vary because the consumer does not have the mental capacity to process information that will yield the optimal option at all times (Bettman et al., 1998; Payne & Johnson, 1985; Payne, 1982).

Bettman's information processing model stems from the study of consumers' attention, memory, and reasoning, and consolidates interests in the process of the decision—rather than in just the final outcome (stimulus-response procedure)—as a dependent variable in the design of a study (Bettman, 1979; Payne, Bettman, & Johnson, 1992; Slovic, 1995). This model is an alternative approach to the normative model to study the consumer decision making, and it explains consumers' actual behaviors more satisfactorily than the normative (classical) choice

model. In a real decision situation, consumers often struggle between two products. If they have well organized and irreversible preference which will yield the best option for them at any time, people should not be feeling regret over not choosing the other option or making the same mistakes of choosing less satisfying options repeatedly; this is an apparent violation of the normative choice model (von Neumann & Morgenstern, 1947). The alternative choice model, on the other hand, assumes consumers' bounded rationality (Simon, 1955) and allows consumers to show intransitivity. Research in memory shows that the human working memory system is limited (e.g., Paivio, 1971; Baddeley & Hitch, 1974; Baddeley, 1992), and it requires greater working memory span to deal with increasingly complex decision tasks such as drawing inferences in a context (Daneman & Carpenter, 1980). Likewise, consumers' working memory capacity is limited and any complex comparisons between alternatives will tax that capacity, debilitating optimally rational decision making. Also, limitations in computational capabilities are thought to impede the calculation about the expected value for each option and result in consumers' constructive decision processes (Bettman, 1979). For these reasons, consumers' choice behaviors are argued to be contingent with the choice task, and constructed on the spot of a decision in this model.

Within an information processing choice model, there are several decision strategies one can use that require different amounts of cognitive effort (Bettman, et al., 1998; Shah & Oppenheimer, 2008), a few of which are described below.

Weighted additive model (Payne, Bettman, & Johnson, 1993)

This decision strategy uses the greatest amount of cognitive effort by requiring exhaustive search and mental calculation. It also shares the fundamental idea described in the Multi-attribute evaluation decision method (Edwards & Newman, 1982) which requires the decision maker to identify attributes of alternatives and assign subjective weights to each attribute. Then, the decision maker calculates the sum of the weighted values of the attributes of each alternative in order to find the alternative with the greatest utility. Based on this model, the utility of a choice is equivalent to the sum of its preferences (Edwards & Newman, 1982; Keeney & Raiffa, 1976). A weighted additive model is assumed to require great cognitive effort to

calculate the sum of weighted attributes for each alternative under consideration. Consumers first need to identify relevant attributes, recalling the information from memory or gathering external information about the attributes. Consumers then have to determine the weight for each attribute and the importance of each attribute. Then the product term of these two weights are calculated, followed by sums of all the product terms to find the overall worth (or value) for an alternative. Lastly, the alternative with the highest value should be chosen. Weighted additive models require a great degree of computation skills and assume that consumers use a substantial portion of working memory; and, due to this expenditure of cognitive effort, the weighted additive model is thought to result in more normatively accurate decision outcomes than using other heuristics (Bettman et al., 1998; Frisch & Clemen, 1994; Hastie & Tibshirani, 1987; Payne et al., 1993).

One of the problems with this strategy, however, is the discrepancy between it and the descriptive strategy that is actually used by consumers. When the decision involved is very important, such as the purchase of a house, consumers would like to follow normative decision strategies to find the most accurate decisions. However, they also probably do not make this important decision at one sitting. It is more likely that consumers distribute the search and comparisons and this will be less taxing on the limited capacity than to go through the mental calculations at once. In addition, due to risk and potential loss when the decision goes wrong, the consumers will be willing to spend more effort in comparisons. In such cases there is a definite benefit in expending cognitive effort, which will be discussed in more detail in a later part of the current research.

Elimination by aspect (Tversky, 1972)

In this strategy, consumers first determine the attribute of greatest importance. All the alternatives in the choice set are then evaluated by this criterion attribute. All the alternatives that do not exceed the minimum threshold (a minimum cutoff value for the most important attribute) are then eliminated from the choice set. The consumers then determine the next important attribute and use that aspect as the next search criterion. The elimination process is repeated until one is left with the last alternative. Elimination by aspect is a less cognitively demanding strategy which combines the principle of satisficing and the lexicographic strategy, which is described next.

Lexicographic (Fishburn, 1964, 1974)

The consumers using this strategy first should determine which attribute is most important and focuses on only that one attribute to yield the best alternative. This strategy assumes that the search of multiple attributes to find the one that best fits one's goal is very demanding, so the decision maker reduces the amount of cognitive effort by terminating any further search process. For example, a consumer might go to a store for dishwasher detergent and be focused only on price. That person will compare prices, and nothing else, until the lowest price is determined, and that will be the best alternative.

Take the Best Algorithm (Gigerenzer & Goldstein, 1996)

This strategy is similar to the lexicographic strategy, in that both strategies assume dependence on one attribute to make a decision, though this model denies the basic assumption of the classical rationality view. Take the best uses only the best discriminating cue to determine the inference or decision and does not assume any combination of two or more cues. In this model, the decision maker uses a search through the memory system until the best discriminating cue is found. The whole information process is contingent upon the search task and it varies depending on the amount of knowledge of the decision maker. Once this best cue is found, the algorithm does not integrate further information. In this model, consumers stop searching for additional attributes to compare because it would be exhaustive to execute the search, and there are diminishing returns for additional attributes in terms of accuracy.

Insights from the meta-goals-based choice model

The information processing choice model outperforms normative (classical) choice models in explaining consumers' actual choice behaviors and describing diverse decision strategies adopted by consumers. On the other hand, this model cannot provide a global assessment of the consumers' choice process including other decision factors such as emotions. The choice model based on meta-goals compensates for this discrepancy (Bettman et al., 1998).

Similar to any other goal-directed behavior, consumers' decision processes are determined by the specific goals relevant to a given decision task. For example, a person can pick up a \$20 gift card for her colleague without putting much thought or effort into the decision.

This person might not even worry about the other person's feeling when she receives this gift, since she is not very close with this person. On the other hand, the same person is likely to go through a very different process when choosing a gift, worth \$20, for someone about whom she deeply cares. She may research the receiver's likes and dislikes, products of interest, and visit several stores before making a final decision. In these two cases, the person spent the same amount of money but the amount of cognitive resources invested in each decision was significantly different. Moreover, the consumer is likely to experience different degrees of negative emotions if both of these decisions turn out to be wrong. The differences in the cost of effort or the cost of potential experienced emotions after the decision are not accounted for in the traditional rational choice model; therefore, these two experiences are treated as the same. More fundamentally, this model cannot account for the use of different strategies in consumers. According to rational choice models, in both situations the consumer should calculate the expected utility for alternatives and choose the option with the maximum utility (Edwards, 1954; Savage, 1954). However, in real life, it is widely accepted that the second situation (a consumer looking for a gift for a dear friend) will use more cognitive effort in this task.

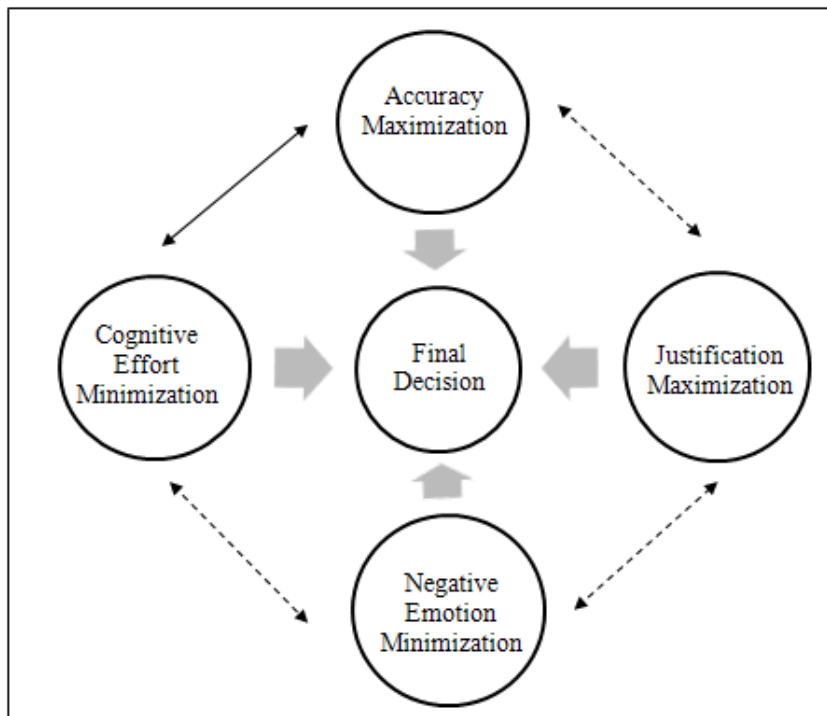
In the previous section, exertion or saving of cognitive effort was discussed in terms of specific decision strategies such as the weighted additive model or elimination by aspects. Studying consumers' inclinations to expend cognitive effort by examining their decision strategy is one method. However, this method fails to study consumers' decision strategy at a more global level. Though these specific decision strategies provide concrete ways that consumers can make a decision, they lack explanation of the overall purchase experience of consumers. Consumers' decision processes can be better understood by investigating the overall experience, and by evaluating the overall purchasing experience and other influences on their choice. This is a framework to examine the consumer behavior in terms of the meta-cognitive level, and how these goals monitor the decision processes and allocate the resources as needed, such as "I should be happy after purchasing a new suit" or "I should make sure I do not regret my decision" found in the everyday life.

The general theoretical approach in Bettman et al.'s (1998) constructive choice model is built on the notion that choice among alternatives depends on 1) the goals of the decision maker, 2) the complexity of the decision task, 3) how the decision maker is asked the question, 4) how the choice set is framed or displayed, and that 5) the choice among options is context dependent.

This approach is significantly different from the classical choice model commonly accepted in economics as discussed in the previous chapter.

Consumers' "goals" mentioned in the first element refer to consumers' meta-goals that shape their decision strategy and not the specific purchase goal. Due to limited cognitive capacity, consumers' decisions are made on the spot and therefore are constructive rather than predetermined by the well-defined preference order. During this process, consumers' constructive choice is thought to be monitored by four meta-goals, which are attempts to (1) minimize the cognitive effort required for making a choice, (2) maximize the accuracy of the decision, (3) minimize the experience of negative emotion during decision making, and 4) maximize the ease of justifying the decision. Consumers will then choose an alternative based on the extent to which the goals are satisfied by that choice.

Figure 2.1 Bettman et al.'s (1998) Meta-Goals-Based Choice Model. The solid arrow between accuracy maximization and cognitive effort minimization goals indicates the trade-off between the two goals. The dotted arrows among other goals indicate the implied but not determined interrelationship among the goals in Bettman et al.'s model.



Each goal in this model will have different decision weights (differences in importance) depending on the decision context and the decision task at hand. The choice process for each decision task should reflect the extent to which each individual goal is achieved, since this model assumes the consumer changes the decision process accordingly. For example, if a consumer perceives a higher risk associated with a decision, this person should use a different strategy than another consumer who only wants a quick result. Based on this model, the decision strategies that the consumer uses also depend on the amount of information processed and on the decision task itself. For example, consumers vary the amount of information processing when deciding on a car or a pair of jeans. The amount of information processing may or may not vary for each attribute or alternative. And the amount of information processing is dependent on the alternatives (multiple attributes of a single option are processed before another option is considered) or on attributes (the values of several alternatives on a single attribute are examined before information on another attribute is considered).

The notion of constructive preferences denies that individuals simply refer to a master list of preferences in memory when making a choice and also asserts that preferences are not necessarily generated by applying some invariant algorithm such as a weighted additive model (Tversky, Sattath, & Slovic, 1988). The consumers' meta-goals model explains the constructive choice processes and presents evidence with specific cases where each goal predominates. In this model, a decision maker is free from having a predetermined decision path that one should follow to ensure rational decision making for optimal decision outcomes. Instead, this approach embraces the descriptiveness of consumers' decision processes which sometimes violates rational behaviors (Bettman, 1979; Bettman et al., 1998; Payne, 1982).

Limitations in the meta-goals-based choice model

The constructive choice model is largely rooted in the effort-accuracy trade-off framework for understanding and predicting consumer decisions (Bettman et al., 1998; Payne, 1982). It is argued that the consumers will choose a decision strategy by trading off the cognitive effort required by a decision strategy (e.g., elimination by aspects, lexicographic strategy) against the potential accuracy (e.g., maximum utility) provided by that strategy. However, this model does not explicitly explain the mechanism behind the effort-accuracy trade-off, even as it provides examples of the decision situations in which one or the other of these goals are

prioritized (Bettman et al., 1998) or predicts the direction of the relationship among the four goals.

In the current study, an alternative meta-goals model is proposed to bridge the gaps in the Bettman et al.'s (1998) model. The alternative model is by no means a complete model that can remedy all the limitations; rather, it is designed to bring some insight about the interactions between the goals and to reevaluate the role of cognitive effort in consumer decision making.

Lack of involvement of interactions among meta-goals

The meta-goal based choice model (Bettman et al., 1998) provides an insightful framework to understand and study how consumers' choice behaviors are constructed. However, the nature of the four meta-goals model makes it impossible to achieve all four desired goals at the same time. To resolve this seemingly contradicting situation, the consumers will implicitly or explicitly make trade-offs among the four goals or between the subsets of the goals. Though the model does not specify the direction of the interaction among the four goals (or, in fact, that there are interactions), Bettman et al. (1998) noted that the importance placed on each goal will vary based on the decision situations and provides situations where individual meta-goals will receive predominant emphasis.

For example, pursuit of accuracy maximization is only possible by sacrificing cognitive effort minimization. In one study, it was found that increases in emotional difficulty resulted in increased cognitive effort (Luce, 1998). Likewise, research (Bettman, Johnson, Luce & Payne, 1993; Böckenholt, Albert, Aschenbrenner, & Schmalhofer, 1991; Payne et al., 1993) also showed interactions among negative emotion, accuracy, and cognitive effort; it was found that increased decision conflict (increased negative emotion) leads to an emphasis of decision accuracy at the expense of cognitive effort.

Tetlock (1992) showed results suggesting interactions among negative emotion minimization, cognitive effort minimization, and justification maximization. Specifically, even though cognitive effort minimization may lead to justification maximization, this was only true when a decision maker had a well-defined preference order. If the preference was not defined for the decision maker (high decision conflict leading to high negative emotion), participants searched more thoroughly, using a process which required more cognitive effort.

Another source for determining possible interactions among meta-goals can be found in the regret literature. An insightful conclusion that can be drawn from these previous results is the usefulness of cognitive effort as a tool to resolve emotional decision conflicts. This perspective is slightly different from Bettman, who argued that consumers have the goal of cognitive effort minimization. Though the current author agrees that consumers have limited cognitive resources, it is disagreed that they will set their goals to conserve cognitive effort at the cost of other meta-goals. Instead, it is assumed by the current author that cognitive effort minimizing will be sacrificed very easily to accommodate the three other goals. Thus, an alternative model which suggests one of the possible directions of this interaction is proposed in the current study.

Lack of involvement of emotion and justification in decision processes

The constructiveness of the consumer's decision process acknowledges the role of emotional experience for consumers and its influence on their decisions. As Bettman et al. (1988 and see also Payne et al., 1993) pointed out, consumers learn from their past experiences and are able to adapt to new decision tasks and environments. In addition, due to limited mental capacity, consumers' preferences are context-dependent (Payne, 1982) and the degree of preference constructiveness will increase with the complexity of the decision task (Bettman et al., 1998).

Following this argument, one may argue that consumers' decision conflicts also increase with the complexity of the decision, and that they are more likely to spend more cognitive effort to resolve this conflict. However, the meta-goal model neglects the importance of decision conflict or the role of decision relevant emotions. Bettman et al. (1998) argued that consumers' choices do not often require emotional involvement or need for justification. Conversely, the choices consumers make are frequently emotionally laden.

Emotion-laden decisions can embrace a broader meaning than how Bettman et al. (1998) define it: an emotion-laden decision is "...when there are choice conflicts between goals that are very important to the individual" (p.205). Such choices are thought to increased negative emotion because the trade-offs required during the process pose threats to the attainment of valued goals. Even when the decision is not important (e.g., spending \$10 for a gag gift), consumers may experience some amount of disappointment or dissatisfaction about the product. Self-contradicting choices will also increase negative emotions during decisions. Many risky behaviors, such as the purchase of illegal drugs, cigarettes, or unhealthy food, will be difficult to

justify and will lead to emotional conflict such as the experience of cognitive dissonance (Festinger, 1957; Okada, 2005). Uncertainty of the outcome will also increase experience of negative emotions during a decision process and make it difficult to justify decisions (Mandel & Nowlis, 2008). In addition, increased importance of a decision will increase the consequences of the decision and potential negative emotions such as regret during a decision process. Since many consumers' choices involve uncertainties, contradictory to Bettman's argument, many consumer decisions deal with emotion laden choices and a need for justification.

Negative emotion minimization and justification maximization are included within the constructive choice model, however, these two goals are discussed independently from cognitive effort minimization or accuracy maximization. For example, Luce (1998) found that increases in negative emotion (e.g., due to decision conflict) led to a greater tendency to prolong search. Luce interpreted this result as an incongruent finding related to emotional choices but did not mention or discuss the possibility of a trade-off (interaction) between accuracy maximization and cognitive effort minimization in the face of a negative emotion minimization goal.

The idea that there is always a best decision for consumers is quite intriguing but does not accurately reflect actual consumer behavior. For example, one can use a weighted additive model and find out which of a set of exhaustive options will be the best for him/her. However, the individual might still end up purchasing a suboptimal option because he or she simply "feels like it," and the consequence of a sub-optimal decision is not considered significant in the current model. In other words, this model does not take into account the importance of emotions in decision making. This issue will be discussed in more detail in a later section of this paper.

Bettman et al. (1998) also noted the difficulty of measuring the amount of emotion generated in making a decision because most negative emotions are generated post-decisional and not prior to the decision when emotion is often measured. To overcome this limitation, regret is used in the current studies to measure pre and post-decision relation emotion. Regret is known to be a negative emotion that has an anticipatory, future oriented aspect (Baumgartner, Rik Pieters, & Bagozzi, 2008). We now discuss how the construct of regret is viewed in consumer decision making research.

Chapter 3 - Negative emotion relevant to consumer decision making:

Regret

Definition of regret

Regret lies in the center of decision processes. It is experienced frequently (Shimanoff, 1984), is a repugnant feeling decision makers experience and has long-term consequences for well-being (Lecci, Okun, & Karoly, 1994), and it happens in various domains of decision making. The choices in which decision regret has been documented range from consumers choices (e.g., Simonson, 1992), medical decisions (e.g., Ritov & Baron, 1990), risky sexual behaviors (e.g., Richard, van der Pligt, & de Vries, 1996), to gambles (e.g., Coricelli et al., 2005; Zeelenberg, Beattie, Vander Plight, & De Vries, 1996) and sports performances (e.g., Turman, 2005).

In the current study, regret is the main negative emotion of interest for several reasons: a) it has relatively clear cognitive dimensions, b) anticipation of regret is found to be a powerful predictor for choice behaviors, and c) it is found to be swayed by the justification of the decision and also d) is believed to be significantly influenced by cognitive effort, the aspects which have not been investigated thoroughly to date.

The premise in the experience of regret is that the chosen option is less attractive than the foregone option (Bell, 1982). Regret here is the decision makers' psychological response about making a bad decision (Bell, 1982) or self-blame or guilt about making a bad decision (Loomes & Sugden, 1982). Kely and Schepanski (1991) proposed that regret is experienced when the decision maker is feeling sorry about making a bad decision. In other words, regret is what "we experience when realizing or imagining that our present situation would have been better, had we decided differently" (Zeelenberg, 1999, p.94) and is a "painful judgment and the state of feeling sorry for misfortunes, limitations, losses, shortcomings, transgressions, or mistakes" (Landman, 1993, p. 4).

Regret theory (Bell, 1982; Loomes & Sugden, 1982) was developed as a model of choices between lottery options with different expected utilities. According to Prospect Theory (Kahneman & Tversky, 1979), decision makers in the gaining domain are likely show preferences for a sure gain over a larger gain with some probability (risk aversion). In the loss domain, the same theory predicts the decision makers to show preferences for a loss with some

probability over a sure loss (risk seeking). Regret theory, conversely, proposes that the choice is based not only on the expected utility of a chosen option but also on the emotions evoked by the foregone options (Bell, 1982; Loomes & Sugden, 1982). When a decision maker experiences negative emotions he/she will try to avoid those emotions when making the decision, even at the cost of choosing more risky choices. In a series of studies (Bell, 1982, 1985), participants were asked to engage in anticipated regret regarding a situation where the foregone option turned out to be more attractive. Results showed that participants were more likely to choose riskier options even in the gaining domain to avoid future experience of regret. Willingness to pay more in return for a safer or known quality violates many of the principles postulated by previous decision making models.

This phenomenon is known as a regret premium (Bell, 1985), which explains how people are willing to take more risks or willing to pay more money in order to avoid future regret. Zeelenberg et al. (1996) also show that consumers tend to choose riskier options even in the domains of gains to avoid future regret; this is known as regret-minimizing choice.

Regret and responsibility

The concept of regret is heavily dependent upon the self-perceived responsibility of an individual decision maker. Unlike disappointment, dissatisfaction, or sadness, regret is experienced only when the decision maker accepts responsibility for the bad decision (Zeelenberg, van Dijk, & Manstead, 1998a). Numerous studies support that greater perception of responsibility increases the experienced regret, whether in a gambling domain (Kahneman & Miller, 1986), a consumers domain (Tsiros & Mittal, 2000), or decision making as a student choosing which course to take (Zeelenberg, van Dijk, & Manstead, 1998a; 2000). The positive relationship between responsibility and regret is also reported in real life regret (Gilovich & Medvec, 1994); participants were asked to list things they regret in life and only 5% of them experienced regret over events that were outside their control (e.g., natural disasters).

Guttentag and Farrel (2007) found that children at seven years of age showed semantic differentiation of regret and disappointment; however, they did not show the same behavior patterns as adults after experiencing or considering the two emotions. Furthermore, significantly more adults than children brought up explanations based on anticipated regret, when they were asked to justify their choices. These findings suggest that only adults show a complete

appreciation of regret. Adults were able to learn from their prior experience and justify their next decision based on anticipated regret. On the other hand, children were not capable of such behavior—even though they understood it—and thus did not change their behaviors that led to regretful outcomes.

The differentiation between regret and disappointment has been researched in diverse ways across different studies. Regret is caused by feeling sorry for the foregone option, whereas the experience of disappointment lies in the low performance of the chosen product itself (Inman, Dyers, & Jia, 1997; Zeelenberg et al., 1998b) or the difference in the expectation and the actual performance level (Shimanoff, 1984). The latter aspect explains why people who put forth effort into achieving a goal only to fail, experience greater disappointment; however, the same situation may reduce regret (van Dijk, Manstead, & Zeelenberg, 1999). In a sense, disappointment is a negative emotion that is elicited from the internal discrepancy of the product, while regret is negative emotion elicited by the outer discrepancy between the chosen and the forgone option (Tsiros & Mittal, 2000). Dissatisfaction is closer to the disappointment that people experience when the chosen option does not yield the expected outcome, and it has been argued that the satisfaction level is dependent on the degree of experienced regret as well (Ortony, Clore, & Collins, 1988). The differences between the two emotions are also found in the coping strategies that people use after experiencing each emotion. After experiencing regret people showed more refined information search to reduce the unpleasant outcome, while after disappointment people turned their attention to a new goal (Zeelenberg et al., 1998b).

