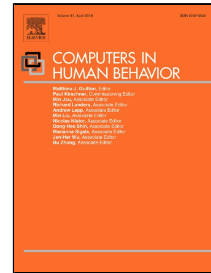


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Abstract

Decision justification provides assurance and reduces negative post-decision emotions, while simultaneously expends decision costs (i.e., cognitive effort). The current paper investigated the function of justification and cognitive effort related to regret, specifically in the online shopping context in two studies. In Study 1, 112 participants reviewed vignettes in a 2 x 2 within-subjects design involving cognitive effort (high versus low) and justification of action (easy versus difficulty), and reported the regret level when their purchase decision yielded subpar consequences. As expected, high cognitive effort and easy justification reduced regret. However, the effect of justification on regret was moderated by cognitive effort. In Study 2, 178 participants were randomly assigned to conditions in a 2 x 2 between-subjects design involving cognitive effort (high versus low) and decision justification (waste versus control). Participants followed a cover story and shopped for a laptop online; then they rated the regret level had they made an unplanned purchase. Results confirmed the hypothesis; regret was greater when justification was wasted. However, wasted justification only worsened regret when more cognitive effort was exerted. The current studies shed light on understanding an intricate dynamic between information processing and justification in relation to regret when shopping online.

Keywords: cognitive effort, justification, regret, online shopping

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1. Introduction

E-commerce has witnessed exponential growth in the past 25 years and in 2015 the e-commerce expenditure was close to \$350 billion in the U.S. (Smith & Anderson, 2016), £52.25 billion in the UK (Moth, 2015). The venues of e-commerce have also diversified including traditional computer-based purchase as well as transactions made on cellphones and using social media links. A recent survey found approximately 80% of Americans have shopped online (Smith & Anderson, 2016) which is a sharp increase from 22% of Americans reported in 2000. In addition, social commerce, such as a purchase made on or through Facebook, is expected to increase as much as \$30 billion (Anderson, Brusa, Price, & Sims, 2011). This trend is not unique to America. The advancement of internet and digitization increased the popularity of online shopping around the world including developing countries (Hoang, Chi, Tuan, & Linh, 2016). Though e-commerce advancements are moving at a rapid pace, a comprehensive understanding of consumer behavior lags in online shopping settings. The current paper attempts to investigate consumers' regret in relation to exerted cognitive effort and justification in online shopping.

Justification is an important part of consumer decision making. The rationalization involved in justification can alleviate decision conflict, and can allow people to formulate reasons to justify a difficult decision (Shafir, Simonson, & Tversky, 1993). Thus, justifying a decision is a common practice and consumers are motivated to maximize justification (Bettman, Luce, & Payne, 1998). Justification goal can shape consumers' decision paths and help them judiciously allocate their finite resources such as cognitive effort or money. Cognitive effort,

besides justification, is equally valuable to consumers. Cognitive effort exertion results in increased confidence and accuracy of a decision (Bettman et al., 1998). Though justification and cognitive effort exertion are unique and independent constructs in decision making, cognitive effort can be spent to *justify* a decision and lower post-decision discomfort. However, this is only probable when the sought information is favorable towards the decision (Liang, 2016). This implies post-decision discomfort may increase when cognitive effort or justification was wasted. The aim of this paper is to explore the function of cognitive effort exertion and justification in relation to regret reduction in the online shopping context.

Though it is still cognitively taxing for consumers to conduct systematic product evaluation (Einhorn & Hogarth, 1981), it has never been more convenient to search for and gather information online. Technology provides convenience to consumers but also allows them to gather an abundant amount of product information at their fingertips. In this information age, consumers are surrounded with high quality information (e.g., expert opinions) and have the ability to organize it more efficiently (Goldenberg, Oestreicher-Singer, & Reichman, 2012). Additionally, by using the online decision aids, consumers may be able to reduce the decision cost yet still gain the benefits from cognitive effort expenditure through increased accuracy.

1.1 Costs and Benefits of Spending Cognitive Effort

Consumers often compare and evaluate product attributes to increase their chance of maximizing their satisfaction, given the spending of a certain amount of money. What most of us neglect during this intensive search process is the cost incurred by using the human mind's limited mental resources. Though it might not be tangibly calculated, the expenditure of cognitive effort will impact consumers' evaluations of the chosen options. For example, consider

the following situation. Mr. Smith methodically compares multiple stores and alternatives before making the final decision, whereas Ms. Johnson foregoes the deliberate comparison process and uses simple and cognitively frugal strategies to locate a satisfying product. These two different types of decision processes may lead to the same end result. Nonetheless, Ms. Johnson might have a better overall experience because she is more cost-effective.

