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The Effect of Regulatory Depletion on Attitude Certainty

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The Effect of Regulatory Depletion on Attitude Certainty

This research explores how regulatory depletion affects consumers' responses to advertising. Initial forays into this area suggest that the depletion of self-regulatory resources is irrelevant when advertisement arguments are strong or when consumers are highly motivated to process. In contrast to these conclusions, the authors contend depletion has important but previously hidden effects in such contexts. That is, despite attitudes equivalent in valence and extremity, the authors submit that consumers are *more* certain of their attitudes when they form them under depletion rather than non-depletion conditions. The authors propose that this effect occurs because feeling depleted induces the perception of having engaged in thorough information processing. As a consequence of greater attitude certainty, depleted consumers' attitudes exert greater influence on purchase behavior. Three experiments, using different products and ad exposure times, confirm these hypotheses. Furthermore, Experiment 3 demonstrates that consumers' naïve beliefs about the relationship between depletion and thoroughness of processing can be varied, and this variation moderates the effect of depletion on attitude certainty. Theoretical contributions and implications for marketing are discussed.

Keywords: Attitude Certainty, Self-regulatory Depletion, Perceived Elaboration, Advertising Effectiveness, Consumer Behavior

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Both everyday experience and popular press articles (Aamodt and Wang 2008) suggest that consumers' efforts to manage work-related stress, control their spending, and handle financial anxiety can impair subsequent efforts to exert control (Vohs and Baumeister 2004). Indeed, research in marketing and psychology has coined the term *depletion effect* (Baumeister et al. 1998) to describe the phenomenon whereby consumers perform more poorly on a self-regulatory task when they have previously engaged in a task that is resource demanding (i.e., depleting) compared to one that is not resource demanding (i.e., non-depleting). Depletion effects are argued to occur because any behavior involving the deliberate regulation of responses draws on the same pool of limited resources (Baumeister et al. 1998). Consequently, expending one's resources on an earlier task limits the amount of resources available for subsequent tasks. Recent work shows being depleted from a prior task can have serious consequences such as inhibiting consumers' restraint from excessive spending (Vohs and Faber 2007) and eating (Tice, Bratslavasky, and Baumeister 2001).

Of interest to marketers, recent research has examined the implications of depletion for advertising effectiveness and information processing. Wheeler, Briñol, and Hermann (2007) found that when consumers are depleted from a prior task, they are more susceptible (i.e., form more favorable attitudes) to persuasive messages containing specious arguments. They suggested that depletion impairs consumers' ability to counterargue arguments they normally could, which in turn increases persuasion (see also Fennis, Janssen, and Vohs forthcoming). Work by Schmeichel, Vohs, and Baumeister (2003) suggests that depletion might instead hinder persuasion by reducing information comprehension. Specifically, they found that depleted consumers performed worse on reading comprehension compared to non-depleted individuals,

suggesting that depletion might prevent important information, such as a new product feature, from being committed to memory.

Although depletion might be of concern to marketers, prior work also suggests that depletion effects on advertising effectiveness and information processing can be eliminated under conditions that are likely to be very common in the marketplace. For example, when message arguments are strong, as is likely the intent of much advertising, depleted and non-depleted individuals show equally favorable attitudes (Wheeler, Briñol, and Hermann 2007). Furthermore, when depleted individuals are motivated to perform a regulatory task, for instance by verbal instructions or financial incentive, they appear capable of overcoming any deficits caused by a depletion task (Baumeister et al. 2005; Muraven and Slessareva 2003), and thus would not be expected to show any information processing deficits.

Based on past research, then, marketers might think there is no effect of depletion when consumers are motivated to attend to an advertisement presented. In contrast, the present research proposes that in situations in which depletion effects appear to be eliminated (i.e., strong arguments and/or high motivation to process information), there might be important effects of depletion that have simply been hidden in past research efforts. We propose that under conditions in which advertising produces equally favorable attitudes and degrees of information processing, depletion might nonetheless affect consumers' attitude certainty. Specifically, based on the hypothesis that feeling depleted might foster the *perception* that consumers have been more thorough in their information processing, we predict that feeling depleted might lead consumers to be more certain of their attitudes following an advertisement, despite no

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differences in their actual information processing or attitudes. Furthermore, as will be discussed, we propose that by increasing attitude certainty, depletion can foster greater purchasing behavior.