Anticipation of regret and changes in the decision paths

Regret is not only experienced after a decision has been made but also anticipated before a decision (Richard, van der Plight, De Vries, 1996; Ritov, 1996; Zeelenberg, 1999). In regard to decision making, anticipated regret has been a candidate for a strong predictor of choice behaviors and thus been avidly researched in the field (see Inman, 2007; Zeelenberg & Pieters, 2007). For example, when consumers were asked to anticipate their regret without giving feedback about the previous prices, they were more likely to purchase the currently available products (Simonson, 1992). On the other hand, when consumers were asked to compare the current and previous price which was lower than the former, they were more likely to delay their current purchase (Cooke, Meyvis, & Schwartz, 2001).

A number of studies have shown substantial effects of anticipated regret on decision making. For example, consumers can be more hesitant to switch brands when asked to engage in anticipated regret and decide to purchase a well-known brand at a higher price (Simonson, 1992). Other research also shows that consumers become more conservative (less likely to choose unknown brands), as well as more rationality-based (systematically comparing more products) decision makers after anticipating regret (Janis & Mann, 1977) and more likely to delay or postpone current decision making (Cooke et al., 2001).

These findings from the regret literature suggest that a willingness to pay more in return for a safer or known quality violates many of the decision making principles postulated by previous researchers, and it can be implied that people are more willing to take risks or pay more in order to avoid future regret; this is a phenomenon known as a *regret premium* (Bell, 1982). There are some explanations why the anticipation of regret can influence decision pathways. As mentioned earlier, regret is experienced when the decision maker takes responsibility for the action. Since level of responsibility is positively correlated with the amount of experienced regret, people will take a more conservative decision path in general, in order to reduce the level of responsibility of choosing an untested brand.

In regards to anticipated regret, people can anticipate missed opportunities and also expect regret caused by something they are about to do. In each case, justification of the decision is needed to resolve both types of regret. More justification is needed when choosing an option that deviates further away from the norm or social acceptance (Okada, 2005). For example, student A who pays \$100 for an impulse purchase of clothing will need to justify his/her decision more so than student B who spends \$200 for textbooks, because textbooks are a justified purchase for a student. Even when both products do not meet the initial expectations for each product, student A (who spent less money than student B) will probably experience more regret for his or her behavior. The described example and the previous literature indicate the interaction between regret and justification which will be investigated in the global decision framework of the meta-goal choice model.

Action, inaction, and regret

People's choice behaviors can either be a decision to do (action) or a decision to not to do (inaction). For instance, a consumer's searching for a car may result in the purchase of a car (action) or in the decision to postpone the purchase until a later time (inaction). In the regret literature, the intensity of regret caused by action versus inaction has yet to reach a consensus (Zeelenberg & Pieters, 2007). Two of the most frequently cited studies are by Kahneman and Tversky (1982) and Gilovich and Medvec (1994, 1995).

Kahneman and Tversky (1982) asked people to read about two investors' regretful situation and asked them which of the two would feel more regret than the other. The investor who lost \$1,200 by taking an action (sold a particular stock) was expected to have felt more regret than the investor who lost the same amount by taking no action (did not sell the stock). Kahneman and Tversky (1982) explain more intense regret after an action with the deliberate counterfactual thought processes. After receiving negative feedback about a decision, people tend to engage in upward counterfactual thinking and experience unpleasant emotions (Roese, 1997). If the decision maker feels the responsibility of the negative outcome, this will lead to self-blame and therefore attribute to high degree of regret (Zeelenberg et al., 1998a; Zeelenberg & Pieters, 2007). On the contrary, the nature of inaction makes it difficult to find the target counterfactual thought such as 'I should have sold that stock.'

On the other hand, Gilovich and Medvec (1995) accumulated the real life regrets of a variety of people with different ages and occupations, and their results were contradictory to those of Kahneman and Tversky (1982). By using the method of recall and report, Gilovich and Medvec (1995) found that when people were asked about what they regretted the most throughout their lives, individuals recalled more inaction-based regrets (caused by inaction) than action-based regrets. On the other hand, if people were asked after reading regret inducing vignettes, regret caused by action was found to be more intense. Gilovich and Medvec (1994) had participants read about Jim and Dave's regretful situations, which differed in only one respect; Jim felt regret by action and Dave felt it by inaction. After reading the vignettes, participants picked which of the two would feel more regret in the short term and in the long term. In the short term, 76% of participants picked Jim, who took an action, and 64% picked

Dave, who took inaction. This is known as the temporal phase of regret (Gilovich & Medvec, 1994).

Regret caused by action may be mitigated as time goes by because people use diverse strategies to cope with the negative results. The coping strategies will help people to overcome the unpleasant outcomes caused by the initial action and when the conflict is resolved people tend to not remember the bad events (Yi & Baumgartner, 2004). Regret caused by inaction, on the other hand, is harder to cope with since inaction maintains the status quo and it is difficult to take action when nothing has been done in the initial stage. In result, a regretful situation due to inaction remains for a longer time and is more easily recalled (Kahneman, 1995). In addition, regret after inactions may linger longer due to bias in our memory (Lecci et al., 1994). When people decide not to take an action due to worries about uncertain results, they tend to obliterate the worries they had. However, later in their life, people may revisit the forsaken decision paths and regret that they had not done anything about it.

Until now, the influence of action and inaction on the experience of regret was discussed on the temporal phase aspect of regret. More recently, research has been focused on finding the behavioral norms of a decision situation and how justification of one's decision prevents the decision makers from the experience of intense regret (e.g., Connolly & Zeelenberg, 2002; Zeelenberg & Pieters, 2007).

Justification and regret

Previous research on regret also supports that inaction and action differences are possible without temporal phase. For instance, Kahneman and Tversky (1982) argue that the intensity of regret can vary based on the social norm. If the norm dictates people to act on a given situation, people who did not act (inaction) are thought to experience greater regret and vice versa. Park and Yoon (2007) found that students who were told that they left multiple choice questions as blanks to avoid a potential penalty for wrongful guesses (and later found out that their initial guesses were correct), experienced greater regret than students who were told they filled in the multiple choice questions (and later found out all of their guesses were wrong and took a penalty for guessing) taking the risk of receiving the penalty. This result shows that the behaviors congruent with the social norms are beneficial in reducing the experienced regret even when the outcome performance is disappointing. More studies confirm the argument that

the experience of regret differs depending on what is considered the more reasonable (or default) choice in that particular decision making situation (e.g., Connolly & Reb, 2003; Park & Yoon, 2007). The reason-based choice and the experience of regret suggests that one's degree of regret can be reduced by having more reasons for that choice, regardless of action or inaction, which contributes to justification of the decision. This effect can be partly explained by the people's need to justify their decisions in the presence of other people (e.g., Okada, 2005; Pieters & Zeelenberg, 2005) and how much easier it is to justify a decision that is congruent with what the society recommends and expects one to do.

In consumer decision making, choice behaviors that deviate from a default or status quo option have been repeatedly found to require more justification before taking action upon them. In one study, consumers were asked to choose among choices that varied in attractiveness (Cheema & Soman, 2006). Contrary to the naïve assumption that the most attractive alternative will be chosen, consumers spent more money on highly justifiable decisions. Similar results were found in more general decision making tasks. When faced with choices between 'want' and 'should' options, the 'should' options were chosen as a default unless there were reasons to justify choosing the 'want' options (Hsee, 1995).

Then what occurs when to make a decision that deviates from the status quo? Among many possible explanations, regret research has shown that greater regret is produced by choices that change from the status quo, as compared to repeated choices of brands (Schweitzer, 1994). Kahneman and Miller (1986) posit that people feel more regret after a decision when they can easily imagine a better alternative outcome than when it is hard to imagine a better outcome. Switching results in more regret because it is easier to mentally change a switching action into a repeat purchase action and thereby undo the outcome. It could be the case that consumers assess anticipated regret associated with purchasing an alternative brand, recognize a level of inconsistency in their behavior, and due to this discrepancy produce greater regret when receiving feedback that is not favorable to the chosen option.

In a related finding, if the decisions were inconsistent with their behavioral intention or previous decision patterns, people indicated a greater need to reason about the decision more before taking an action (Pieters & Zeelenberg, 2005). Expanding on this reasoning, however, the regret literature also suggests that the degree of regret is attenuated when a decision is perceived as justified (Inman & Zeelenberg, 2002). This also explains why consumers engage in

justification and/or rationalization of their decisions as a coping mechanism after experiencing regret and not after disappointment (Yi & Baumgartner, 2004).

In past few decades, an extensive body of research has accumulated on regret (see Zeelenber & Pieters, 2007) and recently there has been a proposal of systematic categorization of factors contributing to the experienced and anticipated regret of the decision makers (Table 3.1). These collective studies about regret provide a meaningful conceptual framework (the global meta-goals framework) within which to study the relationship between cognitive effort, justification, and regret, all of which are useful for the currently proposed studies.

Regret in the current meta-goals framework

Consumers make numerous decisions on daily basis and experience diverse emotions before or after the decisions. In terms of Bettman et al's (1998) meta-goals model, consumers are willing to minimize their negative emotions at the end of the decision, and among negative emotions the proposed study is mainly interested in regret for two reasons. First, regret can be experienced about the past and future (Janice & Mann, 1977; Zeelenberg & Pieters, 2007), and in the proposed study regret is a great candidate to assess the both anticipated and the experienced regret within the meta-goals framework. Second, regret is a negative cognitively laden emotion heavily dependent on counterfactual thinking (Zeelenberg et al., 1998a, b, c; Zeelenberg & Pieters, 2007). Therefore, by providing justifiable reasons what has led to the current decision; it is possible to mitigate the experienced regret. Connolly and Zeelenberg (2002) postulated similar notion that regrets are combination of poor outcome and unjustified decision. Bettman et al. (1998) also noted that consumers have the goal to maximize the justification of a decision but did not explain the interaction with negative emotions. The current research is thought to shed light on the relationship between goals of justification and regret minimization. Cognitive effort, on the other hand, has not been speculated in relation to justification. Previous research on cognitive effort and regret (van Dijk et al., 1999) indicates that cognitive effort can function as justification and may lead to attenuation of the experienced regret.

Table 3.1 Propositions in Regret Regulation Theory (source: Taken from Zeelenberg & Pieters, 2007, p.4).

1. Regret is an aversive, cognitive emotion that people are motivated to regulate in order to maximize outcomes in the short term and learn maximizing them in the long run.
 2. Regret is a comparison-based emotion of self-blame, experienced when people realize or imagine that their present situation would have been better had they decided differently in the past.
 3. Regret is distinct from related other specific emotions such as anger, disappointment, envy, guilt, sadness, and shame and from general negative affect on the basis of its appraisals, experiential content, and behavioral consequences.
 4. Individual differences in the tendency to experience regret are reliably related to the tendency to maximize and compare one's outcomes.
 5. Regret can be experienced about past and future decisions.
 6. Anticipated regret is experienced when decisions are difficult and important and when the decision maker expects to learn the outcomes of both the chosen and rejected options quickly.
 7. Regret can stem from decisions to act and from decisions no to act; the more justifiable the decision, the less regret.
 8. Regret can be experienced about decision process and decision outcomes.
 9. Regret aversion is distinct from risk aversion, and they jointly and independently influence behavioral decisions.
 10. Regret regulation strategies are decision, alternative, or feeling focused and implemented based on their accessibility and their instrumentality to the current overarching goal.
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Chapter 4 - Hypotheses, Studies, and Results

The proposed alternative model of meta-goals based choice model

Studies about consumers' constructive choice models and meta-goals have proliferated, but despite the valuable contributions of the meta-goals model, it still lacks 1) prediction and incorporation of interactions among meta-goals, 2) consideration of possible benefits of cognitive effort in the consumer decision process, and 3) acknowledgment of the different roles of negative emotion (especially regret) in consumer decision making.

The premise of an effort-accuracy trade-off is that the accuracy of a decision should increase by spending more cognitive effort, and that increases in decision complexity should restrict the use of cognitive effort and result in less accurate decisions. This model, however, assumes that the consumers have a uniform level of interest in meeting a particular accuracy level. Real decisions are not created equal, and may vary in importance to consumers. Only if a decision is thought to be important is a consumer likely to spend more effort on the decision. Thus, it is proposed in the current collection of studies that consumers' willingness to spend cognitive effort changes with various decision tasks.

Another problem with the current accuracy goal is the difficulty in providing the feedback about how well consumers performed on this aspect. Though it is an important issue to be addressed, for the purpose of the current studies, the accuracy of a decision will not be examined to a greater extent. However, the trade-off between the goals of cognitive effort minimization and accuracy maximization is assessed at a global level in Study 1 as an initial study. It is hypothesized that the importance of the accuracy goal will increase with the importance of a decision (e.g., decision concerning products in a higher price range) but the accuracy goal is not directly measured for the following reasons. Most studies conducted in the laboratory (using either computer simulation [e.g., Payne, 1982] or real participants [e.g., Bettman et al., 1998]) measured the accuracy maximizing goal by the degree of using a comprehensive weighted additive model. This artificial setting creates a well-controlled environment to measure the accuracy goal; however, it is far from an ecologically valid and "real world" setting in which consumers make *actual* decisions. Instead, the current studies assess the degrees of making the right decision (accuracy of a decision) in three alternative ways: (a) a

direct trade-off between effort-accuracy goal (Study 1), (b) confidence in one's decision (Studies 2 & 3), and (c) satisfaction in one's decision (Study 4). In the current studies, accuracy of a decision is defined as choosing the option that yields the highest overall quality of a decision. This does not share the same definition of the accuracy of a decision commonly used in the previous studies (e.g., Bettman et al., 1998). However, considering that the accuracy of a decision reflects the degree of finding the best product for the consumers, the proposal of alternative methods to measure overall quality of a decision seems appropriate.

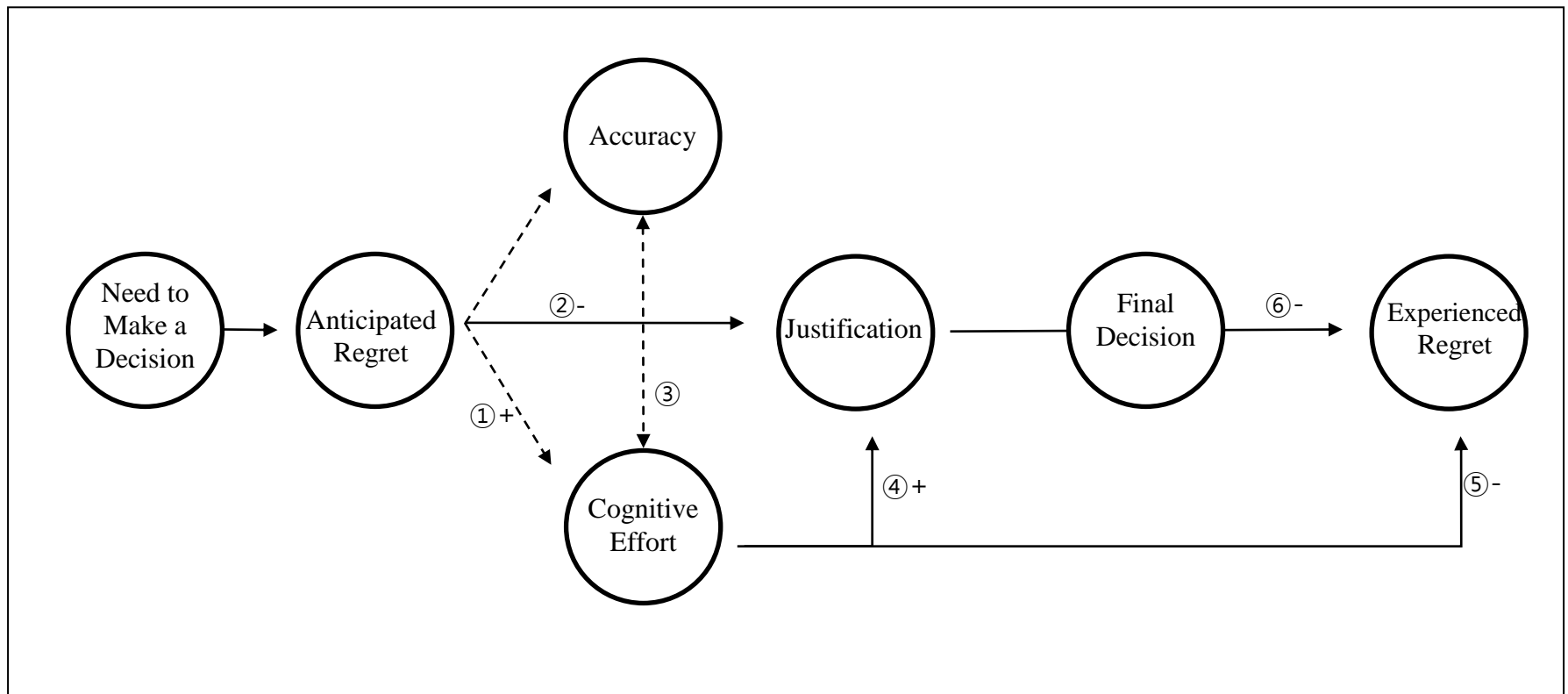
Third, most studies examining the impact of cognitive load or effort on decision making have tapped into the issue of limited working memory capacity. However, consumers in real life decision-making situation can use diverse aids to distribute cognitive pressure by using decision aids or taking an extended time frame to search for the options as needed. Thus, instead of measuring working memory span as cognitive effort, the measure of cognitive effort in the current studies builds on the broader definition of Russo and Doshier (1983) that cognitive effort is the total cognitive resources used in the decision process and on the definition of Garbarino and Edell (1997) that cognitive effort can be measure in terms of overall time spent in comparison of products. In particular, three aspects of overall searching time are measured: willingness to 1) spend time researching about the specifications product, 2) talk to other people to gather information about the options, comparing more options, and 3) search more reviews from other consumers.

Lastly, previous research (Bettman et al., 1993; Bockenholt et al., 1991; Payne et al., 1993) found interactions among negative emotion, accuracy, and cognitive effort even though it is not reflected in the current meta-goal model. In addition, most studies are focused on determining the relationship between accuracy and effort trade-off (e.g., Beach & Mitchell, 1978; Johnson & Payne, 1985; Payne et al., 1999). There is still a need for investigations between effort, negative emotions, and justification. In simple terms, people make trade-offs between accuracy and effort. However, in realistic consumer decision environments, the other two goals (i.e., goals of justification maximization and negative emotion minimization) interact significantly with the effort goal as well, and thus the proposed studies are more focused on bridging the relationship between the other three goals. In recent years, an extensive body of research has accumulated on regret (see Zeelenberg & Pieters, 2007), and a source for determining a possible direction of interaction among the meta-goals can be found in the regret

literature. It has been proposed that “a gestalt-driven decision process” (Inman, 2007, p. 19) helps to mitigate the experienced regret but this proposal has not been studied to date. Based on Janis and Mann’s (1977) seminal work on regret in the consumer decision domain, Inman (2007) posits that the justification of a decision is beneficial in regulating post-purchase regret which is correlated with trade-off difficulty. Further, he notes that attribute-level focused comparisons lead consumers to be more susceptible to self-blame and thus to greater regret, but he does not clearly explain why this occurs. This interesting proposal has not yet been tested, and it is a purpose of the current studies to probe this effect in the meta-goals choice framework, another gestalt-decision process. Understanding the function of cognitive effort exertion in more global decision processes, may illuminate why gestalt-driven decision process may be effective in reducing the degree of regret.

In relation to the regret regulation goal, the current studies propose to probe the relationship between the goals of minimizing cognitive effort and of minimizing the negative emotion of regret. To date, the findings on the topic of meta-goals have shown mixed results. In regard to the goal of minimization of cognitive effort, the current studies propose that consumers will withdraw this goal when faced with an anticipation of negative emotions. Also, contrary to what Bettman et al. (1998) argued, the investment of cognitive effort can be beneficial in reducing the degree of regret (van Dijk et al., 1999). In addition, some consumers even engage in maximizing cognitive effort because they enjoy searching for pleasure (e.g., consumers who are high in need for cognition). In addition, the importance of justification of the decision (e.g., Inman, 2007; Shafir, Simonson, & Tversky, 1993; Zeelenberg & Pieters, 2007) is examined in relation to both cognitive effort and experienced regret. The proposed alternative model is described in Figure 4.1.

Figure 4.1 Consumers' Alternative Meta-goals Model Proposed in Current Studies. This model shows the relationship between the goals of accuracy maximization, cognitive effort minimization, regret minimization, and justification maximization. PATH 1 predicts consumers' willingness to increase cognitive effort, which is assumed to be caused by anticipated regret and PATH 3 predicts the accuracy-effort trade-off. PATH 2 predicts the negative influence on justification of a decision due to increased anticipation of regret. PATHS 4 and 5 predict the contribution of cognitive effort on justification and on the attenuation of the experienced regret respectively. PATH 6 predicts the role of decision justification on attenuation of the experienced regret. The accuracy goal is less important to the current studies; thus, the findings related to this goal are represented by the dotted lines. Since anticipated regret triggers the accuracy-effort trade-off, PATH 1 is also indicated by the dotted line. *Note.* “-” and “+” indicate the direction of the bivariate relationships.



Hypotheses

Based on the theoretical considerations discussed in the previous chapters, the following hypotheses are proposed for the current studies:

H1. Increased importance of a decision will prioritize the accuracy goal over the cognitive effort minimization goal (Study 1).

H1-a. Decisions associated with higher monetary value will involve more frequent use of cognitively demanding decision strategies than decisions associated with lower monetary value (Path 1 in Figure 4.1).

H2. The degree of experienced regret will interact with the level of cognitive effort (Study 2) and the easiness of justification of the effort (Study 3).

H2-a. The degree of experienced regret will be greater when the product under consideration is associated with higher monetary value.

H2-b. The degree of experienced regret will be reduced when greater cognitive effort is invested during the decision process (Path 5 in Figure 4.1).

H2-c. The degree of experienced regret will be reduced when the invested effort is easily justified (Path 6 in Figure 4.1).

H2-d. The degree of experienced regret will be reduced even when less cognitive effort is invested if such circumstance is justified (Paths 4 and 5 in Figure 4.1).

H3. The effort minimization goal will become less relevant as the regret minimization goal becomes more salient (Study 4).

H3-a. The investment of cognitive effort will increase with greater anticipation of regret (Path 1 in Figure 4.1).

H3-b. The investment of cognitive effort will increase the easiness of justification of the decision (Path 4 in Figure 4.1).

H3-c. The greater anticipation of regret will make the decision difficult to justify (Path 2 in Figure 4.1).

H3-d. The justification of a decision will reduce the experienced regret after the decision even when greater regret is anticipated during a decision (Paths 2 and 6 in Figure 4.1).