The expenditure of cognitive effort during search is known to impact the evaluation of the searched-for product, independent of the quality of the product. Therefore, when mental resources used in categorizing or evaluating a product are perceived as being wasted, consumers may be more critical in judging the quality of the product. For example, when consumers are given more varieties of options (Botti & McGill, 2006), more diverse choices (Sagi & Friedland, 2007; Swait & Adamowicz, 2001), and more time for prolonged conscious deliberation (Dijksterhuis & van Olden, 2006; Wilson & Schooler, 1991), satisfaction levels with a final choice tend to decrease. This general finding can be extended to food and beverage choices (Silva et al., 2017), or even touch and visual sensations (Yanagisawa & Takatsuji, 2015). In many studies, the extra cognitive effort put forth to accommodate incongruences, or to process increases in a choice set size, resulted in a more negative evaluation of the product.

One common assumption underlying these studies is that consumers' cognitive capacity is limited. Under this assumption, use of cognitive resources is a decision cost that needs to be reduced. Consumers' cognitive effort is thought to be highly expensive in terms of processing, and therefore decision makers use it at the minimum level (Bettman et al., 1998); in essence decision makers are "cognitive misers" (Fiske & Taylor, 1984, p.12). Despite the predominant perspective on the use of cognitive effort, consumers may prefer to exert rather than conserve this valuable resource when there are benefits for using it. For example, one clear benefit is

increased decision accuracy, which provides ample returns either through finding the best resolution to the decision task or reducing the uncertainties of the decisions (Johnson & Payne, 1985; Payne, 1982; Payne, Bettman, & Johnson, 1988). Cognitive effort exertion can also increase confidence in the decision based on reduced uncertainties and decision conflict.

Unfortunately, due to limited cognitive capacity, there is a clear trade-off between cognitive effort cost and its returns. Similar to financial expenditure, it is reasonable to think unnecessary expense of cognitive resource can be perceived as a waste. Thus, it is advantageous if the expenditure of cognitive effort can be justified (Zeelenberg & Pieters, 2007).

1.2 Cognitive Effort and Justification

Justification, in the vernacular language, refers to finding an acceptable reason or to proving or showing to be right or reasonable (Justify, n.d.). In the decision making literature, it is a well-accepted notion that people tend to follow decision paths that are easy to explain and justify (McMackin & Slovic, 2000; Shafir et al., 1993; Slovic, 1975; Tversky, 1972). Slovic (1975) and Tversky (1972) argue that justifiability can be a tiebreaker between equally attractive options. This shows the complexity of consumer decision making. If the decision utility, such as attributes of a product, is the only decision factor, one can expect to encounter an impasse when the decision utility is similar for two options. However, people seem to be able to choose an option with ease or show their preference based on the reasons for the choices (Shafir et al., 1993; Slovic, 1975; Tversky, 1972). This is true even when the decision utility for each option is different. Cheema and Soman (2006) asked consumers to choose among choices that varied in attractiveness. Contrary to the naïve assumption that the most attractive alternative will be chosen, consumers spent more money on highly justifiable decisions. Considering that

justification requires people to use more cognitive effort in their decision making, these previous studies show the close connection between cognitive effort and justification. People may not be averse to spending cognitive effort in appropriate contexts to find reasons to support their behaviors or decisions. In one study, Garbarino and Edell (1997) demonstrate the negative impact of overused cognitive effort, but their model also suggests that justification moderates the function of cognitive effort and product evaluation. When high cognitive effort is justified (e.g., the search task is complicated), high cognitive effort expenditure is not considered as waste by consumers, and consequently does not degrade the overall evaluation of product quality. Justification can moderate the function of cognitive effort and choice preference as well. Certain decisions are naturally easier to justify such as options with high utilitarian values. However, when defending a decision to choose a hedonic option, people may need to find more reasons to evaluate the options. Likewise, when the search task becomes more complicated, or difficult to justify (e.g., purchasing hedonic goods), consumers are more likely to deliberate on the justification of their behavior and spend more effort (Okada, 2005). Similar results were found in more general decision making tasks. When people were 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).

The aforementioned studies show strong support for people’s choices based on reasons. Only when the decision or situations are justifiable, can people enjoy the circumstances and avoid the feeling of guilt or discomfort (Diefenbach & Hassenzahl, 2011; Okada, 2005). Conversely, if the decisions are not justified people are expected to encounter negative feelings and even regret their decisions.