THEORETICAL BACKGROUND

Attitude Certainty.

What is attitude certainty and why is it a useful measure of advertising effectiveness? Whereas an attitude refers to one's global evaluation or liking of an object such as a product or brand (Petty and Cacioppo 1986), attitude certainty—or attitude confidence—is the subjective feeling of conviction one has about one's attitude, or the extent to which one believes one's attitude is correct (Gross, Holtz, and Miller 1995; Tormala and Rucker 2007). Prior work has established that attitude certainty is independent from the attitude itself (e.g., Berger and Mitchell 1989); differences in attitude certainty can arise in the absence of any differences in attitude valence or extremity (e.g., Rucker and Petty 2004; Tormala and Petty 2002). Thus, consumers can hold both extreme and moderate (positive or negative) attitudes with high or low certainty.

Emerging research suggests that marketers should consider not only attitudes but also attitude certainty when assessing advertising effectiveness. Indeed, two consumers holding the same positive attitude toward a product after reading an ad could be differentially likely to buy the product as a function of differences in attitude certainty. In particular, the attitude held with higher certainty is likely to serve as a stronger guide for judgment, choice, and behavior than the attitude held with lower certainty (Berger and Mitchell 1989; Bizer et al. 2006; for a review see Rucker, Petty, and Priester 2007). Rucker and Petty (2004), for instance, found that consumers were more likely to report purchase intentions consistent with their attitudes when those attitudes were held with high relative to low certainty. In another investigation, Bassili (1996) found that

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participants' attitudes toward social issues were less likely to change (i.e., were more stable) over a ten-day period as the certainty associated with the initial attitude increased. Thus, to ensure that advertising affects purchase behavior, and does so consistently over time, marketers should consider how factors, such as depletion, affect consumers' attitude certainty.

Regulatory Depletion, Perceived Elaboration, and Attitude Certainty.

If depletion has any effect on attitude certainty, one might intuitively expect it to be negative—that is, increasing self-regulatory depletion might decrease the subjective feeling of attitude certainty. After all, depleted individuals might perceive processing an ad to be more straining and difficult than non-depleted individuals. Furthermore, research has shown that processing difficulty reduces attitude certainty (e.g., Haddock et al. 1999). Although this hypothesis has intuitive appeal, we propose that depletion might actually *increase* attitude certainty. Though at first glance this hypothesis might seem less plausible, this alternative view is based upon research suggesting that (1) depletion might foster the perception of having engaged in more thorough information processing (Vohs and Schmeichel 2003; Wan and Sternthal 2008), and (2) the perception of more thorough information processing can foster greater attitude certainty (e.g., Barden and Petty 2008).

For instance, several studies suggest that compared to non-depleted individuals, depleted individuals perceive themselves to have exerted greater effort (Baumeister et al. 1998; Vohs and Faber 2007) and spent more time (Vohs and Schmeichel 2003; Wan and Sternthal 2008) on the same task. Time and effort spent on a task, in turn, shape perceptions of information processing; the more time and effort people spend on a task, the more thorough they perceive their processing to be (e.g., Vonk and van Knippenberg 1995). Furthermore, both the actual and

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perceived thoroughness of one's processing (i.e., elaboration) have been shown to be positively associated with attitude certainty. Berger and Mitchell (1989) found that repeated advertisement exposure increased attitude certainty, arguably because ad repetition enhanced consumers' *actual* product-relevant elaboration. Moreover, both Barden and Petty (2008) and Smith et al. (2007) found that *perceived* elaboration—one's subjective assessment of how carefully one has processed information—mediates the effect of actual elaboration on attitude certainty.