Pilot Study

Prior to Study 1, a pilot study was conducted to test the participants' understanding of the trade-off between the goals of accuracy maximization and cognitive effort minimization. To explicitly measure how participants systematically shifted the importance of each goal, 11-point Likert scales with three labels (1= *Need to increase the accuracy of the decision*, 6= *Neutral*, 11= *Need to save time and effort*) were provided (see Appendix A, p. 144). The following description and example of accuracy of the decision and cognitive effort conservation were provided to ensure the understanding of both terms:

For most people, some decisions are more important than others. When it is considered important, consumers sometimes use decision strategies that will bring them the best results. For example, suppose a consumer is about to purchase a new laptop. He/ she may consider all the attributes of a laptop, such as price, warranty, memory system, size of the hard drive, operating system, design, weight etc. He/ she may also compare all different models of laptop, such as Dell, Sony, HP, Apple, etc. Using this type of decision strategy is likely to lead to the best and most accurate decision. However, this strategy also takes a lot of time and effort

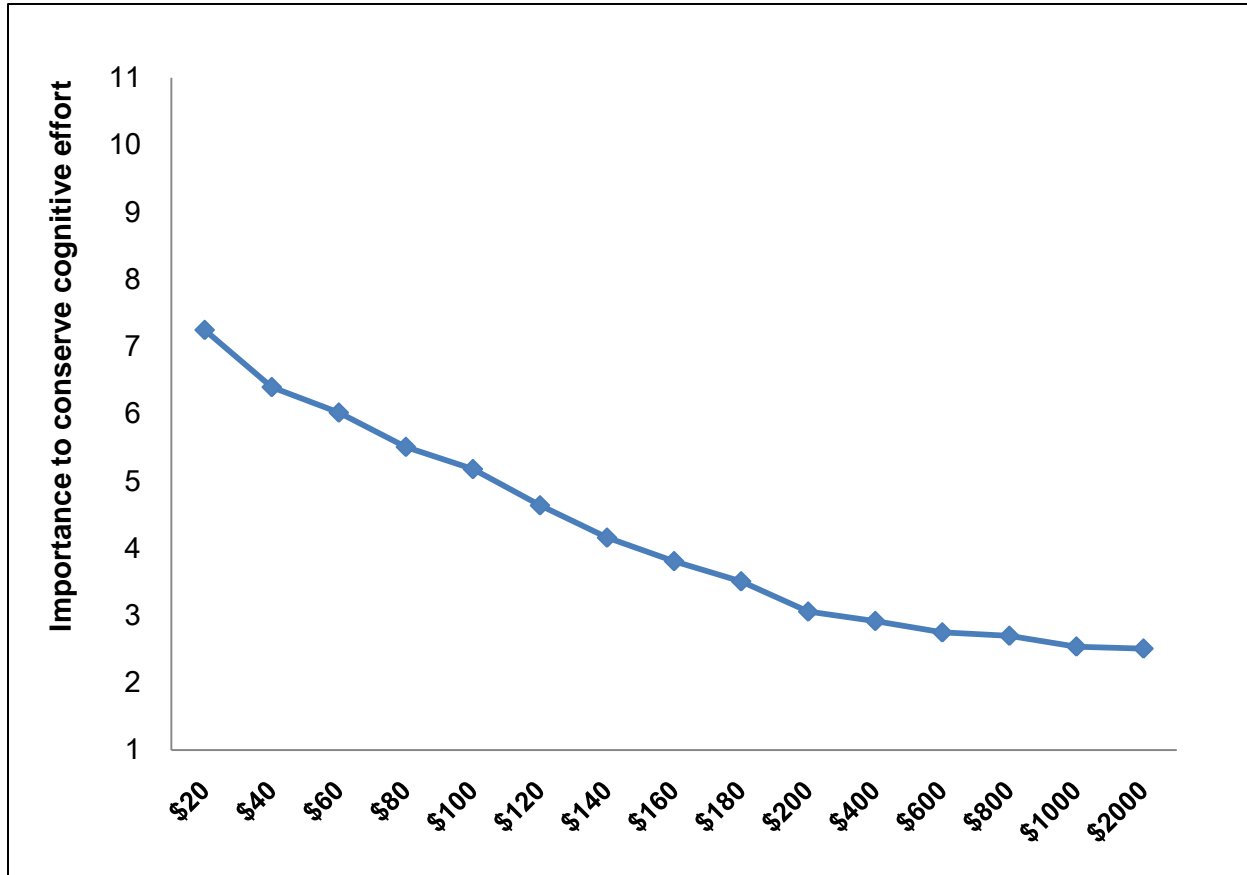
One hundred sixty five (57 males, 104 females, and 4 not specified, mean age: 18.24) participants consented to the study as part of a course requirement. For this pilot test, participants indicated their tendency to focus on either of the two goals on 11-point Likert scales for 15 price categories (price range of \$20 - \$2,000) which were all within the product category of electronics. To avoid individual search preference for a certain product type (e.g., Participant A may like to do research about laptops but not about MP3 players), the subcategory of a product type was not specified for the participants. All stimuli were presented on a computer screen and the order of the 15 price categories was randomized by using Medialab v. 2008 (Jarvis, 2008). MediaLab is a software program that enables researchers to create computerized experiments.

As shown in Figure 4.2, both linear ($F(1, 176) = 162.34, p < .05, \text{partial } \eta^2 = .48$) and quadratic relationships ($F(1, 176) = 61.00, p < .05, \text{partial } \eta^2 = .26$) were found between price range and use of strategy. This research revealed that an increase in product prices has a downward linear and quadratic relationship with the goal to save cognitive effort. Participants indicated that

achieving accuracy —described as considering diverse attributes and compare multiple options to find the best option for them — is more important than to save time and effort with the increment in the price of the product under consideration. The quadratic relationship can be explained by the unequal spacing between the price differences (e.g., there is a \$20-difference between \$20-40; however, there is a \$200-difference between \$200-400 and \$1,000-difference between \$1,000 and \$2,000). To test for the trend form more precisely, an equal spacing between the prices will be needed in the future study. For the current study, both linear and quadratic relationships serve the purpose of this pilot test. Though it is intuitively explainable, it is to our knowledge a rare direct demonstration of deliberative and explicit trade-offs between the goals of cognitive effort minimization and accuracy maximization based on the systematic increase of monetary value of products. This result shows that variation in prices can be used as a cue for consumers to determine whether or not to put additional cognitive effort into a decision.

Based on the findings from this pilot study, Study 1 was conducted to investigate the relationship between product types and consumers' choice of diverse decision strategies which required different levels of cognitive demand.

Figure 4.2 Trade-off between the Goals of Accuracy Maximization and Cognitive. 1 =“Need to make the best and most accurate decision,” 6 = “Neutral” and 11 =“Need to save time and cognitive effort.” This figure shows the mean scores for focusing on either of the two goals at a given price category.



Study 1: Product types and the use of diverse decision strategies

The purpose of Study 1 was to examine the systematic changes in the choice of decision strategies across diverse consumer product types in different price ranges. Copious studies are dedicated to research effort-accuracy trade-off (e.g., Bettman et al., 1998; Johnson, 2008; Kuo et al., 2004; Payne, 1982; Payne, Bettman, & Schkade, 1999), but not many studies have examined the variation in consumers’ choice of strategies concerning diverse product types and their

inclination to trade-off the goals between cognitive effort and decision accuracy across different price range.

There is a close relationship between product category and product type. The membership of consumer products is based on various properties such as pleasantness, durability, aesthetic, or immediacy of need (Bucklin, 1963; Loken & Ward, 1990) and also denotes a different price range. For example, for basic goods, cars are more expensive than electronics or clothing. In the current study, five product types relevant for college students were identified and used to represent different price category.

Method

Participants and design

Three hundred eighteen college students (148 males, 170 females, and 5 not specified; mean age: 18.9) at a Midwestern university participated as part of a course requirement. A 5 (product types) x 3 (decision strategies) within-subjects design was used for Study 1 to investigate the variation in use of strategies concerning different product types.

For the current study, five products types were chosen: cars, electronics, clothing, personal hygiene products, and groceries. These five products are often used in consumer decision making research (e.g., Norum, 2008), especially when the participants are college students. Also, in the verbal communication between the author and participants, a large portion of the participants in the pilot study indicated they had experience in purchasing all five product types and that they were familiar with the purchase process.

In terms of decision strategies, participants were presented with three strategies which required different degrees of cognitive effort to execute the decision. The three strategies were: a) consideration of all the purchasing factors (high cognitive effort), b) use of a rule-of-thumb more than systematic comparisons between the purchasing factors (intermediate cognitive effort), and c) dependence on feelings (low cognitive effort). Previous studies have also used different decision strategies involving varying degrees of cognitive effort (Bettman et al., 1998). For example, a weighted additive strategy requires the highest level of cognitive effort because consumers have to compare all the possible attributes and assign weights relative to their importance. On the other hand, a process of elimination requires less cognitive effort because

options are no longer considered once eliminated. These decision strategies, however, analyze consumers' use of cognitive effort on the attribute level and do not assess their general inclination to expend or save cognitive effort in their decisions. In the current study, these three different decision strategies were verbally explained based on the amount of cognitive effort invested in the process rather than using technical terms often used in consumer research. For example, "use of all five purchasing factors in systematic comparison in the decision process" is considered a term that captures the notion of the weighted additive strategy.

Procedure and tasks

After consenting to participate, participants were asked to list the five purchasing factors (attributes) that they personally would consider, in order of importance, when deciding to purchase the product types in this study (cars, electronics, clothing, personal hygiene products, and groceries). These questions were constructed such that answers were given as open-responses (see Appendix B, p. 147).

After listing their five most important purchasing factors, participants were surveyed about their decision strategies regarding their personal purchasing factors: The frequency with which they used all subjective purchase factors, whether they used rule-of-thumb more frequently than systematic comparisons between these factors, and how much they depended on emotions or feelings when making a decision. These questions were asked, for each participant, regarding all five product types. Specifically, these questions used the following wordings (with *X* replaced in turn by each of the five products):

- a) *When buying X, I consider all five purchasing factors I listed above*
- b) *When buying X, I use rule-of-thumb more than systematic comparisons between the purchasing factors*
- c) *When buying X, I use strategies that depend on my feelings*

Responses to each of these questions were given on a 7-point Likert scale (1= *Disagree very strongly*, 7= *Agree very strongly*). These fifteen questions, asking about the use of each strategy for all three product types, were randomized by using Medialab v2008; an experiment generation and presentation software (Jarvis, 2008).

Results

Open responses

Study 1 explored the participants' experiences with online shopping. It is not a focal research interest to the current study, but general information on the background of the participants is useful pilot data for future studies on consumer decision making in online situations (Dabholkar & Bagozzi, 2002). Out of the 318 participants, 91% of the participants reported that they have experience with on-line shopping. They reported that they have purchased clothing (31.2%), books (27.6%), electronics (15.1%), accessories (10.5%), CDs, DVDs, and video games (0.07%), cosmetics, hygiene products, bedding, or "anything cheap" online (direct quote from participants). At the same time, they were generally reluctant to purchase cars (17.6%), groceries (13.0%), clothing (24.7%), or "anything expensive (e.g., cars, houses 17.0%)" online (direct quote from participants).

Table 4.1 Listed Personal Purchasing Factors for the Given Product Type.

Types of Products	List of purchasing factors (in the order of importance)		
Cars	Price (30.1%)	Quality (19.3%)	Brand (6.5%)
Electronics	Price (56.0%)	Quality (16.0%)	Brand (5.0%)
Clothing	Price (32.2%)	Style/Appearance (24.8%)	
Personal hygiene products	Price (30.1%)	Quality (12.1%)	Brand (12.1%)
Groceries	Price (38.8%)	Quality (8.3%)	

The open responses from Study 1 were analyzed by noting the first-listed purchasing factor and by theme coding participants' open responses for each product type (Table 4.1). Price was the most frequently occurring purchasing factor across all five product categories, followed by quality and brand. This confirms previous findings that price is one of the most important purchasing factors (e.g., Grewal, Krishnan, Baker, & Borin, 1998). The frequency of the each purchasing factor, however, varied depending on the product type. This suggests that, even though consumers consider price as the most important purchasing factor across all product categories, the weight placed on each purchasing factor varied depending on the product type.

This further suggests that consumers' need to minimize cognitive effort, or to use less cognitively demanding strategy will vary depending on the items or products under consideration. This conclusion is supported by responses from the remainder of our study.

Statistical analysis

A repeated measures ANOVA found that the Strategy x Product type interaction was significant ($F(12, 3324) = 39.04, p < .05, \text{partial } \eta^2 = .12$; see Table 4.2 for the means and standard deviation). Further probing this interaction, all three strategies were used to a different degree depending on the product type, $F(3.48, 963.94) = 74.57, p < .05, \text{partial } \eta^2 = .21$; $F(3.75, 1038.83) = 74.57, p < .05, \text{partial } \eta^2 = .03$; and $F(3.77, 1044.93) = 54.60, p < .05, \text{partial } \eta^2 = .17$ for strategy 1, 2, and 3 respectively. The degrees of freedom for this analysis were calculated by using Greenhouse-Geisser correction to meet the sphericity assumptions. The pictorial representation of the relationship between strategies and product type is presented in Figure 4.3.

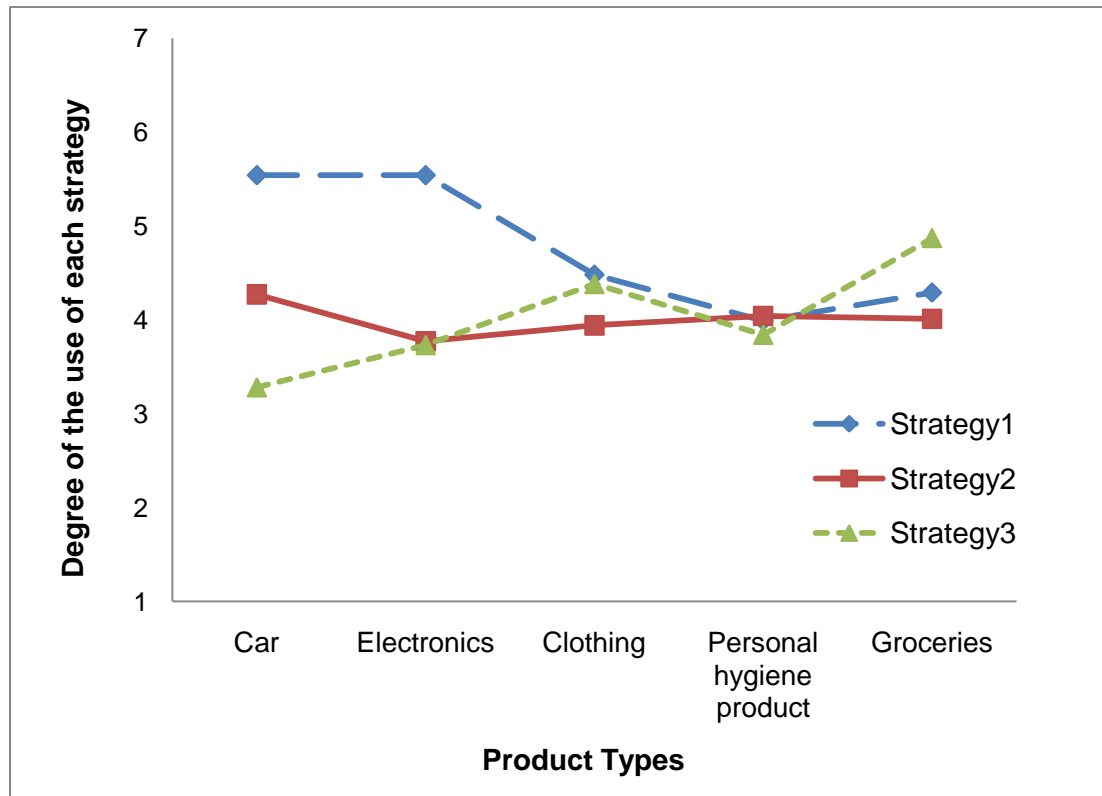
As shown in Figure 4.3, the more cognitively laden strategy (using all five purchasing factors in a decision) was used significantly more than the emotion laden strategy when buying cars or electronics. The decisions involving these two products are considered important especially for college students who are mostly under tight budgetary constraints. Result suggests that consumers are willing to use more cognitively demanding decision strategy when the products are associated with higher monetary values.

On the other hand, more emotion-based and less cognitive effort-based strategies were used when purchasing clothing or personal hygiene products. Groceries were highly dominated by how they feel at the time of purchase.

Table 4.2 Differences in the Use of Each Decision Strategy for Diverse Product Types.

Strategy	Product type	Mean (Std. deviation)
When buying X, I consider all five purchasing factors I listed above	Cars	5.54 (.09)
	Electronics	5.54 (.08)
	Clothing	4.48 (.10)
	Personal hygiene product	3.99 (.11)
	Groceries	4.29 (.10)
When buying X, I use rule-of-thumb more than systematic comparisons between the purchasing factors	Cars	4.27 (.07)
	Electronics	3.77 (.08)
	Clothing	3.94 (.07)
	Personal hygiene product	4.04 (.08)
	Groceries	4.01 (.07)
When buying X, I use strategies that depend on my feelings	Cars	3.28 (.10)
	Electronics	3.73 (.09)
	Clothing	4.38 (.09)
	Personal hygiene product	3.84 (.09)
	Groceries	4.86 (.10)

Figure 4.3 Relationship between the Use of Each Decision Strategy and Diverse Product Types. Strategy 1= When buying X, I consider all five purchasing factors I listed above, Strategy 2= When buying X, I use rule-of-thumb more than systematic comparisons between the purchasing factors, and Strategy 3= When buying X, I use strategies that depend on my feelings.



Discussion

Do consumers prioritize accuracy maximization over cognitive minimization when faced with more important decisions? Previous studies have repeatedly argued that the decision cost is used to enhance the decision result and increase the accuracy of the decision (e.g., Payne, 1982). Study 1 showed that the willingness to trade cognitive effort for accuracy systematically increases as the price of the product involved increases. The price of a product is commonly positively correlated with the importance of the decision in real life, such that purchasing a more expensive product is thought to be more important than purchasing relatively cheap products. Thus Study 1, at the conceptual level, found that importance of the decision is psychologically

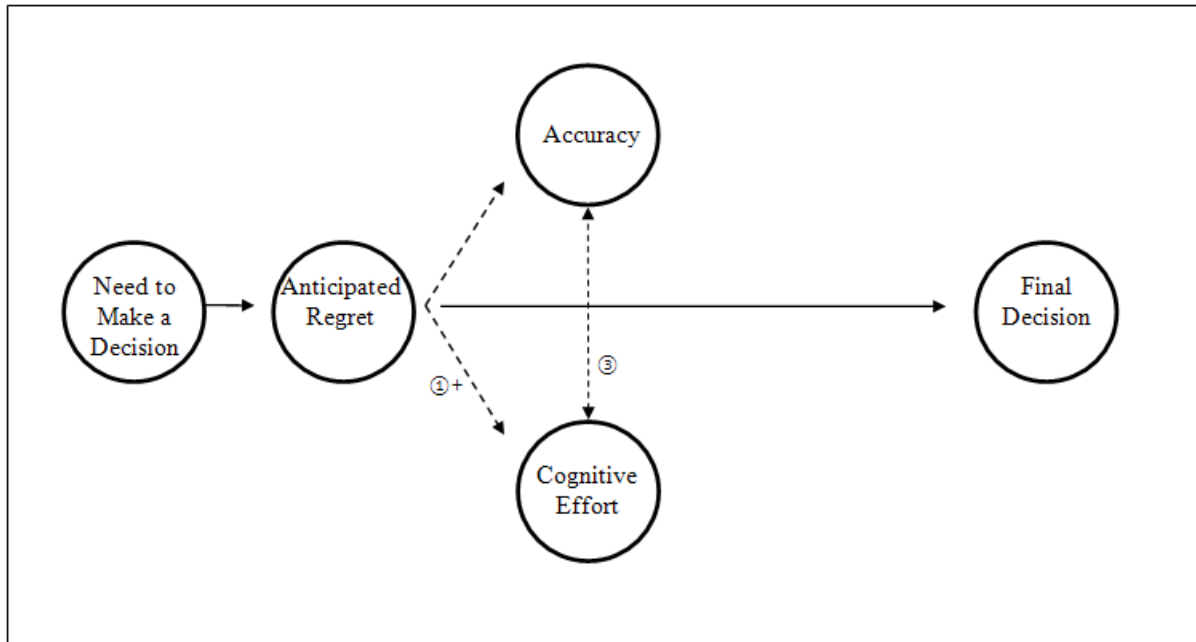
assessed and can be operationally manipulated by changing the price of the product about which the decision is being made. Results from Study 1 confirm the commonsense idea that consumers are more willing to take time and effort to make a judicious decision when it is an important decision.

In addition, the second part of Study 1 shows that participants are willing to use more cognitively-laden decision strategies when choosing a product with higher monetary value. Previous studies on the effort-accuracy trade-off mostly focused on how taxing cognitive effort leads to decreased accuracy under time pressure, and how increases in search cost (cognitive effort) outweigh the benefits (accuracy) and thus increase of use of less demanding decision strategies as task complexity increases (e.g., Garbarino, & Edell, 1997). This study, on the other hand, shows how people are more willing to use cognitively taxing strategies when the decision task involves buying a product with higher monetary value.

Study 1 also shows that different product types can be used to vary the importance of a decision and thus induce people to use high cognitively-laden strategies without manipulating the number of alternatives or attributes. This is different from what has been found in Bettman et al. (1998); that people used more simple decision rules with the increased complexity of the decision set. To the contrary, consumers willingly expanded the search options when they were faced with more important, real life decision tasks. Therefore, it is argued that the current results reflect consumers' willingness to choose a decision strategy that uses more cognitive effort and is more likely to produce accurate decisions. These results imply that consumers vary their emphasis on the accuracy goal and provide direct evidence that people are willing to expend more cognitive effort based on their judgment and perception of the importance of the decision, which is often associated with the price of a product.

Regarding the monetary value associated with a decision, previous research illustrated how decision makers' anticipation of regret increases with the increase in monetary value (Bell, 1982). Thus, overall the findings from Study 1 suggest that Bettman et al.'s (1998) argument of a trade-off between cognitive effort minimization and accuracy maximization is influenced by the price of the product or the importance of the decision at hand and thus are interrelated with the negative emotion (anticipated regret manipulated by the price) minimization goal. This relationship is described in Figure 4.4.

Figure 4.4 Relationships between Goals of Accuracy Maximization, Cognitive Effort Minimization, and Regret Minimization in Study 1. Study 1 shows consumers' willingness to prioritize accuracy maximization goal over cognitive effort minimization goal when faced with products of higher monetary value (PATH 1). Products with higher monetary value are assumed to increase the anticipated regret associated with the decision (PATH3). The accuracy goal is less of an importance to the current studies, thus the findings related to this goal is represented by the dotted lines. The numbers of the paths are congruent with those in Figure 4.1.