1.3 Decision Justification, and Regret

Emotion can be a powerful factor in decision making, but is more often neglected than extensively considered. Consumer behaviors can be understood in terms of gains and losses, which can be physically observed and numerically calculated. It is also true and important to note, however, that consumers' decision paths are influenced by the emotions they experience before, during, and after those consequences. Some consumers may focus on reducing the overall amount of experienced negative emotions such as dissatisfaction, frustration, or regret (Bettman et al., 1998). In the current study, to examine how cognitive effort and justification simultaneously influence negative emotions, post-purchase regret was assessed as the main negative emotion of interest. Regret was chosen as the emotion of interest for several reasons: a) it has relatively clear cognitive dimensions (Roese, 1997), b) it is found to be swayed by the justification of a decision (Kahneman & Tversky, 1982), and c) it is influenced by cognitive effort (Park, Hill, & Bonds-Raacke, 2015).

Regret literature has clearly established the benefits of justification in minimizing experienced regret (Connolly & Reb, 2003; Connolly & Zeelenberg, 2002; Inman & Zeelenberg, 2002; Zeelenberg & Pieters, 2007). Consumers often choose justification to cope with regret but not disappointment (Yi & Baumgartner, 2004). Conversely, it is reasonable to expect an intense experience of regret when wasted effort on a product's evaluation is not explainable—in other words when it is difficult to justify wasted resources. Kahneman and Tversky (1982) found that the intensity of regret can vary based on social norms. This finding implies decisions following social norms are easier to justify and cause less regret. Park and Yoon (2007) found similar results that behaviors congruent with the social norms are beneficial in reducing regret even when the outcome performance is not optimal. More studies confirm the finding that the

experience of regret varies with easiness of justification (Connolly & Reb, 2003; Connolly & Zeelenberg, 2002; Inman & Zeelenberg, 2002; Zeelenberg & Pieters, 2007). The idea of reason-based choice and regret suggests having more reasons for a choice, which contributes to justification of the decision, mitigates self-inflicted discomfort of regret. For example, decisions inconsistent with behavioral intention or previous decision patterns require a greater need to reason about the decision before taking an action to avoid severe regret (Pieters & Zeelenberg, 2005).

In the past few decades, an extensive body of research has accumulated on regret (for an extensive review, see Zeelenberg & Pieters, 2007). These collective studies about regret provide a meaningful conceptual framework within which to study the relationship between cognitive effort, justification, and regret. Furthermore, this framework incorporates a large set of goals, such as cognitive effort minimization, justification maximization, and negative emotion reduction (Bettman et al., 1998), within the consumer decision making context. Past research in consumer decision making has focused on demonstrating the trade-off between the accuracy of a decision and cognitive effort (Bettman, Johnson, Luce, & Payne, 1993; Luce, 1998; Payne, Bettman, & Johnson, 1993); findings show that increased decision conflict leads to an emphasis on decision accuracy at the expense of cognitive effort.

Past studies have made a great contribution to understanding consumer behaviors. However, there is still a need to explore the possible benefits of cognitive effort in regulating different types of negative emotion (e.g., regret) among consumers. In addition, most studies examining the impact of cognitive effort on decision making have tapped into the issue of limited working memory capacity (for an extensive review see Westbrook & Braver, 2015). However, consumers in real life decision making situations can use decision aids or utilize an

extended time frame to search for options in order to effectively distribute cognitive pressure. 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 a decision process, and on the definition of Garbarino and Edell (1997) that cognitive effort can be measured in terms of overall time spent in comparison of products. This is a different approach compared to the commonly accepted premise in the literature that the bounded rationality of consumers 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 behaviors. Instead, the current paper attempts to explore the relationship between cognitive effort (with a broader definition) and justification of this effort, and its impact on post-purchase regret in the shopping context, both in-store (Study 1) and online (Study 2). This is a relatively new aspect, and not many studies to date have examined the difference of regret in relation to these constructs in decision making.

Study 1 investigates the role of cognitive effort exertion and justification on regret reduction in a hypothetical in-store purchasing scenario. Based on the findings from Study 1, Study 2 then explores the impact of wasted justification on regret experience in relation to the intensity of invested cognitive effort in the decision making. Because regret is dependent on both cognitive and emotional attributes (Buchanan, Summerville, Lehmann, & Reb, 2016; Roesse et al., 2009; Zeelenberg et al., 1998), the relative amount of cognitive effort can vary the degree of experienced regret. Thus, the current research examines the following hypotheses in Study 1. A mitigation of regret as cognitive effort increases is expected (H_1). Exertion of cognitive effort

leads to gathering more facts or information about a decision. This in turn is shown to provide more confidence in decision making and result in regret reduction (Park et al., 2015). In addition, Zeelenberg and Pieters (2007) showed that justification of a decision makes it easier to subdue regret. Similar results are expected in the present study (H₂). However, if this cognitive effort expenditure is not deemed, it is expected to have negative or no impact on regret. Thus, the justification effect was expected to be moderated by the amount of cognitive effort invested in the decision (H₃). Justifiability of the expenditure of cognitive effort can either reduce or exacerbate experienced regret (Garbarino & Edell, 1997; Towers, Williams, Hill, Philipp, & Flett, 2016). Consistent with previous findings, justifiability of the decision or the effort for the decision is anticipated to mitigate regret.