Study 2: Cognitive effort and regret

Study 1 showed that people are willing to allocate different amount of cognitive effort in decision making and will vary the importance of different goals (accuracy maximization and cognitive effort minimization) depending on the amount of monetary value associated with the decision (potentially inducing anticipation of regret). This relationship suggests that the function of the effort-accuracy trade-off is interactive (e.g., multiplicative) and not additive.

Even though Payne (1982) and Bettman et al. (1998) showed that people make the trade-off between effort and accuracy, there are gray areas where it is difficult to define the clear cut threshold for each goal. For example, according to Bettman et al.'s (1998) model, it is still not clear when consumers sacrifice cognitive effort minimization goal and thus exert more cognitive

effort into a decision. Study 2 attempted to find decision circumstances in which more cognitive effort is beneficial in the overall decision process by investigating the role of regret in the decision framework. Specifically, the current study applied the concept of the well-known regret premium effect (Bell, 1982) and adopted it within the framework of Bettman et al.'s (1998) meta-goals based choice. The focal interest is on the exploration of impacts of cognitive effort increments on the experience of regret.

The relationship between exertion of cognitive effort and the experience of negative emotion (regret in particular) has been unclear. van Dijk, van der Pligt, and Zeelenberg (1999) found that higher cognitive effort led to a decrease in regret, whereas it increased the degree of disappointment when the outcome did not meet expectation. On the other hand, Carmon, Wertenbroch, and Zeelenberg (2003) showed that thinking over about important decision tasks or considering multiple options generated attachment to the decision and resulted in greater regret after the decision has been made. Carmon et al. (2003) explained this effect in terms of pre-ownership attachment through deliberation: As consumers deliberate on the options, they develop some extent of ownership towards each option. When the decision has been made and only one option is chosen, the foregone options may feel like a loss to them and therefore this could result in less satisfaction or feeling of loss to consumers.

These seemingly contradicting results raise the need to probe the relationship between these two factors. The present study was designed to examine the relationship between cognitive effort and the experience of regret in the consumer decision making domain. In addition, this study investigated the influence of product type and store type (online vs. in-store) on experienced regret. The effect of product type is relatively widely studied; however, there remains a great need to study consumers' decision behavior online. Even though the rate of online shopping has drastically increased since 2000 (Norum, 2008), relatively few studies have looked into decision makers' regret after purchasing a product online.

As mentioned earlier, the main purpose of Study 2 is to examine the relationship between the level of cognitive effort and its influence on the experienced regret. Bettman and colleagues (1998) proposed that consumers set their goals to minimize the cognitive effort required for the decision and to minimize the experience of negative emotion while making the decision and afterwards, but that model did not specify the possible interaction of these goals.

Method

Participants and design

One hundred forty seven college students (45 males and 102 females, mean age: 18.17) at a Midwestern university participated in Study 2 in partial fulfillment of a course requirement. A 2 (Cognitive effort: High vs. Low) x 2 (Store type: In-store vs. On-line) x 2 (Product type: Laptop vs. A pair of jeans) mixed-subjects design was used, where the level of cognitive effort was a between-subject factor. The two products (laptop and jeans) were chosen to represent product types that led consumers to use different decision strategies. Results from Study 1 indicated that consumers depend more on emotional judgment and do not use a cognitive effort laden strategy when purchasing clothing, in contrast to purchasing decisions related to electronics. In addition, a laptop is higher in price (on average \$500 and up) than a pair of jeans (on average \$30 and up) and it is likely that consumers consider the former to be more important than the latter. Therefore, it is predicted that participants will rely more on a systematic comparison of options and are less likely to be swayed by emotions when making more expensive decisions when purchasing laptops. Furthermore, because decision strategies for each product require different levels of cognitive effort, it is predicted that the impact of cognitive effort on the experienced regret will be different for each product.

Procedure and tasks

After giving their consent, participants were randomly assigned to one of the two cognitive effort conditions (high vs. low) and each participant read four vignettes on individual computer screens. The presentation order of vignettes was randomized by using Medialab v2008 (Jarvis, 2008). In the vignettes (see Appendix C, p. 150), the levels of cognitive effort expended on a purchase decision is manipulated. Cognitive effort is defined as amount of time and resources used to gather information about the decision (Garbarino & Edell, 1997; Russo & Doshier, 1983). For instance, vignettes for the high effort condition described how a consumer (the participant) spent a reasonable amount of time on research about a product, comparing the options, and asking product experts about their opinions. Vignettes for the low cognitive effort condition described how the consumer did not spend much time looking for a product, did not

compare many attributes, did not research or compare the options, and did not talk to product experts for their opinions. Finally, the degree of experienced regret was induced for all the participants by creating differences in prices of a same product; specifically the regret-present vignette described how, e.g., “*Two weeks later, you visited the website of the store (the local store in the other condition) and found out that the same kind of laptop you purchased was on sale with an extra 10% discount*” (See Appendix C, p. 150).

After reading each vignette, participants rated the degree of their experienced regret on a 7-point regret item (*Considering the situation, I regret my decision to...*, 1 = *Disagree Very Strongly*, 7 = *Agree Very Strongly*). The participants were also asked to indicate their degree of confidence about the decision, their willingness to make the same decision, and their general decision strategies when buying the same kind of product (e.g., laptop vs. pair of jeans) as described in the vignette (see Appendix C, p. 150).

Results

The first part of the study tested the effect of cognitive effort on the perceived confidence level of the decision. As shown in Table 4.3, in all conditions, the confidence level was significantly higher when participants thought they invested higher degree of cognitive effort whether they bought a laptop in a local store, $F(1, 145) = 15.21$, or online $F(1, 145) = 4.99$. The confidence level in their decision was also higher when they invested more cognitive effort whether they bought a pair of jeans in a local store, $F(1, 145) = 6.25$, or online, $F(1, 145) = 4.23$ (all $p < .05$).

Table 4.3 Means and Standard Deviations for Confidence Level for a Given Decision. In Study2, in store and online indicate the place where each product was purchased.

	Cognitive Effort	Mean (Std. Deviation)
Laptop, In Store	High	4.23* (1.38)
	Low	3.30 (1.49)
Laptop, Online	High	3.77* (1.29)
	Low	3.23 (1.58)
Jeans, In Store	High	4.58* (1.28)
	Low	4.02 (1.37)
Jeans, Online	High	4.11* (1.29)
	Low	3.65 (1.35)

NOTE: * indicates a significant different between high and low conditions at $p < .05$

Which factor causes more regret?

On the issue of regret, the effect of gender was tested on the current variables. Results showed that gender did not influence the experienced regret ($F(1,143) = .60, p = .44, \eta^2 = .004$). In addition, gender did not show any interactions with store type ($F(1,143) = 1.90, p = .17, \eta^2 = .01$), nor with product type ($F(1,143) = .57, p = .45, \eta^2 = .004$). However, Gender x Cognitive effort was significant ($F(1,143) = 7.25, p < .05, \eta^2 = .05$). The simple effect test found a significant difference for males ($F(1, 143) = 19.13, p < .05$), but not for females ($F(1, 143) = .01, p = .93$). When males invested more cognitive effort into making a decision, they experienced significantly less regret. The past regret literature has not discussed much about gender differences and particularly not as they relate to cognitive effort. One possible explanation for this effect is that males in general do not enjoy searching for options and do not get as actively involved in shopping. Thus, high level of cognitive effort invested in the decision brings a more positive influence to reduce experienced regret for males than females. However, this would not explain why males experienced more regret than females when only low cognitive

effort was invested. Although gender difference in experienced regret in relation to cognitive effort was not a focal interest to the current study, this relationship will be an interesting research avenue for the future studies.

Table 4.4 shows that participants experienced less regret when they 1) invested more cognitive effort, $F(1,145) = 10.84, p < .05, \eta^2 = .07$, 2) purchased a pair of jeans rather than a laptop $F(1,145) = 18.32, p < .05, \eta^2 = .11$, and 3) when they purchased a product in a local store rather than online, $F(1,145) = 15.03, p < .05, \eta^2 = .09$.

Table 4.4 Degree of the Experienced Regret Concerning Each Decision Situation in Study 2.

In store and online indicate the place where each product was purchased. Numbers in the parentheses are standard deviations.

	Laptop		Pair of jeans	
	<u>In Store</u>	<u>Online</u>	<u>In Store</u>	<u>Online</u>
High	3.71	4.23	3.41	3.94
Cognitive Effort	(1.32)	(1.17)	(1.23)	(1.19)
Low	4.68	4.58	3.88	4.22
Cognitive Effort	(1.22)	(1.45)	(1.31)	(1.34)

The effect of each of these variables, however, was dependent on the other variable. To represent the direction of the interaction involving cognitive effort more visually, Figure 4.5 is presented below. As shown in Figure 4.5, there is a significant two-way interaction for Store Type x Cognitive Effort, $F(1,145) = 5.74, p < .05$, partial $\eta^2 = .04$. The interaction for Product Type x Store Type was marginally significant, $F(1,145) = 3.83, p \text{ exact} = .05$, partial $\eta^2 = .03$. There was no interaction between Product Type and Cognitive Effort $F(1,145) = 1.94, p = .17$, partial $\eta^2 = .01$.

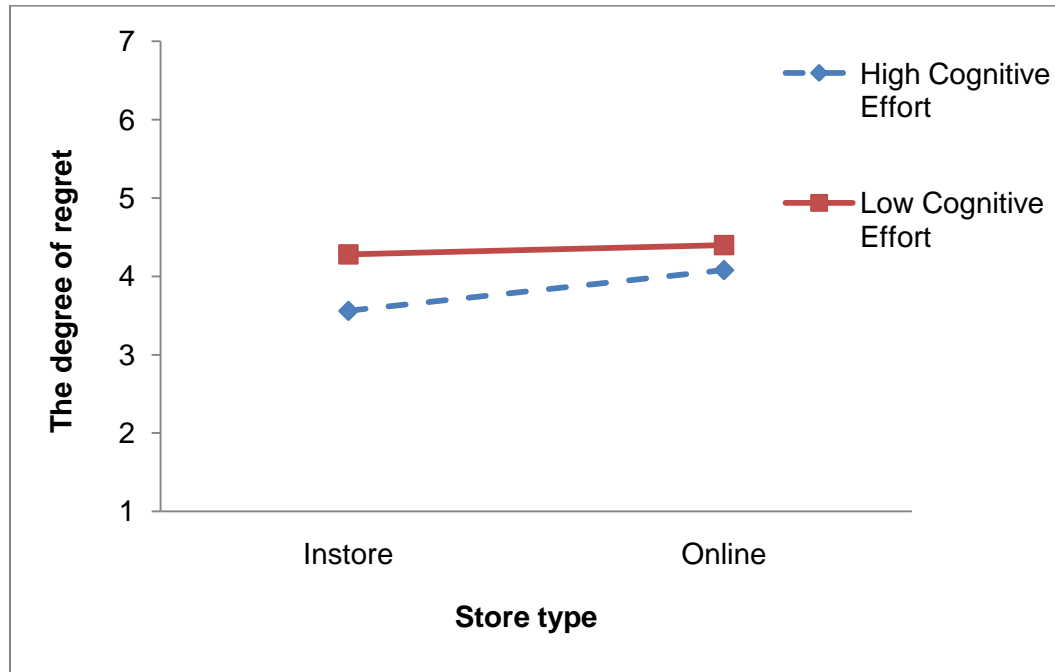
In an analysis of the Store Type x Cognitive Effort interaction, the differences in the experienced regret are only found when participants invested higher cognitive effort into the decision, $F(1,145) = 17.85, p < .05$. In particular, participants experienced significantly less regret when they were told that they purchased a product in a local store after spending higher

amount of cognitive effort. The analysis for the Product Type x Store Type interaction showed that participants' experienced greater regret only when the decision involved purchasing a pair of jeans , $F(1,145) = 8.14, p < .05$, or when purchasing in a store, $F(1,145) = 20.34, p < .05$.

The findings from Study 2 show that more investment of cognitive effort led to an attenuated experience of regret, congruent with van Dijk et al.'s (1999) findings. Cognitive effort intensified the degree of regret when the effort was noninstrumental (when the effort did not directly lead to a better outcome; e.g., dressing up for a blind date and not liking the date), but it alleviated the degree of regret when the effort was instrumental (van Dijk et al., 1999).

Furthermore, in Study 2, attenuation of regret was influenced by whether the product was purchased online or in a store. This suggests an intriguing research question about the decision strategies used for online shopping and associated emotions. With the development of online decision aids, some research suggests that the cost of information gathering and cognitive exertion is reduced (e.g., Huang, Nicholas, & Sabyasachi, 2009). In this case, the consumers might use different strategies for online shopping than when shopping in local stores and may even have developed different meta-goals for their decisions than what have been proposed by Bettman et al. (1998). In addition, due to the variations of the price of the same product on different online shops, the consumers are often more likely to find something cheaper if they search for more options (greater exertion of cognitive effort). This is a relatively new aspect of consumer behavior which needs further investigation.

Figure 4.5 Degree of the Experienced Regret When the Cognitive Effort x Store Type Interaction is Significant in Study 2. In store and online indicate the place where each product was purchased.



Discussion

In relation to Bettman et al.'s (1998) meta-goals, Study 2 suggests that consumers' goals of minimizing cognitive effort and minimizing negative emotion are interrelated and not independent. Study 2 clearly shows the benefit of greater exertion of cognitive effort in terms of the negative emotion minimization goal: invested cognitive effort reduces experienced regret. This supports our previous idea that goals regarding cognitive effort minimization and regret minimization are interrelated. The benefit of cognitive effort in attenuating the experienced regret might first seem somewhat counterintuitive; when the result does not reach an optimal level, the exertion of cognitive effort has not been paid off and therefore a decision maker should experience more regret. There are a few psychological effects with which we can explain this finding. One of them is that consumers may be trying to avoid feelings of wastefulness. Consumers sometimes incorrectly commit resources for a "wrong" cause (e.g., sunk costs) when it is noted that a rational decision maker should utilize resources or increment the decision cost

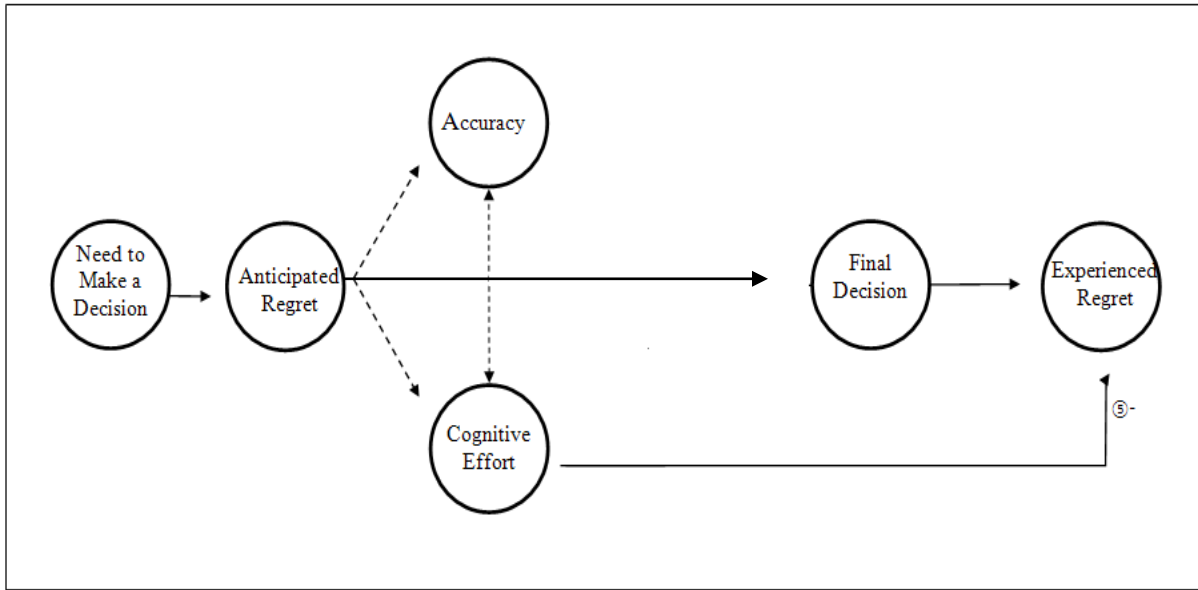
only to increase the benefits from the cost (Arkes & Ayton, 1999). Arkes (1996) explained this with the decision maker's willingness to avoid wastefulness of the invested resources; a person may expend more resources into an already unsuccessful decision in order to not appear wasteful. For consumers, when feeling that they could have purchased product at a better price, they might experience the feeling of wastefulness. In the regretful situation utilized in Study 2, the invested cognitive effort may seem like a waste since the consumers realized that they could have bought the same product 10% cheaper. If consumers have paid more money for the same product, this can be interpreted as a failure in choosing the best option. This is obviously linked to regret; if we think we have acted wastefully, we will naturally engage in a regret process. However, this is the opposite of what was found in Study 2.

A second possible explanation comes from dissonance theory (Festinger, 1957). Dissonance theory predicts that respondents make a retrospective justification of the effort they put into attaining a goal and evaluate the result more positively. Thus, participants might over-justify their decision cost and reduce the experienced regret when the decision goes wrong. Consumers may also want to appear consistent in their choices for reasons of personal justification and social acceptance.

To resolve this issue, Study 3 investigates the roles of cognitive effort, justification of the effort, and the experience of regret. Among the four meta-goals of consumers (Bettman et al., 1998), the relation between minimization of cognitive effort and maximization of justification can also be studied reasonably by investigating the role of these two factors on the experience of regret.

Overall, Study 2 found that participants who invested more cognitive effort into their decisions experienced less regret, suggesting that the exertion of cognitive effort may be helpful in reducing a person's experienced regret when he or she receives less positive feedback about their chosen product. This in turn suggests that consumers who invested more cognitive effort in the decision process will experience less regret, even when the result of the decision is not the best and therefore does not reach the highest 'accuracy' level. All of these findings point at the interrelation between the goals of cognitive effort minimization, accuracy maximization, and regret minimization (see Figure 4.6).

Figure 4.6 Relations between Cognitive Effort and Experienced Regret in Study 2. PATH 5 (consistent with Figure 4.1) shows the attenuated degree of experienced regret after an unfavorable outcome when greater degree of cognitive effort is spent in a decision. The accuracy goal is less of an importance to the current studies, thus the findings related to this goal is represented by the dotted lines. The number of the path is congruent with that in Figure 4.1.



Study 3: Cognitive effort, effort justification, and experienced regret

Study 3 was designed to extend the findings from Study 2 by including an additional decision making factor: effort justification. Specifically, Study 3 tested whether the ease or difficulty of effort justification alters the degree of experienced regret. In a related study, Zeelenberg et al. (2007) proposed that the degree of regret will intensify as it becomes harder to justify one's final decision. Furthermore, Sugden (1985) found that the degree of regret depended on how reasonably a decision maker can explain or support one's own decision. Thus, we expected to find a mitigated degree of regret when a decision maker has substantial and acceptable reasons for endowing more cognitive effort into the decision.

Method

Participants and design

One hundred twelve students (53 males and 59 females, mean age: 19.20) at a Midwestern university participated in Study 3 in return for partial satisfaction of a course requirement. A 2 (Cognitive effort: High vs. Low) x 2 (Cognitive effort justification: Ease vs. Difficulty) within-subjects design was used.

Procedure and tasks

Upon giving their consent, each participant read four vignettes, each describing a decision situation. The order of vignettes was randomized by using Medialab v.2008 (Jarvis, 2008). Cognitive effort level was manipulated in a similar method to that used in Study 2. We defined cognitive effort as the usage of more resources in terms of gathering information, investigating or researching about the decision, and spending more time on the decision. For example, in the high cognitive effort condition, participants read that he/ she (decision maker) gathered information about the product by researching the specification, comparing options, and talking to the product experts. Participants were also told that they spent quite some time before making the final decision. In addition, we provided detailed specifications about the product within the vignette in the high cognitive effort condition, thus the physical amount of time spent while reading the vignette differed between two conditions (see Appendix D, p.154).

The ease and difficulty of effort justification invested in the decision process are defined as having a clear (not clear) reason for their cognitive effort (e.g., lack of knowledge about the product and therefore investing a great deal of cognitive effort). In this study, easy (difficult) justification is manipulated by providing clear (unclear) reasons for the level of cognitive effort invested. For example, in the high cognitive effort / easy to justify condition, the participants read:

...Since this was the first time purchasing a laptop by yourself, you were not certain which laptop would be the best option for you. You walked around the store and read the descriptions of each model. You also talked to the product manager who seemed very knowledgeable and was able to answer your questions in detail...

In the high cognitive effort / difficult to justify condition, the vignette described that the participant (decision maker) ended up wasting a substantial amount of effort on the decision process. It is described that the invested effort was not necessary because the final option was the

same product the decision maker had in mind when first walking into the store based on his/ her experience. The remaining two conditions were manipulated in a similar way (see Appendix D, p. 154).

A manipulation check was conducted on the ease of justification by responding on a 7-point scale (e.g., *The effort invested in this decision was necessary*, 1 = *Disagree very strongly*, 7 = *Agree very strongly*), to indicate the level of agreement about whether the invested effort was reasonable amount for the given situation. The experienced regret was manipulated, as in Study 2, by creating a 10% price difference for the same product at a subsequent time.

After reading each vignette, participants rated the degree of regret they would feel in that situation, using a single regret item as in Study 2 (e.g., *Considering the situation, I regret my decision to...*, 1 = *Disagree Very Strongly*, 7 = *Agree Very Strongly*). The participants were also asked to indicate the degree of confidence about their decision, willingness to make the same decision, and general decision strategies when buying the same kind of product as described in the vignette.

Results

In the manipulation check, a significant difference was found between the ease/difficulty of effort justification invested in the decision (mean difference = .41, standard deviation = 1.37, $p < .05$; mean difference = .47, standard deviation = 1.70, $p < .05$ for high and low cognitive effort condition respectively). In addition, as shown in Table 4.5, participants indicated a higher degree of confidence with the decision when they were told that they had invested higher cognitive effort in the decision, whether it was easy to justify the decision effort ($t[1, 110] = 8.47$, $p < .05$) or difficult to justify the decision effort ($t[1, 110] = 5.31$, $p < .05$). This result is consistent with findings from Study 2, supporting that expenditure of cognitive effort contributes positively to consumers' confidence in their decision.

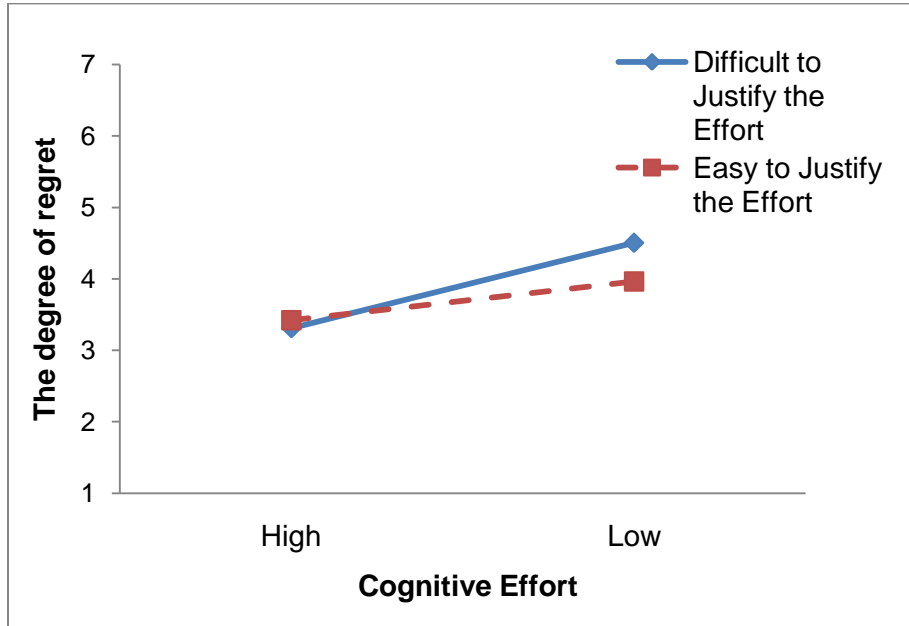
Table 4.5 Confidence Level for Each Decision Condition

Decision conditions	Mean (Std. Deviation)
High cognitive effort, difficult to justify	4.93 (1.36)
Low cognitive effort, difficult to justify	3.45 (1.61)
High cognitive effort, easy to justify	4.78 (1.53)
Low cognitive effort, easy to justify	3.98 (1.55)

Study 3 partially replicated the results of Study 2. Participants reported a lower degree of regret when they invested more cognitive effort into making a decision, $F(1,110) = 33.58$, $p < .05$, $\eta^2 = .23$, and the degree of experienced regret was attenuated when effort for the decision was easy to justify, $F(1,110) = 4.35$, $p < .05$, $\eta^2 = .04$, as expected (see Figure 4.7). The fact that greater, but justified, effort led to less regret might seem counterintuitive to some, but it is again in support of van Dijk's (1998) finding that people regret less when their effort was related to the outcome of their decision.

The interaction between Cognitive Effort x Ease of Justification was significant, $F(1,110) = 8.64$, $p < .05$, $\eta^2 = .07$. To further probe this interaction, a simple comparison was conducted to closely examine the simple effect; a statistically significant difference was only found in the low cognitive effort condition, $F(1,110) = 11.68$, $p < .05$. The degree of regret significantly increased when the cognitive effort was low, particularly when it was difficult to justify the low level of cognitive effort invested in the decision. Considering the main effect of cognitive effort, the significant interaction here implies that the effect of decision justification is dependent upon the degree of cognitive effort invested in the decision.

Figure 4.7 Degree of Experienced Regret When the Level of Cognitive Effort x Ease/Difficult of Effort Justification Interaction is Significant.



In each condition, a greater amount of experience was correlated with the lower level of confidence in one’s decision (see Table 4.6; Pearson’s *r* range between -.64 and -.68). This supports previous studies on self-respect, self-esteem and the experience of regret in non-consumer related decisions (Feeney, Gardiner, Johnston, Jones, & McEvoy, 2005). The current study shows that self-confidence in current decisions is significantly related to the experience of regret, and also the willingness to maintain the current decision strategy decreases as the experience of regret increases for each condition (Table 4.7, Pearson’s *r* range between -.45 and -.65). While the relationship is only a correlation, the pattern is consistent with the idea that participants are more likely to switch their decision strategy as they experience more regret.

The correlation between the perceived worth of the cognitive effort and the degree of experienced regret implies an interesting result. As the perceived worth of the amount of effort increased, the degree of experienced regret decreased for each condition (Table 4.8, correlation coefficients are between -.45 and -.53). This again implies that justification, cognitive effort, and experienced regret are intercorrelated and therefore, will not have a simple additive function. Payne (1982) also admits the importance of justification but fails to include it as an important decision factor.

Table 4.6 Zero Order Correlation between the Confidence in Decision and the Degree of Experienced Regret

	1	2	3	4	5	6	7
High cog Difficult to justify: confidence (1)	1						
High cog Difficult to justify: regret (2)	-.64 (**)	1					
High cog Easy to justify: confidence (3)	.65 (**)	-.53 (**)	1				
High cog Easy to justify: regret (4)	-.40 (**)	.50 (**)	-.65 (**)	1			
Low cog Difficult to justify: confidence (5)	.23 (*)	-.19 (*)	.33 (**)	-.09	1		
Low cog Difficult to justify: regret (6)	.04	.09	-.13	.23 (*)	-.67 (**)	1	
Low cog Easy to justify: confidence (7)	.42 (**)	-.39 (**)	.47 (**)	-.30 (**)	.47 (**)	-.31 (**)	1
Low cog Easy to justify: regret (8)	-.14	.30 (**)	-.30 (**)	.35 (**)	-.40 (**)	.48 (**)	-.68 (**)

NOTE:

* is significant at $p < .05$.

* * is significant at $p < .001$.

Table 4.7 Zero Order Correlation between the Status Quo in Decision and the Degree of Experienced Regret

	1	2	3	4	5	6	7
High cog Difficult to justify: status quo (1)	1						
High cog Difficult to justify: regret (2)	-.60 (**)	1					
High cog Easy to justify: status quo (3)	.64 (**)	-.46 (**)	1				
High cog Easy to justify: regret (4)	-.41 (**)	.50 (**)	-.62 (**)	1			
Low cog Difficult to justify: status quo (5)	.29 (**)	-.17	.38 (**)	-.07	1		
Low cog Difficult to justify: regret (6)	-.04	.09	-.06	.23 (*)	-.55 (**)	1	
Low cog Easy to justify: status quo (7)	.43 (**)	-.22 (*)	.45 (**)	-.21 (*)	.47 (**)	-.24 (*)	1
Low cog Easy to justify: regret (8)	-.20 (*)	.29 (**)	-.19 (*)	.34 (**)	-.26 (**)	.48 (**)	-.50 (**)

NOTE:

* is significant at $p < .05$.

** is significant at $p < .001$.

Table 4.8 Zero Order Correlation between the Worth of the Effort and the Degree of Experienced Regret

	1	2	3	4	5	6	7
High cog Difficult to justify: worth (1)	1						
High cog Difficult to justify: regret (2)	-.53 (**)	1					
High cog Easy to justify: worth (3)	.50 (**)	-.38 (**)	1				
High cog Easy to justify: regret (4)	-.45 (**)	.51 (**)	-.45 (**)	1			
Low cog Difficult to justify: worth (5)	.09	.03	.23 (*)	-.06	1		
Low cog Difficult to justify: regret (6)	-.05	.02	.07	.11	-.65 (**)	1	
Low cog Easy to justify: worth (7)	.29 (**)	-.16	.34 (**)	-.07	.48 (**)	-.26 (**)	1
Low cog Easy to justify: regret (8)	-.24 (*)	.44 (**)	-.09	.20 (*)	-.31 (**)	.41 (**)	-.56 (**)

NOTE:

* is significant at $p < .05$.

** is significant at $p < .001$.

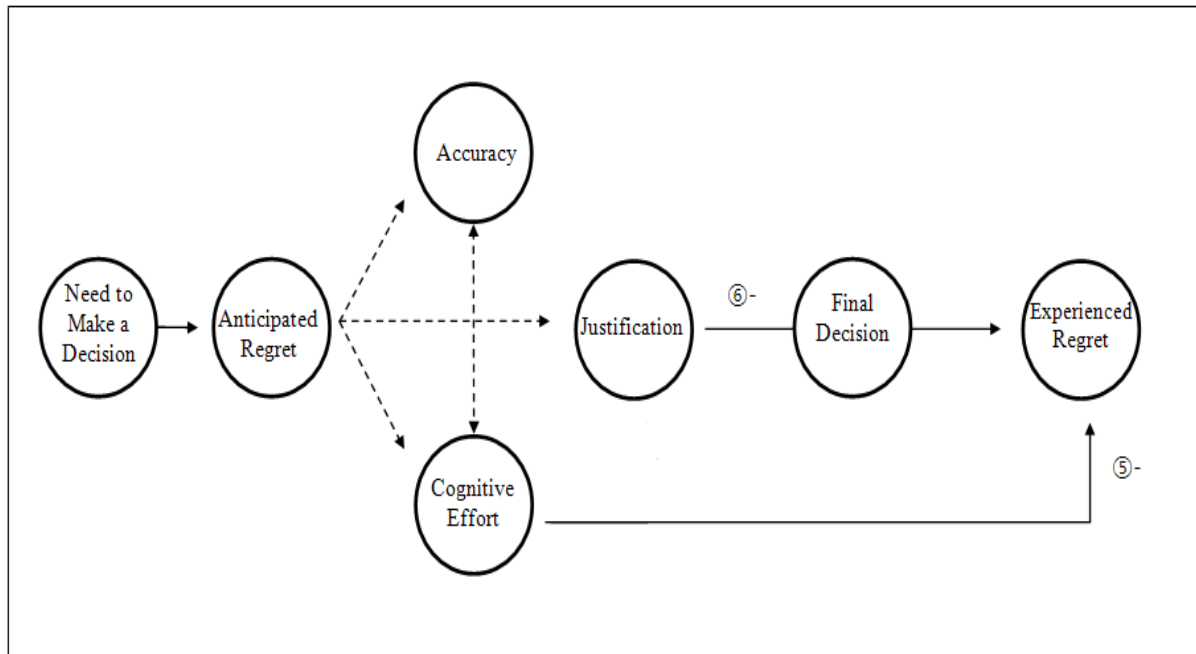
Discussion

Study 3 investigated the function of exerted cognitive effort and the ease of justification of that effort with regards to the experience of regret. In this study, participants chose between two laptops and two pairs of jeans. In one condition, participants put forth cognitive effort deemed unjustified- they spent a lot of time researching other products but ended up buying the original laptop or pair of jeans they wanted. In other conditions, they did not research much about the product even when they did not know much about the product. In the latter situation,

the cognitive effort is under-spent, and the participants did not have a good reason or ‘excuse’ for this lack of cognitive effort. Results showed that unnecessary cognitive effort did not make much difference in post-purchase regret, but under-spent cognitive effort exacerbated post-purchase regret. Results imply that high cognitive effort itself may be a way to justify the consumers’ decisions which suggest the interrelationship not only between the cognitive effort goal and negative emotion goal but also between the cognitive effort goal and justification of that effort (see Figure 4.8).

In addition, in Study 3, exerted cognitive effort helped participants feel more confident about their decision process, even when the outcome was not desirable. This could imply that exerted effort enhances the consumer’s self-efficacy in decision making and contributes to less aggravating experiences when the decision goes wrong.

Figure 4.8 Relationship between Cognitive Effort, Effort Justification, and Experienced Regret in Study 3. PATH 5 confirms the prediction of current study and replicates the findings from Study 2. It shows the benefits of exerted cognitive effort on the experienced regret. PATH 6 shows that justified decision effort generates less experienced regret. The accuracy goal is less important to the current studies; thus the findings related to this goal are represented by the dotted lines. The numbers of the paths are congruent with those in Figure 4.1.



Study 4: Cognitive effort, justification of the decision, and regret

Studies 2 and 3 have showed that cognitive effort is effective in attenuating experienced regret, and effort justification has a multiplicative relation with it. If one of the functions of exertion of cognitive effort is related to reducing the anticipation of regret and if the benefit of cognitive effort is related to attenuating experienced regret, we can expect to observe such behaviors in a consumer decision making environment. Thus, in Study 4, we investigate whether consumers are willing to spend more cognitive effort in decision making when perceived greater anticipation of regret within the meta-goal framework. If results are consistent, Study 4 will provide evidence of why the trade-off between cognitive effort and accuracy might occur, as well as illuminate the role of decision cost with respect to the goal of negative emotion minimization. By spending more cognitive effort rather than being cognitive misers, participants are predicted to spend more time to prevent any potential regret when the decision goes wrong. In addition, current study examined the function of decision justification in relation to experienced regret.

In Study 4, a slightly different method is used in the vignettes to induce regret in the participants. Consumers in real decision situations often impulsively purchase a product rather than what they had initially planned. A consumer might plan on buying a pair of dress pants, but he/she might end up buying a pair of new shoes. Later on, this consumer may experience regret for buying something unnecessary (new shoes) instead of what they needed (e.g., a new pair of dress pants for an unexpected interview). Consumers can regret the opposite situation as well. If they really wanted to purchase something, but had to miss the opportunity because of an immediate need, they can also experience regret later on (Tykocinski & Pittman, 1998). In Study 4, the relationship between experienced regret and these two option choice situations were investigated. Regret was induced not by the price difference but by the missed opportunity (See Appendix E, p. 158). Initially, we asked participants to consider purchasing a laptop for the following reasons: 1) it is one of the most widely used products among college students, 2) the price range is reasonably wide, and 3) it is high on utilitarian value which is the aspect to be manipulated in Study 4.

As the alternative option we provided an opportunity to buy an LCD TV (described in the vignette as an item that they always wanted) which was on sale for only a limited time, thus

creating a situation where it would be difficult to forgo this alternative option. Studies have persistently shown that people find it difficult to forgo an option that is on sale for a limited time (e.g., Cialdini, 2004). The LCD TV was chosen to 1) match the price range of laptops, and 2) find something that has more hedonic value than utilitarian value. Today most college students own a TV. The second LCD TV will therefore serve more of a hedonic value than a utilitarian value.

Method

Participants and design

One hundred seventy seven participants at a Midwestern university (57 males, 104 females, and 16 not specified, mean age: 18.24) participated in return for credit in partial fulfillment of a course requirement. We used a 2 (Anticipation of regret: High vs. Low) x 2 (Cognitive effort: High vs. Low) x 2 (Opportunity for justification: Present vs. Absent) mixed-design where anticipation of regret was a within-subject factor.

Manipulation of cognitive effort

In contrast to Studies 2 and 3, in Study 4 cognitive effort was manipulated by varying the actual/physical amount of time while searching for the options online. In the high cognitive effort condition, the parameters of the computer program (MediaLab v2008 [Jarvis, 2008]) were set so the participants mandatorily spent 8 minutes to search for options on a real website of an electronics store (i.e., <http://bestbuy.com>).

In addition, participants were asked to fill out the specifications of the top three models of their choice. In the low cognitive effort condition, participants were given 2 minutes to look for options. All participants were also given a blank piece of paper to make notes during the decision process. The search duration (8 vs. 2 minutes) was chosen based on the results of a pilot test for this study; it was reported that 8 minutes or longer was perceived as an adequate amount of time to search for the products, whereas 2 minutes was perceived as a noticeably shorter amount of timed search for the products.

Opportunity to write justification of their decision

In the current study, justification was defined as the act of providing reasons for their decision. For this study, our interest was in examining the impact of post-justification of one's decision on the person's experienced regret. Adopting a method often used in consumer research (e.g., Simonson, 1999) we asked participants about their reasons for choosing a specific option (justification condition) or did not ask (no justification condition).

Inducement of regret

In Study 4, two types of regret were measured: anticipated and post-purchase experienced regret. Anticipation of regret (used as an independent variable) was induced by using two different monetary values (\$1,000 vs. \$300). It is expected that higher monetary value will be related to a higher risk of detrimental consequences when the decision goes wrong; Variable monetary values of the products were used in our study as a method to induce different levels of anticipation of regret by creating risk associated with the decision task. A manipulation check was included in the study to test for the effectiveness of manipulation. The experienced regret (used as a dependent variable) was induced by either choosing a laptop over a LCD TV, or choosing a LCD TV over a laptop. It was described in a few sentences how they might regret about the foregone options as following (see also Appendix E, p. 158).

Now suppose you have purchased the new LCD TV instead of what you had planned to purchase, a laptop. Two weeks after your purchase of the new TV, you are having trouble because you don't have a good, working laptop. For example, you have to wait for a vacant spot in the library to work on your projects; or you lost all of your unsaved work from the library computer.

We also slightly changed the regret scales for Study 4. In Studies 1-3, the degree of experienced regret was measured on a single item (e.g., *How much regret would you feel?* 1 = *Not at all*, 7 = *Very much*). For Study 4, we used two items to measure the degree of experienced and anticipated regret based on McElroy and Dowd's (2007) study.

To measure anticipation of regret we used the following two items:

Considering the situation, how much regret do you anticipate about making a bad decision? (1 = Not at All, 5 = Neutral, 9 = Very Strongly)

Considering the situation, how worried are you about making a bad decision? (1 = Not at All, 5 = Neutral, 9 = Very Strongly)

To measure experienced regret, we used the following two items:

Considering the situation, I regret my decision to purchase the LCD TV [laptop]. (1 = Not at All, 5 = Neutral, 9 = Very Strongly)

Considering the situation, I should have purchased the laptop [LCD TV]. (1 = Not at All, 5 = Neutral, 9 = Very Strongly)

Study 4 also used supplementary materials. In the high cognitive effort condition, we asked our participants to use the information fill-out sheet and compare the specifications (e.g., hard drive size, memory size, screen size etc.) of their top three model choices. This was an addition from the previous studies, based on the responses from pilot testing prior to Study 4. In the pilot study, participants reported that 8 minutes in the lab is long enough that they experienced some lack of concentration during the search job. Thus, this new task was implemented to keep them occupied in the cognitive exertion and actively comparing the products. To keep the process parallel, a blank sheet was provided for the low cognitive effort condition to make notes if needed.

Procedure and task

After informed consent, participants were randomly assigned to one of the four conditions (see the design of the study). All the materials were presented on a computer screen by using MediaLab v2008 (Jarvis, 2008). Participants read instructions and specific cover stories related to each decision task (see Appendix E, p. 158). During the experiment, the program was directly linked to a website of an electronics store where they had to spend a fixed amount of time (8 vs. 2 minutes for high and low cognitive effort conditions, respectively). In the vignette, participants were given a situation in which they had to shop for a new laptop. At this time, on the computer screen they were directed to an online electronics store and were asked to search

for a laptop that would best fit their needs. After the fixed amount of time has passed (8 vs. 2 minutes), the program redirected the participants to the next question in the queue described below.

After the online search task, the cover story noted that while participants were still looking for a laptop, they found a LCD TV which was on a special, limited-time offer sale (10%). At this time, participants were asked of their final choice between a laptop and a LCD TV. If they were in the Justification Present condition, participants were also asked to list three strong reasons for their decision (e.g., *I choose laptop because....*, or *I choose LCD TV because....*).

Next, participants were asked of their experienced regret for when they were told that they bought a laptop and missed the opportunity to buy a LCD TV, and vice versa. At the end, it was asked to indicate their level of satisfaction with their decision (see Appendix E, p. 158).

Results

A manipulation check for perceived anticipation of regret (within-subject factor) between high and low levels was conducted; results showed a significant difference between the two conditions (mean difference = .61, standard deviation = 1.63, $t [1, 174] = 5.0, p < .05$). In addition, in the high anticipation of regret condition, it was found that they were more likely to postpone the final decision (mean difference = .37, standard deviation = 2.27, $t [1, 174] = 2.2, p < .05$).

Another manipulation check for the perceived amount of cognitive effort invested (between-subject factor) between high and low levels also showed a significant difference between the two group, $F (1,175) = 14.16, p < .05$, partial $\eta^2 = .08$ (Table 4.9).

Table 4.9 Manipulation Checks for Perceived Degree of Cognitive Effort and Anticipated Regret

Cognitive Effort	Mean (Std.dev)	Anticipated Regret	Mean (Std.dev)
High	6.15 (1.70)	High	5.70 (2.05)
Low	5.01 (1.77)	Low	5.09 (2.11)

On average, participants were willing to spend \$662 (median = \$600) for a laptop and \$421 (median = \$300) for an LCD TV in real life. This shows that \$1,000 as an estimated worth laptop and \$300 as an estimated worth of a laptop were adequate distinctions between high and low anticipation of regret (i.e., cost) for the current participants.

We had three measures of willingness to exert more cognitive effort: willingness to spend more time searching for options, willingness to talk to more people before making the final decision, and willingness to read more reviews. All three scales showed differences between high and low anticipation of regret. When in the high anticipation of regret condition, participants were willing to (1) spend more time searching for options, $F(1, 176) = 10.47, p < .05$ partial $\eta^2 = .06$, (2) talk to more people, $F(1, 176) = 15.72, p < .05$ partial $\eta^2 = .08$, and (3) read more review of the products, $F(1, 176) = 21.29, p < .05$ partial $\eta^2 = .11$ (see Table 4.10 for means and standard deviations).

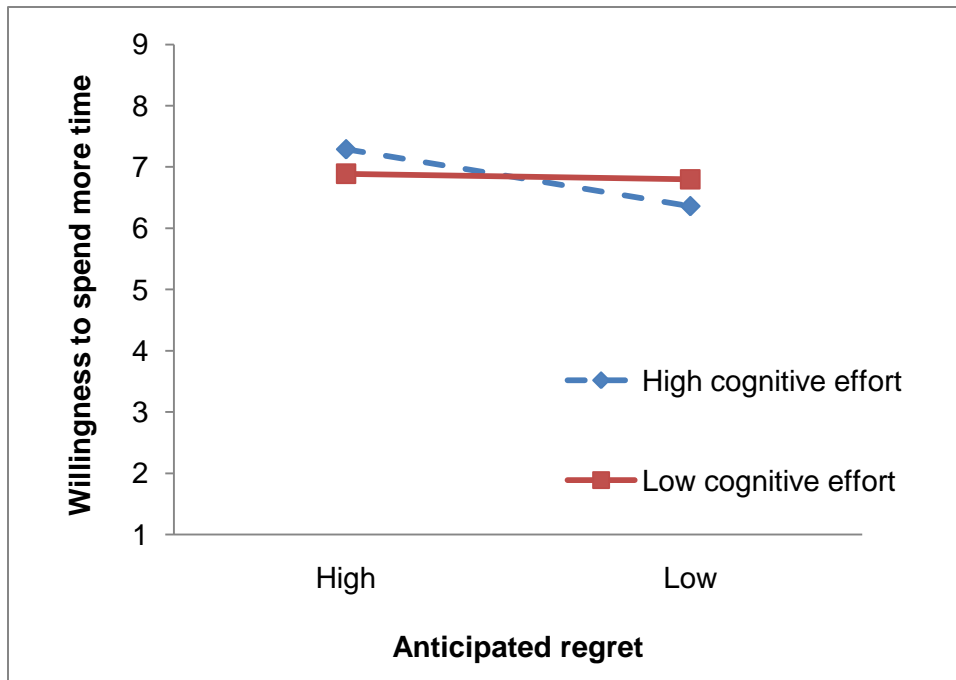
There was also a significant two-way interaction between anticipation of regret and cognitive effort, $F(1, 174) = 7.08, p < .05$ partial $\eta^2 = .04$. As shown in Figure 4.9, the simple effect test showed the difference was only significant when the cognitive effort was high $F(1, 176) = 17.58, p < .05$ and not when it was low $F(1, 176) = .16, p = .69$. It was found that when anticipation of regret was low, the willingness to spend more time researching about the laptop decreased significantly if the initial search effort was greater (8 min compared to 2 min). On the other hand, when the initial search time effort relatively low (2 min), the inclination to spend more time in researching was similar regardless of the difference in the anticipated regret.

Table 4.10 Willingness to Spend more Cognitive Effort (DV) for Each Condition. The first part of Study 4 examined the changes in willingness to spend more cognitive effort after spending either 8 (High cognitive effort) or 2 (Low cognitive effort) minutes in the decision, as well as when they were purchasing a laptop worth \$1,000 (High anticipation of regret) and one worth \$300 (Low anticipation of regret). Willingness to spend more cognitive effort (dependent variable) is measured in three scales of 1-3.