2. Study 1

2.1. Method

2.1.1 Participants and design.

One hundred twelve students (53 men and 59 women, M_{AGE} : 19.29, SD_{AGE} : 2.56) at a Midwestern university participated in Study 1. Utilizing a convenience sampling method, participants were students enrolled in an introductory psychology course, and took part in this study in return for partial fulfillment of course requirement. To minimize the possibility of coercion, participants were given equitable alternative options to obtain the same amount of course credit without participating in the research. All Institutional Review Board (IRB) regulations were followed during data collection. A 2 x 2 within-subjects design involving cognitive effort (high versus low) and cognitive effort justification (easy versus difficult) was used.

2.1.2 Procedure and tasks.

Upon giving their consent, participants read four shopping vignettes, each describing a decision situation. The order of vignettes was randomized by using Medialab v.2008 (Jarvis, 2008).

Cognitive effort is defined as the usage of mental resources gathering information, investigating or researching about the option, and amount of time spent on a decision (Garbarino & Edell, 1997; Russo & Doshier, 1983). Following this definition, cognitive effort level was manipulated by providing more or less information about a product in the vignette. For example, in the high cognitive effort condition, detailed specifications were provided (e.g., hard drive size, operating system, warranty etc.) about the product in the vignette (98 words), whereas no product specifications were available (0 word) in the low cognitive effort condition. Thus, two conditions also differed in the amount of time to process the vignette. In addition, vignettes for the high cognitive effort condition described an intensive information gathering process about a product including option comparison and opinion seeking from product managers.

Justification in Study 1 is defined as finding a reason for one's action (Justify, n.d.). In this study, easy and difficult justification conditions were manipulated by providing a clear or unclear reason for one's actions, respectively. For example, in the high cognitive effort/difficult justification condition, the vignette described that the participant (decision maker) wasted a substantial amount of cognitive effort on the decision process. It was described that additional cognitive effort was disbursed without a clear reason, and therefore the action was not justified in the decision. The remaining conditions were manipulated in a similar way.

A manipulation check was conducted on justification by responses 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 degree of invested effort was reasonable for the given situation. Regret was manipulated by creating a 10% price difference for the same product at a subsequent time. After reading each vignette, participants rated the degree of regret regarding their decision using a single regret item (e.g., *Considering the situation, I regret my decision to...*, 1 = *Disagree Very Strongly*, 7 = *Agree Very Strongly*).

2.2 Results

In the manipulation check, a significant difference was found between high ($M = 5.25$, $SD = 1.29$) and low ($M = 3.42$, $SD = 1.64$) cognitive effort conditions regarding the perceived level of cognitive effort invested in the decision, $t(111) = 9.19$, $p < .05$. A significant difference was also found between easy justification ($M = 5.15$, $SD = 1.40$) and difficult justification ($M = 4.81$, $SD = 1.50$) conditions regarding the justification of one's action, $t(111) = 2.46$, $p < .05$.

Hypothesis one. The main effect for cognitive effort was significant. Results showed a lesser degree of regret in the high cognitive effort condition ($M = 3.37$, $SD = 1.51$) than the low cognitive effort condition ($M = 4.23$, $SD = 1.62$), $F(1, 110) = 33.58$, $p < .05$, $\eta^2 = .23$.

Hypothesis two. The degree of regret was attenuated when the action was easy to justify ($M = 3.69$, $SD = 1.52$) than when it was difficult to justify ($M = 3.91$, $SD = 1.60$), $F(1, 110) = 4.35$, $p < .05$, $\eta^2 = .04$.

Hypothesis three. The interaction between cognitive effort and justification was significant, $F(1, 110) = 8.64$, $p < .05$, $\eta^2 = .07$ (see Figure 1). To further probe this interaction, a simple effect analysis was conducted; a statistically significant difference was only found in the low cognitive effort condition. The degree of regret was significantly higher in the difficult justification condition ($M = 4.51$, $SD = 1.69$) than it was in the easy justification condition ($M = 3.96$, $SD = 1.66$), $F(1, 110) = 11.68$, $p < .05$. No difference was found in the high cognitive effort

condition, $F(1, 110) = .67, p = .42$. The degree of regret was still higher when the decision effort was difficult to justify in general; however, the justification factors for under-spent cognitive effort seemed to help the reduction of the high experienced regret.