Cognitive effort	Anticipated regret	(1) Willingness to spend more time to research the products online	(2) Willingness to talk to more people	(3) Willingness to read more reviews
High	High	7.29 (2.05)	6.81 (2.16)	7.26 (2.11)
	Low	6.36 (2.52)	6.28 (2.40)	6.50 (2.58)
Low	High	6.89 (2.00)	6.84 (1.94)	7.31 (1.91)
	Low	6.80 (2.00)	6.25 (2.43)	6.66 (2.07)

Figure 4.9 Willingness to Spend More Time to Research Products (DV) when the Interaction between Anticipation of Regret x Cognitive Effort is Significant (Study 4).

Cognitive effort is manipulated by spending either 8 (High cognitive effort) or 2 (Low cognitive effort) minutes in the decision. Anticipated regret is manipulated by either purchasing a laptop worth \$1,000 (High anticipated regret) or worth \$300 (Low anticipated regret).



The difference in anticipation of regret did not influence the perceived ease of justification of a current decision $F(1, 175) = 1.59, p = .21$ partial $\eta^2 = .01$ (Table 4.11). However, the exertion of cognitive effort resulted in marginally significant differences in the same factor, $F(1, 175) = 3.80, p_{exact} = .05$ partial $\eta^2 = .02$; participants felt it was easier to justify the current decision when they put more cognitive effort into the decision.

Table 4.11 Means and Standard Deviations of Easiness of Justification of the Decision. High and low cognitive effort is manipulated by allowing 8 vs. 2 minutes for the search task. High and low anticipation of regret is manipulated by using \$1,000 vs. \$300 laptop respectively.

Cognitive effort	Anticipated regret	Mean (Std. dev)
High	High	6.67 (1.80)
	Low	6.66 (1.93)
Low	High	6.40 (1.82)
	Low	6.01 (1.91)

Table 4.12 Satisfaction of the Chosen Option at a Given Situation. High and low cognitive effort is manipulated by allowing either 8 or 2 minutes for the search task. High and low anticipation of regret is manipulated by using a \$1,000 or \$300 laptop respectively. Justification is manipulated by either allowing or not allowing the opportunity to provide reasons for their choice.

Anticipated regret	Cognitive effort	Justification	Mean (Std. dev)
High	High	Present	7.09 (1.80)
		Absent	7.56 (1.60)
	Low	Present	7.02 (1.78)
		Absent	7.56 (1.38)
Low	High	Present	7.30 (1.53)
		Absent	6.96 (1.66)
	Low	Present	6.28 (2.15)
		Absent	6.85 (1.97)

As shown in Table 4.12, the satisfaction rate showed no difference in high and low cognitive effort $F(1, 172) = 1.82, p = 0.18$. This result is different from previous research which showed a negative influence of cognitive effort on a person's satisfaction level.

In Study 4, we also asked for participants' experienced regret when their decision went wrong (e.g., *Now suppose you have purchased the new LCD TV instead of what you had planned to purchase, a laptop. Two weeks after your purchase of the new TV, you are having trouble because you don't have a good, working laptop. For example, you lost all of your unsaved work from the library computer*).

When buying a laptop and missing the chance to buy LCD TV on sale

Results for this analysis (see Table 4.13) show that experienced regret also increases with the anticipation of regret, $F(1, 176) = 9.80, p < .05$ partial $\eta^2 = .05$. In addition, replicating the findings from Studies 2 and 3, exertion of cognitive effort was beneficial in reducing experienced regret, $F(1, 176) = 3.69, p \text{ exact} = .05$ partial $\eta^2 = .02$.

A two-way interaction of Cognitive Effort x Justification was statistically significant $F(1, 176) = 5.33, p < .05$ partial $\eta^2 = .03$. To further probe this interaction, we tested for a simple effect which showed that the difference was present in the high cognitive effort condition, $F(1, 176) = 5.38, p < .05$, but not in the low condition, $F(1, 176) = 1.03, p = .31$. As shown in Table 4.13, in the high cognitive effort condition experienced regret decreased significantly when participants had the opportunity to justify their decision.

Table 4.13 Experienced Regret (DV) about Purchasing a Laptop based on Cognitive Effort, Opportunity to Justify, and Anticipated Regret (IVs). The numbers in the parentheses are standard deviations. High and low cognitive effort is manipulated by allowing 8 vs. 2 minutes for the search task. High and low anticipation of regret is manipulated by using \$1,000 vs. \$300 laptop respectively. To avoid confusion in the use of terms, high vs. low anticipated regret are replaced with \$1,000 vs. \$300.

Cognitive effort	Justification	<u>Laptop</u>	
		\$1, 000	\$300
High	Present	1.99 (1.07)	2.31 (1.99)
	Absent	2.76 (1.57)	3.07 (2.07)
Low	Present	2.83 (1.78)	3.46 (2.50)
	Absent	2.54 (1.72)	3.10 (2.03)

When buying a LCD TV on sale and missing the chance to buy a laptop

In one of the conditions, participants were told to imagine they bought an LCD TV instead of a laptop and were asked about their experienced regret. When they were told they had purchased the LCD TV, it still shows that the experienced regret depends on the anticipation of regret $F(1, 175) = 25.83, p < .05$ partial $\eta^2 = .13$; a higher degree of experienced regret was found when they anticipated greater regret.

The main effect of cognitive effort was not significant $F(1, 175) = .45, p \text{ exact} = .51$, partial $\eta^2 = .003$. However, a two-way interaction cognitive effort x justification was significant $F(1, 173) = 3.69, p = .05$ partial $\eta^2 = .02$; as well as the main effect of justification $F(1, 173) = 3.94, p < .05$ partial $\eta^2 = .02$, but counter intuitively, the direction of the effect was opposite from what was expected. Participants reported greater experienced regret when they had the opportunity to justify their decision (see Table 4.15).

A possible explanation can be found by comparing the results from Tables 4.13, 4.14 and 4.15. Figures 4.10 and 4.11 attempt to recapture these seemingly contracting results, and to represent the relationship between justification and cognitive effort in a more intuitive manner.

There is an almost mirror image pattern regarding the degree of experienced regret. When participants purchased a laptop over a LCD TV, the least amount of regret was experienced for those who spent high cognitive effort in the decision and also had a chance to justify their choices and decisions (see Figure 4.10). On the other hand, when participants purchased a LCD TV over a laptop- which was the product of their initial purchase intent- the least amount of regret was experienced for those who did not spend much cognitive effort in the decision and also did not have a chance to justify their decisions (see Figure 4.11).

Further analysis of this effect showed that the differences from the interaction was due to the high cognitive effort condition, $F(1, 174) = 7.79, p < .05$, and not the low cognitive effort condition $F(1, 174) = .01, p = .94$. As shown in Table 4.15 and Figure 4.10, in the high cognitive effort condition the experienced regret decreased significantly when participants had the opportunity to justify their decision.

Figure 4.10 Differences in the Experienced Regret between Cognitive Effort and Justification about Purchasing a Laptop and missing out on the LCD TV. High and low cognitive effort is manipulated by allowing 8 vs. 2 minutes for the search task. Justification is manipulated by either allowing or not allowing participants the opportunity to provide reasons for their choice.

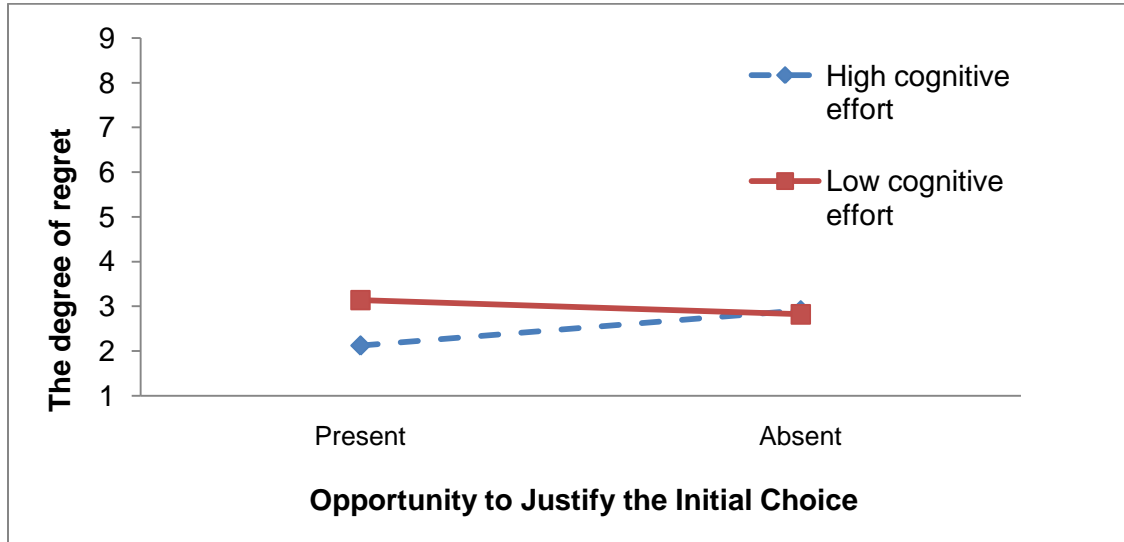


Figure 4.11 Differences in the Experienced Regret between Cognitive Effort and Justification about Purchasing a LCD TV and Missing Out on the Laptop. High and low cognitive effort is manipulated by allowing 8 vs. 2 minutes for the search task. Justification is manipulated by either allowing or not allowing participants the opportunity to provide reasons for their choice.

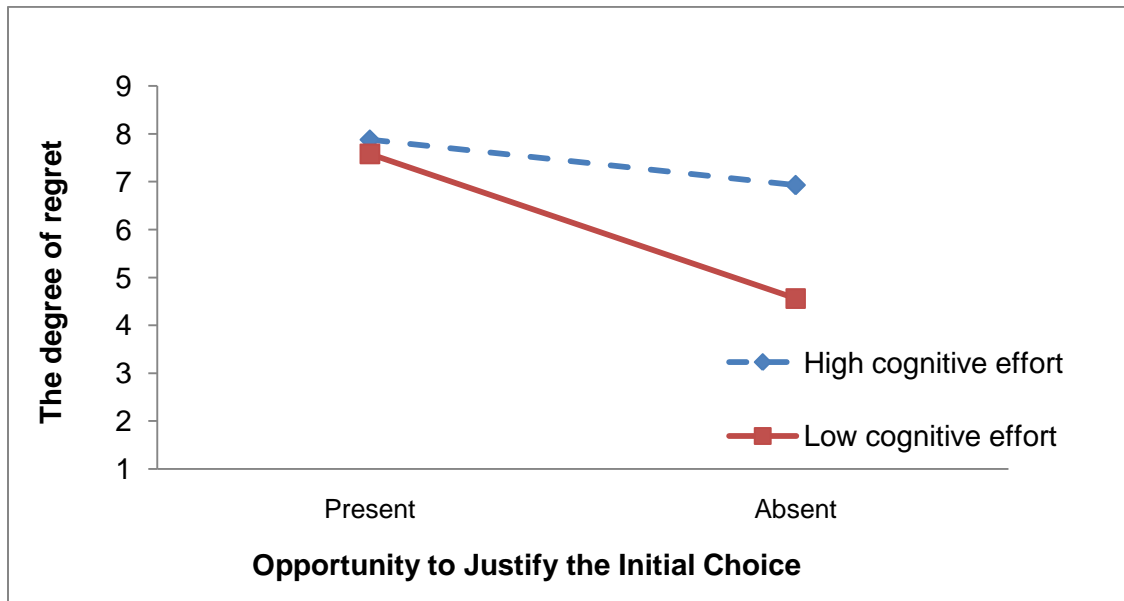


Table 4.14 Choice between Laptop and LCD TV. The numbers represent the number of participants who chose each option. At the end of the search task (searching for a laptop), participants were asked to think about a new option (LCD TV) and choose between the two options (see Appendix E, p. 158). High and low anticipated regret is manipulated by using \$1,000 vs. \$300 laptop respectively.

Condition	Choice	Low anticipated regret		Total
		Laptop	LCD TV	
High anticipated regret	Laptop	146	29	175
	LCD TV	1	2	3
Total		147	31	178

Table 4.15 Experienced Regret (DV) about Purchasing a LCD TV and Missed the Chance to Buy a Laptop Based on Cognitive Effort, Opportunity to Justify, and Anticipated Regret (IVs). High and low cognitive effort is manipulated by allowing 8 vs. 2 minutes for the search task. High and low anticipated regret is manipulated by using \$1,000 vs. \$300 laptop respectively. To avoid confusion, high vs. low anticipated regret are replaced with \$1,000 vs. \$300 laptop.

Cognitive effort	Justification	Laptop	
		\$1,000	\$300
High	Present	8.42 (1.12)	7.33 (2.39)
	Absent	7.09 (2.21)	6.78 (2.36)
Low	Present	8.06 (1.58)	7.09 (2.30)
	Absent	8.17 (1.28)	6.95 (2.17)

Discussion

Study 4 showed that consumers are willing to spend more cognitive effort (in terms of spending time, talking to people, and reading reviews online) when they perceived greater anticipation of regret. And a result, the greater exertion of cognitive effort was beneficial in reducing experienced regret about a missed opportunity. In particular, if participants had a chance to provide justifications for their decisions, the exerted cognitive effort effectively reduced the experienced regret.

In regard to the differences found between the experienced regret after purchasing either a laptop or a LCD TV, there are many possible explanations. First, for these participants, as students, purchasing a laptop can be considered an investment in their academic success. Thus, the monetary investment may be fully justified already to themselves or to others. In addition, it is possible to use a laptop for multiple purposes (academic work, games, and even watching television shows) which support their decisions to a greater extent. This could be the reason why participants revealed very low degrees of experienced regret. Second, the initial search task was to look for a laptop. In this case, purchasing a laptop is maintaining the status quo for their decision path and the experience of regret is successfully reduced (Schweitzer, 1994) compared to the alternative situation in which participants purchased an LCD TV.

Yet another explanation, which is particularly relevant to the current manipulation, comes from the interaction between justification and choice. Based on Table 4.14, the majority of participants indicated they would purchase a laptop over an LCD TV. Since most of the participants justified their decisions to buy a laptop, when they were told to imagine they had bought a LCD TV in the vignette, the final choice in the given vignette is incongruent with what they had provided justifications for. Therefore, this incongruence may have led to a greater degree of regret. These results show that the opportunity to justify one's decision only mitigates experienced regret when the justification is congruent with and aimed at the intended decision. If one has the opportunity to defend an alternative option, but somehow ended up purchasing the other option, justification may also increase the experienced regret. Justification theory (Inman & Zeelenberg, 2007) posits that justification of the decision helps reduce the experienced regret, regardless of action or inaction. The current findings can expand the postulations of justification

theory by providing more finite situations in which pre-justification of a decision may be aggravating.

These results imply that Bettman's meta-goals are interrelated and that the exertion of cognitive effort is beneficial in preventing the experience of negative emotions and maximizing justification of the decision. Although it is agreed that consumers have limited cognitive resources, the current results are not in accordance with the idea that consumers set their goals to conserve cognitive effort at the cost of other meta-goals. Instead, the current study proposes that cognitive effort minimizing will be altered very easily to make adjustments to the three other goals. For example, Luce (1998) found that increases in negative emotions (e.g., due to decision conflict) led to a greater tendency to prolong search. Luce concluded this result was an incongruent finding related to emotional choices but did not mention or discuss the possibility of a trade-off (interaction) between accuracy maximization and cognitive effort minimization. In the current research, we provide an alternative model to show how cognitive effort can be used as a tool to resolve decision conflicts. Figure 4.11 describes the findings from Study 3, and Figure 4.12 shows the overall findings from Studies 1-4.

Figure 4.12 Relationship between Cognitive Effort, Justification, and Regret in Study 4.

PATH 4 shows cognitive effort contributing as justification factor of a decision. PATH 5 replicates the findings from studies 1 and 2. PATH 6 additionally shows that the justification before and after the decision is beneficial in attenuating the post-purchase experienced regret. The accuracy goal is less of an importance to the current studies, thus the findings related to this goal is represented by the dotted lines. The numbers of the paths are congruent with those in Figure 4.1.

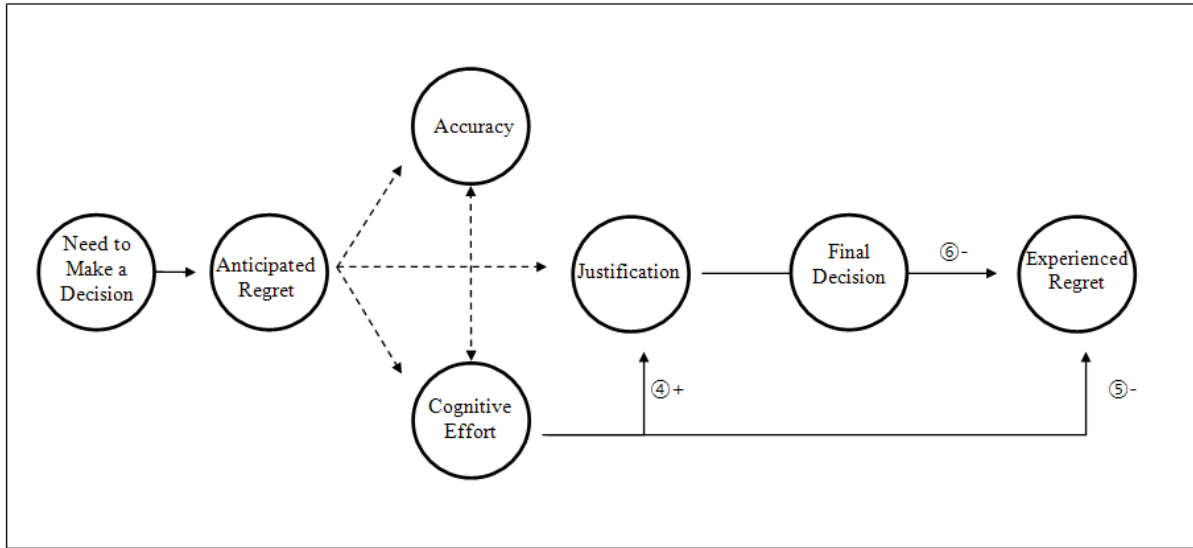
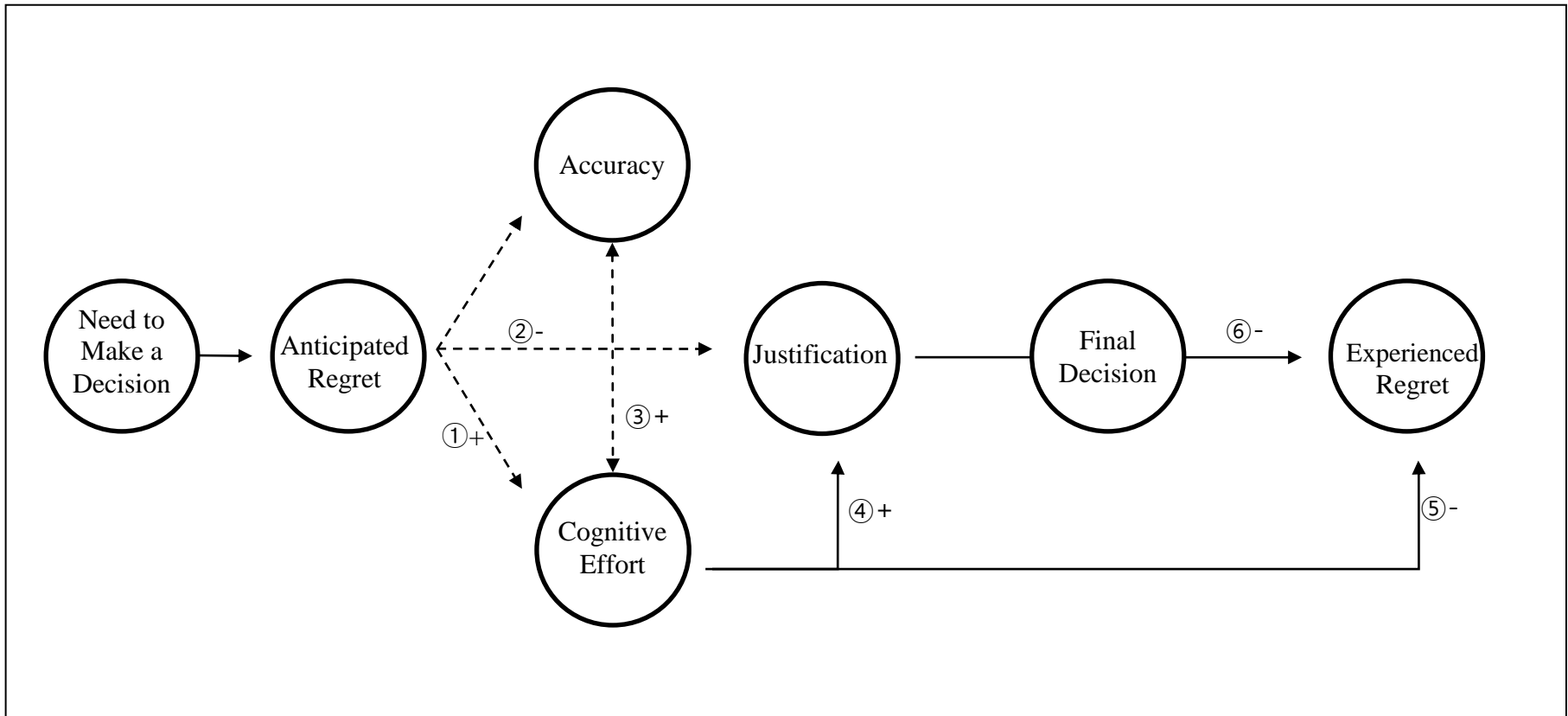


Figure 4.13 Relationship between Meta-goals of Cognitive Effort Minimization, Accuracy Maximization, Regret

Minimization, and Justification Maximization in Current Studies.

All the paths from 1 – 6 are supported except for the PATH2, which predicted the decrease of justification maximization goal at greater anticipation of regret. The accuracy goal is less of an importance to the currents studies; thus, the findings related to this goal are represented by the dotted lines. Since anticipated regret triggers the accuracy-effort trade-off, PATH 1 is also indicated by the dotted line. the numbers of the paths are congruent with those in Figure 4.1. *Note.* “-”and “+” indicate the direction of the bivariate relationships.



Chapter 5 - General discussion

Hypotheses

In the Pilot Study, the effort-accuracy trade-off was probed with the increment of product price. Study 1 examined how people's use of cognitively laden strategies varied across diverse product types in a different price range. In relation to research hypotheses, findings from Study 1 support H1-a: Decisions associated with higher monetary value will involve more frequent use of cognitively demanding decision strategies than decisions associated with lower monetary value.

In Study 2, the influence of cognitive effort on the experienced regret was tested against the research hypotheses. Results from Study 2 showed that decision involving purchasing a laptop, when compared to a pair of jeans, elicited more experienced regret. The two product types hold different monetary values and decisions involving each product differ in terms of importance of the decision. This finding supports H2-a: The degree of experienced regret will be greater when the product under consideration is associated with higher monetary value. In Study 2, spending more time processing the information about the products resulted in attenuation of the experienced regret. This result supports H2-b: The degree of experienced regret will be reduced when greater cognitive effort is invested during the decision process. This relationship is expanded in Study 3 by closely investigating the impact of effort justification which supports H2-c: The degree of experienced regret will be reduced when the invested effort is easily justified, and also partially supports H2-d: The degree of experienced regret will be reduced even when less cognitive effort is invested if such circumstance is justified. The degree of experienced regret was still higher when the decision effort was difficult to justify; however, the justification factors for under spent cognitive effort seemed to help the reduction of the high experienced regret.

In Study 4, willingness to invest more cognitive effort was measured by varying the degree of anticipated regret. It was found that more anticipation of regret resulted in increased willingness to spend more cognitive effort (measured as a dependent variable). Thus, H3-a: The investment of cognitive effort will increase with greater anticipation of regret is also supported. More expenditure in cognitive effort (manipulated as an independent variable) led to ease to justify the current decision (measured as a dependent variable) which supports H3-b: The investment of cognitive effort will increase the ease of justification of the decision. However, the

current study did not find any support for H3-c: The greater anticipation of regret will make the decision difficult to justify. Lastly, the current study did not support for any interactions between anticipated regret and justification of the current decision, and consequently, H3-d. The justification of a decision will reduce the experienced regret after the decision even when greater regret is anticipated during a decision is not supported.

Contributions and findings of current studies

One of the noteworthy contributions of the current study is a re-evaluation of the role of cognitive effort in a decision process. Note that, in Hogarth's (1981) argument, decision making is a continuous process. In this respect, exerted cognitive effort in researching about products may not only be considered as a decision cost that is wasted, but alternatively as an investment that will benefit the next decision task. No one is born with perfect decision making strategies; which is one of the reasons why people go to school to educate themselves and receive more training. Consumer decision making is the same. A child, acting as a consumer, may first attempts to choose a bag of potato chips for her dad's birthday and might think that is the best decision she has ever made. However, as this person grows, she notices there are more important things for her dad and expands her searching skills as well as using her cognitive resources. This process can be thought of as a training session for her to adapt to the subsequent decision tasks, and her decision strategy may change based on the feedback she receives. As it becomes more habitual, she may use a less taxing strategy not because of her limited capacity but because there is no obvious reason for her to waste her limited resources. She can use more cognitively demanding strategies when she judges that the benefits that effort brings in will outweigh the costs she needs to pay.

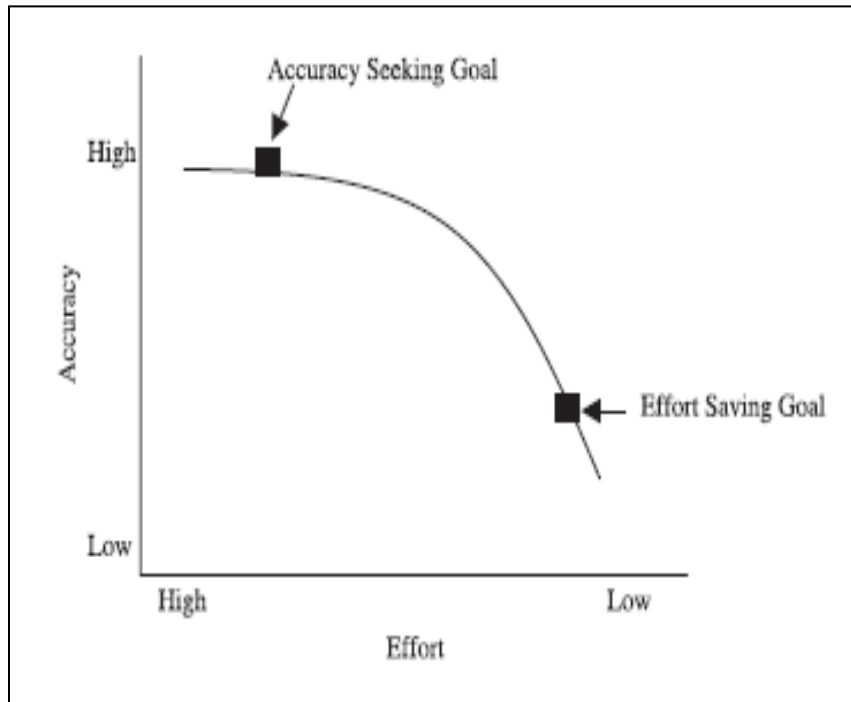
Previous work on consumers' meta-goals explained how decision processes are constructed based on the context (Bettman, 1979; Bettman et al., 1998). The meta-goals model provides an insightful and broad conceptual frame work to understand how consumers' decision process is monitored and constructed. What this model lacks, though, is clear guidelines about how the four meta-goals (accuracy maximization, cognitive effort minimization, negative emotion minimization, and ease of justification maximization) are interrelated.

One aspect of the current research focused on the benefits that exertion of cognitive effort can bring to the decision maker. In the consumer decision making literature it is widely accepted and assumed that cognitive effort is the decision cost that needs to be minimized if at all possible, and over spent cognitive effort has been shown to result in negative evaluation of the product as well as impeding purchase intent (e.g., Botti & McGill, 2006; Dijksterhuis & van Olden, 2006; Iyengar & Lepper, 2000; Mogilner, Rudnick, & Iyengar, 2008; Sagi & Friedland, 2007). Thus, the basis of the tension between cognitive effort minimization and decision accuracy is the inverse linear relationship between these two goals (Figure 5.1).

Conversely, the proposed alternative model assumes interactions between these two goals and the additional meta-goals of justification maximization and negative emotion (particularly regret) minimization. In the current study, increased decision cost (cognitive effort) did not lead to an increase of decision accuracy, which is the premise of the effort-accuracy trade-off. The existing literature on trade-off based choice model does not explain this contradicting situation. However, the current model argues that the accuracy and effort goals are interrelated with the other two meta-goals, and spending more cognitive effort in terms of researching thus helps the decision maker to attenuate their experienced regret even when the effort has no payoff in terms of accuracy.

In the current studies, an attempt was made to lay out an alternative framework for this model, focusing on the construct of regret (as a paradigmatic negative emotion in consumer decision making) and redefining the useful role of cognitive effort as a consumer decision-making resource. Though the current research has focused on the study of consumers as decision makers, the findings can be expanded to other fields such as choosing service goods (e.g., choosing a medical health care provider, or seeking an experimental medical treatment), hedonic goods, or even in organizational behavior (e.g., cognitive effort, entrepreneurship, and regret). In addition, the basic consumer decision-making model can also shed light on research about the role of self-regulation on consumers' choices on hedonic goods (e.g., Ferraro, Shiv, & Bettman, 2005) or the change in self-regulation in relation to cognitive load (e.g., Ward & Mann, 2000).

Figure 5.1 Payne's (1982) Effort-Accuracy Trade-off Model (source: Taken from Kuo et al., 2004, p. 333).



Benefits of Cognitive effort exertion

Findings from some of the current research (Study 1) suggest there are some benefits in expending more cognition during decision making. In particular, we predicted that people will first determine the necessity of exertion of cognitive effort. In other words, people will weigh the importance of their decisions and make trade-offs between the goals of accuracy maximization and cognitive effort minimization, implying that there may be an interrelationship between the two meta-goals. As expected, it was found that people trade-off the need to maximize the decision accuracy with the need to conserve time and cognitive effort depending on the value of the product under consideration (Study 4). Furthermore, it was found that exertion of cognitive effort led to a decreased level of experienced regret. However, certain aspects of the relationship between regret, cognitive effort, and decision justification remain unclear. Some research finds that additional time speculating on decision alternatives (cognitive effort) can decrease the perceived quality of the final option (Wilson & Schooler, 1991, Wilson et al., 1993). However, results from the current study lend support for the benefits of cognitive effort during decision

making tasks. By manipulating the amount of cognitive effort and product type (e.g., laptop vs. a pair of jeans) through regret-inducing vignettes, it was found that more investment of cognitive effort led to an attenuated experience of regret (Study 2), which is congruent with van Dijk et al.'s (1999) finding. In addition, benefit from greater exertion of cognitive effort was stronger when the product was purchased in local stores than on-line. Although not the main interest of the study, this finding poses an intriguing research question for future studies about the possibly different decision strategies used for online shopping and associated emotions.

In Study 3, the relationship between cognitive effort, justification of the effort, and the experience of regret was investigated. As expected, and supported by previous research, a higher degree of regret was experienced when the effort was difficult to justify. However, this effect disappeared when greater cognitive effort was already expended in the decision. This result again supports the idea that consumers' meta-goals are interrelated with each other.

Future studies should include the role of responsibility in this interrelation. The experience of regret lies at the core of the decision process itself because of its relationship with self-perceived responsibility of the decision maker. In previous research, the influence of responsibility on experienced regret was examined by comparing two situations where the decision maker either had or did not have control over a situation that led to an undesirable outcome. It was found that a lack of responsibility about the decision decreased the experience of regret (Park & Yang, 2007). Congruent with previous research (e.g., Zeelenberg et al., 1998), this result implies that consumers may alleviate the experience of regret by allocating responsibility to external factors. However, from another perspective, consumers faced with more important decisions will find it difficult to share responsibility and in turn may find it difficult to regulate the aversive feelings of regret. The current studies can provide some helpful suggestions for this type of situation: findings imply that consumers spending enough cognitive effort (e.g., time, gathering information, and researching), regardless of whether that effort is justified or not, can mitigate their future experienced regret. In a way, invested cognitive effort itself functions as a justification for a decision process and protects oneself from being blamed. Our understanding of the role of responsibility is not clear and was not investigated in the current studies. Clearly, the implications of our understanding of this relationship are far-reaching and important, but require more research to make confident, and highly-applicable claims.

Effort-accuracy trade-off revisited

In order to examine the trade-off between accuracy maximization and cognitive effort minimization in the proposed alternative model, the present research directly measured: (1) tendency to focus on one of the two goals, and (2) the use of more cognitive-effort laden strategies across products in different price ranges. There was a systematic increase in emphasis on the accuracy goal rather than the cognitive effort minimization goal as price increased (e.g., \$50 vs. \$1,500). In addition, it was found that people used more cognitively demanding decision strategies when buying cars or electronics and use more emotionally dependent strategies when buying clothing or groceries (Study 1). This is a direct piece of evidence that shows how consumers will emphasize the accuracy goal to varying degrees in different contexts and are willing to voluntarily exert more cognitive effort for certain decisions. Since each strategy was found to be used to a varying degree depending on the product type, these results imply that the cognitive effort minimization goal interact with the accuracy maximization goal. The precise nature of how effort-accuracy trade-off interacts with the goals of justification maximization and negative emotion minimization should be investigated more closely in the future studies.

The interrelation between the goals of cognitive effort minimization, negative emotion minimization, and justification maximization

Previous studies on anticipation of regret have shown its role as a strong predictor of a final choice. Inducement of anticipated regret result in more conservative and rationality-based decision processes (Janis & Mann, 1977) and increased the tendency for delaying the final decision (Cooke et al., 2001). In the current studies, similar results were found using different product types. Products associated with higher monetary value (e.g., a laptop compared to a pair of jeans) induced more anticipation of regret and people reported being more willing to spend time and cognitive effort in comparing the attributes and making systematic trade-offs (Study 1). It is also possible to induce higher or lower anticipation of regret by using hedonic vs. utilitarian goods. Previous study has shown that people require more justification of their decision when choosing food with high hedonic values (e.g., rich cheesecake) due to higher internal decision conflicts (Okada, 2005). Though it has not been thoroughly examined yet, some of the present research can be expanded to the study of choices involving hedonic goods (e.g., drugs, alcohol,

and high calorie food choice) in relation to anticipation of regret. It is believed this line of research will contribute substantially on understanding consumers' risky choice behaviors and what can be done to facilitate the self-regulatory strategies to make healthier choices.

Another valuable aspect of regret in decision-making is its capability to predict behavioral changes. Previous research on anticipated regret found that the expectation of feedback on foregone outcomes influences decision making and can either promote more risk-seeking behavior (Bell, 1982) or reduce risky behaviors (Richard et al., 1996; Zeelenberg & Beattie, 1997). In Study 4, the influence of increased anticipated regret on willingness to spend more cognitive effort and on final choice was examined. The results confirmed that an increase in anticipated regret resulted in increased exertion of cognitive effort and thereby the actual experience of regret is thought to be attenuated. Study 4 showed that people are more willing to spend time in their search (i.e., cognitive effort) when they were anticipating a higher degree of regret. This finding suggests an effective prevention strategy for consumers: If consumers acknowledge how cognitive effort invested in decision processes can be beneficial, they can apply this finding to avoid future regret and may even increase self-efficacy in their decision making (Feeney et al., 2005).

In addition, Study 4 found that even post-purchase justification is beneficial to reduce experienced regret, as postulated by prior research (e.g., Inman & Zeelenberg, 2002). On the other hand, the current findings provide evidence for when purchase justification can be detrimental for consumers and instead make them feel worse (experience a greater degree of regret). This was only true, however, when the actual decision was incongruent with consumers' initial decision and thus diverting from the status quo. The current findings can expand understanding of Justification Theory (Inman & Zeelenberg, 2002) by providing a more precise situation in which pre-justification of a decision may be aggravating, and how it may interact with the inaction effect shown in the regret literature (e.g., Kahneman, 1995). This finding carries a practical message for marketers and advertisers. When consumers are given time to process information about a product, they think they have invested enough cognitive effort into the decision and consequently experience less regret. In addition, when they are given a chance to provide reasons (i.e., justify) for their decisions, they are less likely to feel regret about any missed opportunities. This may imply that consumers will feel greater satisfaction about the chosen option in this situation. This implication suggests the need for further investigation.

Marketers, competing with the other companies, might benefit from providing consumers with information to choose their products and not the opponents'. At the same time, marketers might benefit from letting consumers actively research and compare products freely without pressure, to reduce any regret about the foregone options (i.e., the opponent's product).

Limitations and future directions

There are a couple of limitations associated with the current model. One limitation is a lack of control of preexisting knowledge about the products. The current study assumed that all consumers had about the same level of preexisting knowledge about the products in question. However, research has shown that experts use decision cues and strategies which help them surpass their cognitive limitations (Shanteau, 1988), and more experienced web users used less cognitive effort than less experienced people to reach the same accuracy level (Kuo et al., 2004). Thus, it will be important to address this issue in future studies.

A second limitation comes from the current selection of products. Based on pilot testing from potential participants, a laptop and a pair of jeans were chosen as the target products for the current series of studies. These two product types are meaningful in this study because they involve the use of different levels of the effort-demanding strategy, and are in very different price ranges. However, the two product types do not share in their functions, thus making it difficult to directly compare these two conditions in some respects. To remedy this issue, a laptop computer and LCD TV were chosen as target products in further studies, one representing utilitarian goods and the other hedonic goods. The results from qualitative data, however, suggest that some participants assumed that laptops have hedonic values as well (e.g., *I can watch movies on my laptop*), even though it was mainly considered a utilitarian good. Thus, for future studies, a more specific cover story to prevent such potential complication is recommended. As an alternative method to overcome this shortcoming, future studies can use a product which has a higher hedonic value for the sample population (e.g., game tools such as Xbox or Playstation).

A third limitation has to do with the need for an alternative method to measure the goal of accuracy maximization in the current alternative meta-goals model. The current studies avoided using weighted additive model as a way of measuring the accuracy goal (see rationale and discussion in previous chapters). Rather, in the current study, accuracy of a decision is

defined as choosing the option that yields the highest overall quality of a decision. In addition, the assessment of (a) use of exhaustive search (Study 1), (b) confidence in one's decision (Studies 2 & 3), and (c) satisfaction in one's decision (Study 4) have been suggested as alternative measures of choice accuracy. Although these alternative methods do not share the same definition of the accuracy used in some past consumer research (e.g., Bettman et al., 1998), the proposal of alternative methods to measure overall quality of a decision seems appropriate considering that the accuracy of a decision reflects the degree of finding the best product for the consumers. There has not been much research that attempts to assess decision accuracy in this manner, and more systematic validation is needed for this process. It would be ideal if further studies can provide an alternative definition for accuracy of a decision and provide empirical data to support the argument. Unfortunately, this was beyond the scope of the current studies, which did not investigate the concept of accuracy in depth. This important conceptual issue, however, should be followed up in future studies to further clarify our understanding of consumers' decision processes related to the meta-goals.

A fourth limitation is that the current studies only examined one negative emotion (i.e., regret). Further studies can include additional negative emotions beyond regret. Previous research (e.g., Yi & Baumgartner, 2004; Zeelenberg & Peiters, 2007; Zeelenberg et al., 1998b, 1998c) has noted that regret is different from other negative emotions (e.g., disappointment, dissatisfaction) and therefore it is possible to find different effects of cognitive effort by using other negative emotions. However, in terms of consumer decision making processes, and especially in relation to cognitive effort and justification, regret was believed to be the best candidate to test the current hypotheses.

The current study used a 10% discount rate to induce regret for Studies 2 and 3. It is possible that 10% may not be big enough difference to generate a large effect (e.g., difference in the degree of regret) in the results. This should definitely be explored in future studies. The author has collected additional data to find the effects of 10%, 15%, 20%, and 25% discount rates on experienced regret. The result supported the linear trend for the four difference discount rate. The mean experienced regret increased with the discount rate; however, the increase between 15% and 20% was greater than that between 20% and 25%. Thus, there is some support for the idea that a 20% discount rate may be used to induce regret with greater effect.

The current alternative meta-goals based choice model attempted to provide a psychological model of consumer decision process. Psychological processes involve how people think, make judgments, how they react (behaviorally) to the environment, and how they feel. The current model describes how mental effort, such as cognitive effort and justification, for a decision influences the psychological experience of the emotion of regret. This model explains how consumers interact with the decision environment, and shows the interactions among these variables. The alternative meta-goals model proposed in the current studies is also considered as describing a psychological process because of its potential to predict consumers' choice behaviors as each component in this model interacts with the decision environment.

However, the current proposed model may also be a description of a choice process and considered a decision flow chart. The current model does not explain or predicts the psychological judgment processes that measure people's behavior based on their subjective values and thought processes. This important limitation cannot be readily addressed. Therefore, it is recommended that future studies on consumer behavior involve in depth investigation of psychological processes that underlie consumers decision making.

Lastly, like any other vignette-based studies, there are limitations due to using vignette-based decision making studies rather than real decisions involving payments. This might be the cause of relatively small effect sizes reported in a few of the studies. The studies based on mock consumers or decision vignettes have been criticized by many researchers because participants' reactions to decision vignettes may be significantly different from their choices and responses in the 'real' decision situations. For example, in the pilot study, several participants indicated that they will spend more time researching about the laptops in their real life despite the fact they noted that the 10-minute search task was long enough for them in the lab. This implies the degree of participants' experienced regret after exertion of high vs. low cognitive effort in real life may also be different from the current findings based on their self-reported measures. Thus, to overcome this limitation, Study 4 used a real webpage to create an authentic search task, final choice (though participants did not purchase the chosen item), and decision making environment as real consumers. In addition, the product of choice was tailored to the current sample population, who were college students. In the future, to make the decision task even more ecologically valid it is recommended to have participants 'experience' the chosen options, as this is what they do as real consumers.

In the current research, an attempt was made to redefine the role of cognitive effort as a tool for consumers. This research also expanded study on the role of regret in relation to self-regulation. In the future, it is proposed to study changes in self-regulation, with variation in the degree of exerted cognitive effort. In addition, to speculate consumers' choice behaviors as a more continuous process, a multi-session study might be needed. In the current study (Study 4), it was attempted to measure the influence of anticipated regret, cognitive effort, and justification on the final decision and on the experienced regret in a continuous process. Despite the effort, this attempt was only partially successful. In Study 4, participants had to engage in a search task online to find an option (laptop) they would want to purchase. Also, participants were asked to provide reasons to support their choices, and this decision task occurred in a continuous process. However, to manipulate the experienced regret, participants were forced to imagine regretful situations created by the experimenter. The experienced regret was, therefore, not measured in a continuous process. To remedy this shortcoming, implementation of a multi-session study might disentangle the complication of the current design of Study 4. Through this line of research, it is believed that we can study consumers' decision and choices in respect to how they anticipate negative emotions, change in decision strategies accordingly, and react to the feedback they receive.

Concluding remark

Consumers are faced with many decisions on a daily basis and along with those decisions come a diverse array of emotions. In the modern era, consumers' decision environment is changing faster than ever, and each choice is becoming more and more complex. For example, a consumer looking for a bottle of shampoo is sometimes faced with more options to choose from than needed: 'Shall I buy it online or in a store?', 'Which brand should I choose from?', and 'What are the specific functions I am looking for?', or 'What scent shall I pick?' Seeking out additional information and using more cognitive resources does not always result in the best product choice, due to uncertainties of the choice outcome. Consequently, the experience of regret is unavoidable in many cases. What might be useful in this type of situation is to find a decision mechanism that helps consumers to be more preventative about their future regret. This current research suggests that consumers are less likely to experience post-purchase regret when

they put forth a sufficient amount of cognitive effort into the decision. If their decision effort is low, consumers may need to justify for the under spent cognitive effort in order to reduce post-purchase regret. Consumers also often find themselves diverting from their initial purchase task and debating whether or not to make an unplanned purchase which is on limited time offer. Findings from current research indicate that consumers are less likely to experience regret when they stay with their initial search task (status quo), especially when they have already expended a great amount of cognitive effort (e.g., searching for an option), and they have strong reasons for the decision. If consumers decide to divert from their initial task and make an unplanned purchase, consumer who spent only scarce cognitive effort on the decision, and did not think about the reasons why they needed the initial product in the first place, are less likely to experience regret.

In the context of this complicated consumer decision environment, it is implausible to have an exhaustive choice model that explains everything. Admitting this, the current studies expand upon the useful alternative conception of a *meta-goal based choice model*, suggesting that there are several key interrelations between these meta-goals, re-evaluating the benefits of cognitive effort, and assessing the role of anticipated regret and experienced regret in relation to other goals.

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Appendix A - Pilot Study

A.1 Measure of direct trade-offs between the goals of cognitive effort minimization and accuracy maximization (Pilot Study).

For most people, some decisions are more important than others. When it is considered important, consumers sometimes use decision strategies that will bring them the best results. For example, suppose a consumers who is about to purchase a new laptop. We may consider all the attributes of a laptop, such as price, warranty, memory system, size of the hard drive, operating system, design, weight etc. We may also compare all different models of laptop, such as Dell, Sony, HP, APPLE etc. Using this type of decision strategy is likely to lead to the best and most accurate decision. However, this strategy also takes a lot of time and effort. At other times, consumers would rather find a way to save time and effort for a decision.

Instructions: The following questions are being asked to help us understand how consumers make decisions. Please read each question and answer by placing a circle around the number of the scale.

On all of the scales below, the scales increase from left to right, such that 1 always equals most emphasis on the “Need to make the best and most accurate decision” and 11 always equals most emphasis on the “Need to save time and cognitive effort”.