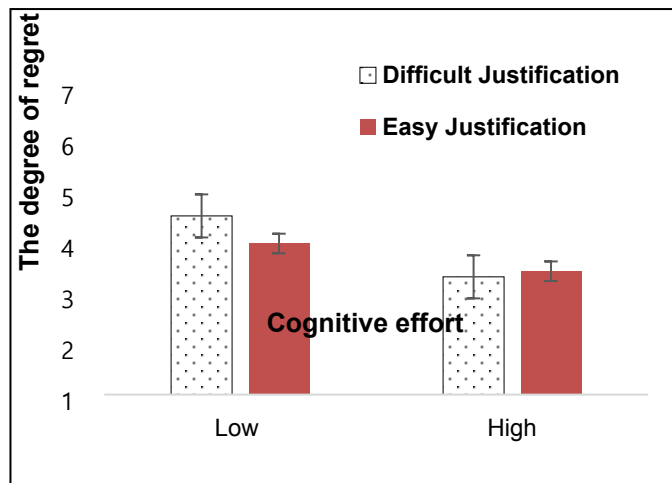


Figure 1. Changes in the regret level in relation to justification

2.3 Discussion

Study 1 investigated the function of exerted cognitive effort and justification in regard to the experience of regret. In this study, through vignettes, participants gathered varying degrees of information about a product in a store and made a price comparison in an online store, which is a common consumer behavior. Two conditions were set; in one condition, participants put forth cognitive effort deemed unjustified—they spent a lot of time researching one specific product when not needed. In the other condition, participants were not given the opportunity to spend cognitive effort 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 worsened post-purchase

regret. These results imply that high cognitive effort itself may be a way to justify consumers' decisions, which suggest interrelationships between the cognitive effort minimization and regret minimization and justification of that effort.

3. Study 2

Many studies have shown a reduction in regret when participants' decisions are justified, or even when their decisions are made for what they deem acceptable reasons (Connolly & Zeelenberg, 2002; Garbarino & Edell, 1997; Towers et al., 2016; Zeelenberg & Pieters, 2007). Study 1 confirmed the effectiveness of justification in attenuating experienced regret, but this benefit was minimized when cognitive effort was sufficiently expended. Study 2 investigates the role of justification and cognitive effort on regret, *when the justification is not redeemed*.

In a real-world decision making, consumers may encounter a decision conflict and divert from their initial purchasing task; such a conflict may result in an *unplanned purchase*. The aforementioned decision conflict can increase in intensity when the object of the unplanned purchase is on sale, or only available for a limited time. This experience is quite often during online shopping; web-based stores frequently recommend different but related products to those in a consumer's shopping cart, or based on the original item typed into the store's search engine. When presented with these recommended products, some consumers will choose to stay with their original product, but some consumers will depart and switch to another product. Either decision can result in experienced regret. If consumers product-switch, they might later regret not buying the product on their shopping list. Alternatively, consumers who stay with their original shopping item might also later regret the missed opportunity (Tykocinski & Pittman, 1998).

In addition to examining the impact of cognitive effort on regret, Study 2 explored changes in participants' regret levels when justification of an original purchase decision is discarded due to an unplanned, and thus unjustified, purchase. In this study, it is expected that justification waste—the discarded justification used on a purchase never made—would lead to an increase in regret (H_4) because people in general have an aversion to wastefulness (Arkes, 1996). In addition, it is hypothesized that increased cognitive effort will again reduce regret (H_5). Lastly, it is hypothesized that the regret-increasing effects of wasted justification will be moderated by cognitive effort (H_6). The negative impact of justification waste is thought to be more evident when more cognitive effort was invested. When invested cognitive effort is necessary in the context, or is directly linked to the quality of the outcome, wasted effort does not seem to increase regret (van Dijk, van der Pligt, & Zeelenberg, 1999). However, when the cognitive effort invested is irrelevant to the final choice due to switching a product, as well as the justification for the decision, it is expected to worsen the regret level.

3.1 Method

3.1.1 Participants and design. One hundred seventy-eight participants at a Midwestern university (61 men, 116 women, and 1 not specified, $M_{AGE} = 18.24$, $SD_{AGE} = 0.60$) were selected by utilizing a convenience sampling method. Students participated in the study in return for credit in partial fulfillment of a course requirement. To minimize the possibility of coercion, participants were given equitable alternative options to obtain the same amount of course credit without participating in the research. All IRB regulations were followed during data collection. Study 2 used a 2 (Cognitive Effort: High vs. Low) x 2 (Justification: Waste vs. Control) between-subjects design. The target product used in Study 2 was a laptop, which was priced

around \$1,000. This product was used because of its functional qualities, and its ubiquitous use among college students. On average, participants were willing to spend \$662 (median = \$600) for a laptop.

3.1.2 Manipulation and Procedure. After providing informed consent, participants were randomly assigned to one of the four conditions (see the design of the study).

Manipulation of Cognitive Effort. Cognitive effort was manipulated by varying the actual amount of search time required by participants in the online shop. In the high cognitive effort condition, the parameters of the computer program (MediaLab v2008 [Jarvis, 2008]) were set so the participants mandatorily spent eight minutes searching for options on a real website of an electronics store (i.e., <http://bestbuy.com>). In addition, participants were asked to list, on a separate sheet of paper, the specifications of their top three laptop models while searching (e.g., hard drive size, memory size, screen size etc.). In pilot testing, participants reported that eight minutes of online searching was long enough and after that they experienced some lack of concentration during the search task in the lab.

To keep the low and high cognitive effort conditions similar in all but exertion level, a blank sheet was provided for the low cognitive effort condition to make notes if needed. However, in the low cognitive effort condition, participants were given two minutes to look for options on the same website, but did not receive explicit instructions to fill out and compare their top choice specifications, which were required in the high cognitive effort condition.

All the materials were presented on a computer screen by using MediaLab v2008 (Jarvis, 2008). Participants read the instructions and specific cover stories related to each decision task. In the vignette, participants were given a situation in which they had to shop for a new laptop. 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 (either eight or two minutes for the high and low cognitive effort conditions, respectively). At this time, they were asked to search for a laptop that would best fit their needs in the online store. After the fixed amount of time has passed, the program returned the participants to the study on the local computer.

Manipulation of Justification. After the online search task, the cover story in the instruction noted that while participants were still looking for a laptop, they saw an advertisement of an LCD TV. The TV was on a special, limited-time offer sale (10% off) and they have always wanted an LCD TV to play video games and entertain friends and guests at their house. Participants then either continued on (justification control condition), or were asked to justify their reasons for their top laptop choices (justification waste condition).

In Study 2, “Justification” was defined as the act of providing reasons for their original purchasing decision. For this study, the interest was in examining the impact of wasted justification, due to an unplanned purchase, on regret. Adopting a method often used in consumer research (e.g., Simonson, 1999), a half of the participants in each cognitive effort condition were asked to list reasons for their top choices during their initial laptop search in the online store. However, they were later told in the cover story that they purchased the LCD TV on sale. This condition was defined as the justification waste condition because the reasoning behind a new laptop is wasted.

This stands in contrast to the other half of participants (Control Condition). The final decision described in the cover story was identical to the justification waste condition. These participants, however, passed over explicitly justifying their laptop choices. Therefore, when told to imagine if they chose a different product, they should be less likely to feel as if any justification of the original product was wasted by their product switch.

Inducement of Regret. Experienced regret was induced in reference to a potential missed purchasing opportunity. Specifically, the experienced regret was induced by diverting participants away from the initial search product (laptop) and telling them that they later made an unplanned purchase (LCD TV). Participants were then asked to rate their level of regret on a 9-point Likert scale (“Considering the situation, I regret my decision to purchase the LCD TV,” 1 = Not at all, 5 = Neutral, 9 = Very Strongly).

3.2 Results

A manipulation check showed a significant difference between high ($M = 6.11$, $SD = 2.19$) and low ($M = 5.28$, $SD = 2.08$) cognitive effort conditions regarding the perceived level of cognitive effort invested in the decision, $t(175) = 2.58$, $p < .05$, $d = 0.39$.

Hypothesis four. Results showed a main effect for justification waste, where a higher degree of regret was reported when invested justification was wasted ($M = 8.25$, $SD = 0.17$) compared to the control condition ($M = 7.63$, $SD = 0.17$), $F(1, 174) = 6.68$, $p < .05$, partial $\eta^2 = .04$.

Hypothesis five. The main effect for cognitive effort on regret was not significant. Participants in the high cognitive effort condition ($M = 7.76$, $SD = 0.17$) reported similar regret levels to participants in the low cognitive effort condition ($M = 8.13$, $SD = 0.17$), $F(1, 174) = 2.38$, $p = .13$, partial $\eta^2 = .01$.

Hypothesis six. The interaction between cognitive effort and justification was significant, $F(1, 174) = 8.64$, $p < .05$, partial $\eta^2 = .05$. To further probe this interaction, a simple effect analysis was conducted. When cognitive effort was high, the degree of regret was significantly higher in the justification waste condition ($M = 8.42$, $SD = 1.12$) than the control condition ($M = 7.09$, $SD = 2.21$), $F(1, 174) = 15.46$, $p < .05$. No difference was found in the low cognitive effort

condition, $F(1, 174) = 0.03, p > .05$. This suggests wasted justification does not intensify the regret level when only low amount of cognitive effort is invested. However, wasted justification, compared to no justification, results in a higher regret level when high cognitive effort is exerted (Figure 2).