(NOTE: Questions from 1.1 – 1.15 were randomized and appeared on a computer screen)

Response scale

1-----2-----3-----4-----5-----6-----7-----8-----9-----10-----11
Need for accuracy Neutral Need to save
time and effort

1.1. Suppose you are making a decision to purchase an electronic product worth \$20. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.2. Suppose you are making a decision to purchase an electronic product worth \$40. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.3. Suppose you are making a decision to purchase an electronic product worth \$60. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.4. Suppose you are making a decision to purchase an electronic product worth \$80. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.5. Suppose you are making a decision to purchase an electronic product worth \$100. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.6. Suppose you are making a decision to purchase an electronic product worth \$120. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.7. Suppose you are making a decision to purchase an electronic product worth \$140. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.8. Suppose you are making a decision to purchase an electronic product worth \$160. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.9. Suppose you are making a decision to purchase an electronic product worth \$180. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.10. Suppose you are making a decision to purchase an electronic product worth \$200. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.11. Suppose you are making a decision to purchase an electronic product worth \$400. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.12. Suppose you are making a decision to purchase an electronic product worth \$600. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.13. Suppose you are making a decision to purchase an electronic product worth \$800. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.14. Suppose you are making a decision to purchase an electronic product worth \$1,000. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

1.15. Suppose you are making a decision to purchase an electronic product worth \$2,000. Which of the following two goals will you focus more on? If you had a scale where you could show the importance of each goal, where would you place it?

Appendix B - Study 1

Instructions. The following statements describe your *general opinions* about your decision-making. Please be honest in your response.

1.1 When purchasing electronics, _____, _____, _____, _____, _____ are the five most important purchase factors (in order) that I consider.

1.2 When purchasing clothing, _____, _____, _____, _____, _____ are the five most important purchase factors (in order) that I consider.

1.3 When purchasing groceries, _____, _____, _____, _____, _____ are the five most important purchase factors (in order) that I consider.

1.4 When purchasing a car, _____, _____, _____, _____, _____ are the five most important purchase factors (in order) that I consider.

1.5 When purchasing personal hygiene products, _____, _____, _____, _____, _____ are the five most important purchase factors (in order) that I consider.

II. The following statements describe your *general behaviors* about your decision-making.

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree	Very Strongly Agree

NOTE: The order of following questions was randomized

2.1	When buying cars, I consider all five purchasing factors I listed above.	1	2	3	4	5	6	7
2.2	When buying electronics, I consider all five purchasing factors I listed above.	1	2	3	4	5	6	7
2.3	When buying clothing, I consider all five purchasing factors I listed above.	1	2	3	4	5	6	7
2.4	When buying groceries, I consider all five purchasing factors I listed above.	1	2	3	4	5	6	7
2.5	When buying personal hygiene products, I consider all five purchasing factors I listed above.	1	2	3	4	5	6	7
2.6	When buying cars, I use rule-of-thumb more than systematic comparisons between the purchasing factors.	1	2	3	4	5	6	7
2.7	When buying electronics, I use rule-of-thumb more than systematic comparisons between the purchasing factors.	1	2	3	4	5	6	7
2.8	When buying clothing, I use rule-of-thumb more than systematic comparisons between the purchasing factors.	1	2	3	4	5	6	7
2.9	When buying groceries, I use rule-of-thumb more than systematic comparisons between the purchasing factors.	1	2	3	4	5	6	7
2.10	When buying personal hygiene products, I use rule-of-thumb more than systematic comparisons between the purchasing factors.	1	2	3	4	5	6	7
2.11	When buying cars, I use strategies that depend on my feelings.	1	2	3	4	5	6	7
2.12	When buying electronics, I use strategies that depend on my feelings.	1	2	3	4	5	6	7

2.13	When buying clothing, I use strategies that depend on my feelings.	1	2	3	4	5	6	7
2.14	When buying groceries, I use strategies that depend on my feelings.	1	2	3	4	5	6	7
2.15	When buying personal hygiene products, I use strategies that depend on my feelings.	1	2	3	4	5	6	7

III. Demographic Information

3.1 Age _____ 3.2 Gender _____

3.3 How often do you shop on-line?

1) once or twice a year 2) more than three times a year 3) once or twice a month 4) I've never shopped on-line

3.4 What are the few reasons you prefer to/ not to shop on-line?

3.5 What products are you willing to purchase (or have you purchased) on-line? Why?

3.6 What products are you reluctant to buy (or will you never buy) on-line? Why?

Appendix C - Vignettes and questions for Study 2

NOTE: All the vignettes and questions were present on a computer screen

C-1. Purchasing a laptop, in a store (online), after high exertion of cognitive effort

Recently your computer broke down and you decided to buy a new laptop. Soon after, you stopped by an electronics store (*visited an on-line electronic store*) and started looking for the models you like. You walked around the store (*searched the web*) and read the descriptions of each model. One model had a 4GB DDR3 memory system, hard drive size of 500GB, and the latest operating system. It also came with a DVD/CD reader-writer drive with double-layer support, built-in camera, and a 1-year warranty for the computer parts and it cost \$899.99. The other model had a 3GB DDR3 memory system, hard drive size of 320GB, and also had the latest operating system. It came with a DVD/CD reader-writer drive, 1-year warranty for the computer parts, but did not have a built-in camera and cost \$645.99. In the store, you spent a few hours researching and gathering information about your options, talking to a product manager who seemed very knowledgeable. And you finally decided which laptop will best suit you. You finally decided on which laptop to purchase. Even though you did not have a chance to compare the price in on-line stores (*local stores*), you bought the laptop and were satisfied with it.

Two weeks later, you visited the website of the store (*local store*) and found out that the same kind of laptop you purchased was on sale with an extra 10% discount.

NOTE: This scale was provided at the end of all the vignettes in Study2.

Instructions: Please read each question and answer by placing choosing a number of the scale.

1	2	3	4	5	6	7
Disagree Very Strongly	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree	Agree Very Strongly

1. Considering the situation, I am confident that I made the right decision.	1	2	3	4	5	6	7
2. If I could go back to the situation, I would not make the same decision.	1	2	3	4	5	6	7
3. Considering the situation, I regret my decision.	1	2	3	4	5	6	7
4. When I buy a laptop, I use the rule-of-thumb more often than systematic comparisons between attributes.	1	2	3	4	5	6	7
5. I would spend as much time as I need to compare the options before making a final decision.	1	2	3	4	5	6	7
6. I am satisfied with my decision.	1	2	3	4	5	6	7

C-2. Purchasing a pair of jeans, in a store (online), after high exertion of cognitive effort

Recently you lost your favorite pair of jeans and decided to buy a new pair. Shortly after, you stopped by a store in the mall (*online store*) and started looking for the pairs you liked. You walked around the store and started comparing the jeans and tried them on. You also asked for the product manager’s opinion who seemed very knowledgeable. In the store, you spent several hours trying on the jeans, checking the wash, color, and design of various jeans (*You looked into detailed images of the jeans to check the price, fit, pocket design, rise, wash, color, and design of various jeans. For more information, you read descriptions of each model and the guidelines on the website on purchasing jeans. You also read the comments from other purchasers who seemed*

very knowledgeable). Finally you found a pair of jeans that fit just right and decided to purchase them. Even though you did not have a chance to compare the price in on-line stores (*local stores*), you bought the jeans and were satisfied with them.

Two weeks later, you visited the website of the store (*online*) and found out the same kind of jeans were on sale with an extra 10% discount.

C-3. Purchasing a laptop, in a store (online), after low exertion of cognitive effort

Recently your computer broke down and you decided to buy a new laptop. Shortly after, you stopped by an electronics store (*visited an on-line electronic store*) and immediately walked up to the brand that you liked. Not really spending much time researching the laptops and without comparing the properties of each option, you decided on which laptop you wanted to purchase. Even though you did not have a chance to compare the price in on-line stores (*a local store*), you bought the laptop and were satisfied with it.

Two weeks later, you visited the website of the store (*a local store*) and found out that the same kind of laptop you purchased was on sale with an extra 10% discount.

C-4. Purchasing a pair of jeans, in a store (online), after low exertion of cognitive effort

Recently, you lost your favorite pair of jeans and decided buy a new pair. Shortly after, you stopped by a store in the mall (*searched the web*) and walked up to the brand that you liked. Not spending much time neither comparing the jeans nor trying them on (*neither comparing the jeans nor reviewing the pictures or images of various jeans*), you decided on which pair you wanted to purchase. Even though you did not have a chance to compare the price in on-line stores (*a local store*), you bought the jeans and were satisfied with them.

Two weeks later, you visited the website of the store (*a local store*) and found out the same kind of jeans were on sale with an extra 10% discount.

Appendix D - Vignettes and questions for Study 3

NOTE: All the vignettes and questions were present on a computer screen

D-1. High cognitive effort when the effort level is difficult to justify

Recently your computer broke down and you decided to buy a new laptop. Soon after, you stopped by an electronics store and started looking for the models you like. Since this is not the first time purchasing a laptop by yourself, you have a pretty good idea of which laptop will be the best option for you. You walked around the store and read the descriptions of each model. One model had a 4GB DDR3 memory system, hard drive size of 500GB, and the latest operating system. It also came with a DVD/CD reader-writer drive with double-layer support, built-in camera, and a 1-year warranty for the computer parts and it cost \$899.99. The other model had a 3GB DDR3 memory system, hard drive size of 320GB, and also had the latest operating system. It came with a DVD/CD reader-writer drive, 1-year warranty for the computer parts, but did not have a built-in camera and cost \$645.99. You also talked to the product manager who seemed very knowledgeable and was able to answer your questions in detail even though you already knew the answer for them.

In the store, you spent quite some time researching and gathering information about your options and finally, you decided on which laptop to purchase. Even though you put quite some time and effort in this shopping, your final choice was what you had in mind when you walked into the store.

After a week, you visited the website of the store and found out there was a 10% off coupon for the same kind of laptop you purchased in the store.

NOTE: This scale was provided at the end of all the vignettes in Study3.

Instructions: Please read each question and answer by choosing a number of the scale.

1	2	3	4	5	6	7
Disagree			Neither			Agree
Very	Strongly	Disagree	Disagree	Agree	Strongly	Very
Strongly	Disagree		nor Agree		Agree	Strongly

1. Considering the situation, I am confident that I made the right decision.	1	2	3	4	5	6	7
2. If I could go back to the situation, I would make the same decision.	1	2	3	4	5	6	7
3. Considering the situation, I regret my decision.	1	2	3	4	5	6	7
4. Considering the situation, the time and effort I put in for this decision was enough.	1	2	3	4	5	6	7
5. In general, I enjoy searching options for laptops.	1	2	3	4	5	6	7
6. Considering the situation, the effort I put in for this decision was necessary.	1	2	3	4	5	6	7

D-2. High cognitive effort when the effort level is easy to justify

Recently your computer broke down and you decided to buy a new laptop. Soon after, you stopped by an electronics store and started looking for the models you like. Since this was the first time purchasing a laptop by yourself, you are not certain which laptop will be the best option for you. You walked around the store and read the descriptions of each model.

One model had a 4GB DDR3 memory system, hard drive size of 500GB, and the latest operating system. It also came with a DVD/CD reader-writer drive with double-layer support, built-in camera, and a 1-year warranty for the computer parts and it cost \$899.99. The other model had a 3GB DDR3 memory system, hard drive size of 320GB, and also had the latest operating system. It came with a DVD/CD reader-writer drive, 1-year warranty for the computer parts, but did not have a built-in camera and cost \$645.99. You also talked to the product manager who seemed very knowledgeable.

In the store, you spent quite some time researching and gathering information about your options but you were not still certain what to choose between the two models. Finally, you decided on which laptop to purchase. Since this was your first time purchasing a laptop, you thought this effort was necessary for this decision.

After a week, you visited the website of the store and found out there was a 10% off coupon for the same kind of laptop you purchased.

D-3. Low cognitive effort when the effort level is easy to justify

Recently your computer broke down and you decided to buy a new laptop. Soon after, you stopped by an electronics store and immediately walked up to the brand that you liked. Since this is not the first time purchasing a laptop by yourself, you have a pretty good idea of which laptop will be the best option for you. Not really spending much time researching the laptops and without comparing the properties of each option, you decided on which laptop you wanted to purchase. Your final choice was what you had in mind when you walked into the store.

After a week, you visited the website of the store and found out there was a 10% off coupon for the same kind of laptop you purchased.

D-4. Low cognitive effort when the effort level is difficult to justify

Recently your computer broke down and you decided to buy a new laptop. Soon after, you stopped by an electronics store and immediately walked up to the brand that you liked. Since this was the first time purchasing a laptop by yourself, you are not certain which laptop will be the best option for you. However, you did not really feel like spending much time researching the laptops. Not really reading the descriptions of each laptop nor comparing the properties of each option, you decided on which laptop you wanted to purchase. Since this is your first time purchasing a laptop, you are not certain if this is the right model for you.

After a week, you visited the website of the store and found out there was a 10% off coupon for the same kind of laptop you purchased.

Appendix E - Cover Stories and Questions for Study 4

NOTE: All the cover stories and questions were present on a computer screen

You will be provided with various decision making situations. After reading each vignette, please select the response that indicates the extent to which you agree or disagree with each statement.

Instruction1. Imagine that you have a part time job that pays approximately \$750 a month after taxes. You typically categorize your discretionary expenses under the following broad headings: food, clothing, entertainment, and emergency expenses. Your rent and school supplies are being paid through your student loan.

1.1 In general, how much will you be willing to spend on a laptop?

I will be willing to spend \$_____ for a laptop.

1.2 In general, how much will you be willing to spend on a LCD TV?

I will be willing to spend \$_____ for a LCD TV.

Instruction2. Suppose the following situation. As a student, you use a laptop on regular basis for various reasons (e.g., doing homework, research, work, e-communication, shopping, playing games, watching movies, listening to music etc). Recently your computer broke down so you decided to check out a new laptop. You have slowly realized over the past year that there is so much you can do with your laptop. You believe that you can do a major part of your work from your laptop and be productive. You also know you can use your laptop for diverse entertainment purposes. So you have decided to spend around \$1,000 and buy a premium laptop. To find a new laptop that fits your purpose, you checked out a website of an electronics store and started to read the description of each model.

At this time, you will be given 8 (2 in the *low cognitive effort condition*) minutes to review the laptops on a website. Please read and study the specifications of each model carefully so you can choose the model that best fits your need. Compare each model and fill out the information for the top three models of your choice. At the end of the study you will be asked to indicate the laptop of your choice. Remember, you are looking for a laptop that is worth about \$1,000.

2.1 For this decision, you have reviewed the products for 8 (2) minutes. Considering the situation, how much effort do you think is invested in this decision?

2.2 Considering the situation, the effort I put in for decision was enough.

Instruction3. While you are still trying to decide on which model of laptop will be best for you, suppose you ran across a LCD TV you have always wanted. This LCD TV was on sale (10%) which also can be purchased for \$1,000. You know that you need a new laptop but cannot let go of this great opportunity of getting the LCD TV you have always wanted.

Instruction4. Please select the response that indicates the extent to which you agree or disagree with each statement. On all of the following scales, the scales increase from top to bottom (on the computer screen), such that 1 always equals the lowest amount and 9 always equals the highest amount. Remember, you are in the process of searching for a laptop that is worth about \$1,000 and came across a LCD TV on sale.

1	2	3	4	5	6	7	8	9
Not at all				Neutral				Very Much

- 4.1 Considering the situation, how responsible are you for this decision?
- 4.2 Considering the situation, how likely are you to spend more time researching about your options (i.e., learning about the specifications)?
- 4.3 Considering the situation, how likely are you to talk to more people before making the final decision?
- 4.4 Considering the situation, how likely are you to visit more websites to compare the products before making the final decision?
- 4.5 Considering the situation, how much regret do you anticipate about making a bad decision?
- 4.6 Considering the situation, how likely are you to read more reviews of the products before making the final decision?
- 4.7 Considering the situation, how worried are you about making a bad decision?
- 4.8 Considering the situation, how likely are you to postpone your final decision?
- 4.9 In general, how easily do you experience regret?
- 4.10 Considering the situation, how much do you feel the need to justify your current decision?
- 4.11 Considering the situation, how easily can you justify your decision?
- 4.12 Considering the situation, which of the two products (laptop vs. LCD TV) will you choose? Please 1) indicate your answer in the first line and 2) briefly defend your decision with 3 strong supporting reasons in the following separate lines (*The last question is only for the Justification opportunity present condition*).

Instruction5.1 In the earlier part of the study, you had the opportunity to search laptops online.

5.1 During the search, which model was your final choice?

5.2 How satisfied are you with your decision?

Instruction6. Now suppose you have purchased the new LCD TV instead of what you had planned to purchase, a laptop. Two weeks after your purchase of the new TV, you are having trouble because you don't have a good, working laptop. For example, you have to wait for a vacant spot in the library to work on your projects; or you lost all of your unsaved work from the library computer.

Response scale

1	2	3	4	5	6	7	8	9
Very								Very
Strongly				Neutral				Strongly
Disagree								Agree

6.1 Considering the situation, I regret my decision to purchase the LCD TV.

6.2 If I could go back to the situation, I would probably make the same decision.

6.3 Considering the situation, I should have purchased the laptop.

Instruction7. Now suppose you have purchased the new laptop instead of the LCD TV you have always wanted. Two weeks after your purchase of the new laptop, you revisited the website and saw the same model of LCD TV was no longer on sale. Your friend who purchased the LCD TV on sale is having a great experience with the new TV. You wonder how much you could have enjoyed a new LCD TV.

Response scale

1	2	3	4	5	6	7	8	9
Disagree								Agree
Very				Neutral				Very
Strongly								Strongly

7.1 Considering the situation, I regret my decision to purchase the laptop.

7.2 If I could go back to the situation, I would probably make the same decision.

7.3 Considering the situation, I should have purchased the LCD TV.

Instruction8. Suppose following situation. Recently your computer broke down so you decided to buy a new laptop. You do not want to buy a very expensive laptop but rather want to buy a basic model mainly for your school work. So you have decided to spend around \$300 on your new laptop. You checked out a website of an electronics store and started to read the description of each model.

At this time, you will be given 8 (*2 for low cognitive effort condition*) minutes to review the laptops on a website. Please read and study the specifications of each model carefully so you can choose the model that best fits your need. Compare each model and fill out the information for the top three models of your choice. At the end of the study you will be asked to indicate the laptop of your choice. Remember, you are looking for a laptop that is worth about \$300.

8.1 For this decision, you have reviewed the products for 8 minutes. Considering the situation, how much effort do you think is invested in this decision?

8.2 Considering the situation, the effort I put in for decision was enough.

While you are still trying to decide on which model of laptop will be best for you, suppose you ran across a LCD TV you have always wanted. This LCD TV was on sale (10%) which also can be purchased for \$300. You know that you need a laptop but cannot let go of this great opportunity of getting the LCD TV you have always wanted.

Instruction9. Please select the response that indicates the extent to which you agree or disagree with each statement. On all of the following scales, the scales increase from top to bottom, such that 1 always equals the lowest amount and 9 always equals the highest amount. Remember, you

are in the process of purchasing a laptop that is worth about \$300 and came across a LCD TV that is on sale.

Response scale

1	2	3	4	5	6	7	8	9
Not at all		Neutral					Very Much	

9.1 Considering the situation, how responsible are you for this decision?

9.2 Considering the situation, how likely are you to spend more time researching about your options (i.e., learning about the specifications)?

9.3 Considering the situation, how likely are you to talk to more people before making the final decision?

9.4 Considering the situation, how likely are you to visit more websites to compare the products before making the final decision?

9.5 Considering the situation, how much regret do you anticipate about making a bad decision?

9.6 Considering the situation, how likely are you to read more reviews of the products before making the final decision?

9.7 Considering the situation, how worried are you about making a bad decision?

9.8 Considering the situation, how likely are you to postpone your final decision?

9.9 In general, how easily do you experience regret?

9.10 Considering the situation, how much do you feel the need to justify your current decision?

9.11 Considering the situation, how easily can you justify your decision?

10.1 Considering the situation, which of the two products (laptop vs. LCD TV) will you choose? Please 1) indicate your answer in the first line and 2) briefly defend your decision with 3 strong supporting reasons in the following separate lines (*The last question is only for the Justification opportunity present condition*).

10.2 In the earlier part of the study, you had the opportunity to search laptops online. During the search, which model was your final choice?

10.3 How satisfied are you with your decision?

Instruction 11. Now suppose you have purchased the new LCD TV instead of a laptop. Two weeks after your purchase of the new TV, you are having trouble because you don't have a working laptop.

Response scale

1	2	3	4	5	6	7	8	9
Disagree								Agree
Very				Neutral				Very
Strongly								Strongly

11.1 Considering the situation, I regret my decision to purchase the TV.

11.2 If I could go back to the situation, I would probably make the same decision.

11.3 Considering the situation, I should have bought the laptop.

Instruction 12. Now suppose you have purchased the new laptop instead of the LCD TV you have wanted. Two weeks after your purchase of the new laptop, you revisited the website and saw the same model of LCD TV was no longer on sale. You wonder how much you could have enjoyed a new TV.

Response scale

1	2	3	4	5	6	7	8	9
Disagree								Agree
Very				Neutral				Very
Strongly								Strongly

12.1 Considering the situation, I regret my decision to purchase the laptop.

12.2 If I could go back to the situation, I would probably make the same decision.

12.3 Considering the situation, I should have bought the TV.

Appendix F - Glossary

Accuracy: In the original Bettman et al.'s (1998) model, the accuracy of a decision is the extent to which the weighted additive model is used. However, in the current studies, accuracy is defined as choosing the option that yields the highest overall quality of a decision.

Cognitive dissonance theory: A theory that predicts that respondents make a retrospective justification of the effort they put into attaining a goal and evaluate the result more positively.

Cognitive effort: The amount of time and resources used to gather information about the decision.

Counterfactual: A thought that is contrary to the facts or the thoughts involving alternative versions of the past (Roese, 1997, p. 133).

Decision complexity: The degree to which a decision involves a number of options and attributes for each option.

Downward counterfactual thinking: Counterfactuals that posit alternative circumstances that are evaluatively worse than actuality (Roese, 1997, p. 134).

Ecological validity: Ecological validity is a type of external validity which looks at the testing environment and determines how much it influences behavior.

Gestalt-driven decision process: A decision process that is based on a holistic process that justifies decision makers' choice rather than based on an attribute-level comparison (Inman, 2007, p. 19).

Intransitivity: A fundamental premise of normative decision process. If a person prefers option A over option B, the same person cannot prefer option B over option A simultaneously. Thus, unless the expected value or the utility of an option changes, a person's choice preference order should remain irreversible.

Justification: The act of providing reasons for decision makers' choices.

Negative emotion: In the original Bettman et al. (1998) model, negative emotion is an entity that arises from making difficult trade-offs between emotion-laden choices (see Emotion-laden choices). In the current study, negative emotion is defined more broadly as negative affect such as disappointment, dissatisfaction, anger, and regret etc.

Regret: What we experience when realizing or imagining that our present situation would have been better, had we decided differently (Zeelenberg, 1999, p.94) or a "painful judgment and the

state of feeling sorry for misfortunes, limitations, losses, shortcomings, transgressions, or mistakes” (Landman, 1993, p. 4).

Upward counterfactual thinking: Counterfactuals that posit alternative circumstances that are evaluatively better than actuality (Roese, 1997, p. 134).