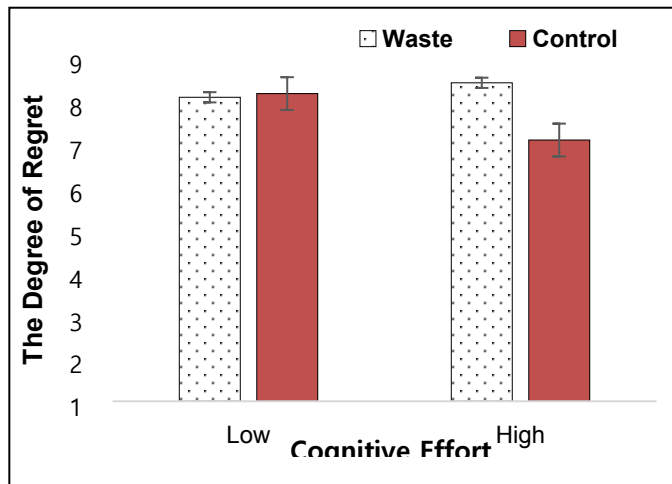


Figure 2. Differences in the experienced regret between cognitive effort and justification about purchasing an LCD TV and missing out on a laptop.

3.3 Discussion

In Study 2, in general, a high level of experienced regret was reported compared to Study 1. Considering the regret in Study 2 was after purchasing an LCD TV instead of a laptop, 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 money spent may be fully justified already to themselves or to others. Second, the initial search task was to look for a laptop, accordingly purchasing a laptop is maintaining the status quo for their decision path and the experience of regret is successfully reduced compared to purchases made against the status quo (purchasing an LCD TV).

When participants were told to imagine they had bought an LCD TV in the vignette, the final choice in the given vignette is incongruent with the search for a laptop, for which they had provided justifications. Therefore, this incongruence is leading to a greater degree of regret. If one has the opportunity to defend an alternative option, but ended up purchasing another option, justification may also increase the experienced regret. The current findings can expand the postulations of justification theory (Inman & Zeelenberg, 2002) by providing more finite situations in which pre-justification of a decision may actually be aggravating.

4. General Discussion

Regret is a commonly experienced emotion and tends to have a lingering effect on the decision maker (Zeelenberg & Pieters, 2007). The findings from current exploratory studies suggest a few ways to reduce post-purchase regret by investing more cognitive effort in the decision and managing justification efforts. In the current studies, an attempt was made to lay out a framework for a choice 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.

In Studies 1 and 2, the relationship between cognitive effort exertion and regret was examined as a function of justification during online and offline shopping. This relationship was expanded upon by more closely investigating the impact of effort justification. Study 1 showed that regret is reduced when the situation was easy to justify; however, it was moderated by cognitive effort. This supports Garbarino and Edell's (1997) findings that the penalty from overused cognitive effort diminishes when the effort is justified. Greater, but justified, effort did not negatively impact the regret level. On the other hand, lesser and not justified effort

aggravated the regret level. In essence, insufficient cognitive effort needs to be justified but overspent effort is acceptable. Based on the current study, justification does not seem to come from explicit reasons. In the current study, justifiability of the situation was embedded in the scenario and not specifically stated. Towers and colleagues (2016) found similar results in their recent study.

The current findings also provide an insight into understanding the use of justification. Justification can be explicit such as to elucidate the rationale behind a decision or to list supporting reasons for a choice. Past research shows that explicit justification is important in decision processes (Shafir et al., 1993; Slovic, 1975; Tversky, 1972). However, explicit justification, on the other hand, requires more use of cognitive resources. Also, situations might arise where the cost of explicit justification outweighs its benefit. For example, explicit justification can either improve or degrade judgement quality contingent on whether the task requires more or less analytical processing (McMackin & Slovic, 2000). When specific justification is not necessary, it may be perceived as wasting cognitive resources, and this may intensify the negative emotion afterwards. This is what was found in Study 2.

Study 2 indicated that cognitive effort and justification may be important in lowering regret as postulated by prior research (Park et al., 2015; Zeelenberg & Pieters, 2007). On the other hand, the current findings provide evidence for when a purchase justification can be detrimental for consumers and instead make them feel worse (experience a greater degree of regret) when the justification is not redeemed during online shopping. The current findings can expand the understanding of justification 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 (Kahneman, 1999; Kahneman & Tversky, 1982; Tykocinski & Pittman, 1998).

Current findings suggest that decision makers' tendencies to minimize the use of cognitive effort, as shown by numerous previous studies, may be altered very easily to make adjustments to consumers' goals. For example, Luce (1998) found that increases in negative emotions (e.g., due to decision conflict) led to a greater tendency to prolong a search. Luce's study as well as the current study imply the possibility of a trade-off (or interaction) between negative emotion and cognitive effort minimization. Cognitive effort exertion can be used as a tool to resolve decision conflicts when faced with negative emotion.

5. Contributions and Findings of Current Studies

One of the noteworthy contributions of the current research is a re-evaluation of the role of cognitive effort in consumer decision processes specifically during *online* shopping. Online shopping is fast and convenient, which provides consumers with a sense of reduced decision costs. This reduction in decision costs will correspond to a reduction in information in a traditional in-store shopping experience. However, in online shopping, where consumers rely on various decision tools, a reduction in decision costs may not necessarily impact post-purchase regret levels. This could partially explain why benefits from higher cognitive effort exertion were not present in Study 2.

An important aspect of the current research focused on the benefits that exertion of cognitive effort can bring to the decision maker. Though there is a trade-off between decision cost and benefit, a greater emphasis has been on decision cost reduction in the consumer decision making literature. Therefore, it is often assumed that cognitive effort is the decision cost that

needs to be minimized if at all possible (Bettman et al., 1998; Botti & McGill, 2006; Dijksterhuis & van Olden, 2006; Sagi & Friedland, 2007; Swait & Adamowicz, 2001; Wilson & Schooler, 1991). Although past research suggest people may be cognitive misers (Fiske & Taylor, 1984), in the current study spending more cognitive effort in terms of researching can benefit decision makers to attenuate their experienced regret even when the effort has no payoff in terms of accuracy. This may imply consumers will choose to spend more cognitive effort to prevent future regret (anticipated regret). This relationship should be further explored in the future studies.

This finding carries a practical message for marketers and advertisers. Study 2 proposes that if consumers decide to divert from their initial task and make an unplanned purchase, and if they already spent cognitive effort on the decision, it is better for them to not think about the reasons why they needed the initial product in the first place, to experience less regret.

When consumers are given time to process information about a product, they are likely to believe they have invested enough cognitive effort into the decision and consequently experience less regret. Additionally, when given a chance to provide reasons (i.e., justify) for their decisions, they are less likely to feel regret about missed opportunities. This may provide consumers with greater satisfaction about their chosen option. This implication suggests the need for further investigation. Marketers, who are promoting products that face competing options, can benefit from providing consumers with explicit 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 regret about foregone options (i.e., the opponent's product).

6. Limitations and Future Directions

A few limitations still exist in the model outlined in this research. 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 use less cognitive effort than less experienced people to reach the same accuracy level (Kuo, Chu, Hsu, & Hsieh, 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 of potential participants, a laptop and an LCD TV were chosen as target products in Study 2, 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 primed as utilitarian goods in the cover story. Thus, future studies could use contrasting products which show more clear distinction between utilitarian and hedonic values for the sample population.

Lastly, like any other vignette-based studies, it is noted that there are limitations due to using hypothetical behaviors (vignette in Study 1 and hybrid of vignette and real product search in an online store in Study 2) rather than real decisions involving payments in this study. There may be imprecision in behavioral predictions of the real world, and therefore the current study could be challenged in ecological validity. However, myriads of vignette-based studies have been used in the past literature and have provided an efficient method of examining the relationship between principal constructs, as well as maintaining a healthy level of replicability (Evans et al., 2015). Furthermore, it is acknowledged that vignette-based studies and the real-

world decisions are not identical; rather, vignettes are used to create a platform to test key constructs in a more controlled situation. Nonetheless, to improve ecological validity, future research needs to validate current findings with real consumer decisions.

7. Concluding Remark

The current research attempted to re-examine the role of cognitive effort as a tool for consumers. Future work could study changes in need for cognition with variation in the degree of exerted cognitive effort during online shopping. Additionally, one could assess consumer choice behaviors as a more continuous process, using multi-session studies. Through this line of research, consumers' decisions and choices can be studied with respect to how they anticipate negative emotions, change in decision strategies accordingly, and react to the feedback they receive.

In the context of this complicated consumer decision environment, it is implausible to have an exhaustive and comprehensive choice model. The current studies, however, significantly expand upon the useful conception of a meta-goal based choice model (Bettman et al., 1998), suggesting that there are several key interrelations between these meta-goals, re-evaluating the benefits of cognitive effort, justification, and assessing the role of experienced regret in relation to other goals in the online shopping context.

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Highlights

- Modeled experienced regret as a function of cognitive effort and justification during online shopping
- Supported positive effect of cognitive effort in regret reduction
- Showed cognitive effort moderates the effect of justification
- Demonstrated that the negative effect of unplanned purchasing on regret is moderated by the degree of cognitive effort