Of importance, however, perceived elaboration can sometimes be independent of any differences in actual elaboration. Two consumers might engage in equivalent levels of thought about an advertisement, for example, but one might perceive that he or she was relatively thorough in processing the advertisement whereas the other perceives that he or she was not very thorough in processing the advertisement. We propose that one variable that could produce such an outcome is depletion. Specifically, if depleted and non-depleted consumers are both motivated to process the same advertisement for the same amount of time (e.g., an attention-grabbing TV commercial), we predict that they should rise to the occasion and engage in similar levels of information processing (Muraven and Slessareva 2003), resulting in similar thoughts and attitudes. Despite similar levels of actual information processing, we propose that depleted individuals should perceive themselves to have been more elaborative in their processing (i.e., more effortful and thorough) than non-depleted individuals. Differences in perceived elaboration, in turn, should lead to greater attitude certainty among depleted individuals.

Thus, under conditions in which previous research identifies no effects of regulatory depletion on attitudes, we propose a hidden effect of depletion that has important implications for advertising effectiveness. Formally, we hypothesize:

H_1: Depleted and non-depleted individuals will form similar attitudes toward the product featured in an advertisement. However, depleted individuals will be more certain of their attitudes than non-depleted individuals.

As discussed earlier, it is important to assess attitude certainty because of its significant role in influencing one of the most valued measures of advertising effectiveness: purchase behavior (e.g., Weiss and Windal 1980). Past research has suggested that attitudes held with high certainty serve as stronger guides for judgment, choice, and behavior than attitudes held with lower certainty (for a review, see Tormala and Rucker 2007). Hence we hypothesize:

H_2: Compared with non-depleted individuals, depleted individuals will be more likely to purchase an advertised product toward which they hold positive attitudes.

We postulate that, given sufficient motivation to process, differences in certainty are driven by differences in *perceived,* not actual, elaboration. That is, providing high motivation to process should not lead depleted individuals to engage in greater processing than non-depleted individuals, but rather it should eliminate any processing differences between these groups (Muraven and Slessareva 2003). However, depletion should lead individuals to feel as if they have exerted more effort and been more thoughtful (e.g., Vohs and Schmeichel 2003; Wan and Sternthal 2008), which in turn fuels differences in attitude certainty.

H_3: Depleted individuals will perceive that they have engaged in greater processing of the target information compared to non-depleted individuals, and this inference will mediate the greater certainty found among depleted individuals.

As an initial examination of the effects of depletion on attitude certainty, the present work focuses specifically on contexts associated with relatively high processing motivation (i.e.,

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where initial depletion can be overcome) and everyday consumer decisions. In three experiments, we expose participants to an advertisement after manipulating their state of depletion. While we expect no differences in participants' attitudes toward the target product, given that all participants will be given high motivation to read the ad, we do anticipate differences in attitude certainty. We also examine the mechanism underlying the effect of depletion on attitude certainty as well as a boundary condition for the effect.

EXPERIMENT 1

Overview and Design.

Experiment 1 tested our hypotheses by having participants first complete a depleting versus non-depleting task and then respond to a print advertisement for a snack product. To motivate all participants to process the ad carefully, we highlighted the importance of their participation to the study (e.g., Chaiken and Maheswaran 1994). We expected that motivating both groups to actively process the advertisement would induce equivalent attitudes in depleted and non-depleted individuals (Muraven and Slessareva 2003). However, due to differences in perceived elaboration, we expected attitude certainty to be greater for depleted individuals than non-depleted individuals. Of greatest importance, we predicted that these differences in certainty would create differences in purchasing behavior. Specifically, we expected depleted (vs. non-depleted) individuals with favorable attitudes to be more likely to purchase the advertised product.

The first experiment also allowed a test of an alternative hypothesis for the effect of depletion on attitude certainty based on an ease of processing perspective. As already noted, one

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might argue that feeling depleted should be associated with greater processing difficulty and, therefore, *less* attitude certainty (Haddock et al. 1999). In contrast, our perceived elaboration account predicts the opposite—that feeling depleted should be associated with greater perceived processing and *greater* certainty. Thus, the direction of the effect of depletion on attitude certainty allows a test of this competing proposition.

Procedure.

Fifty-four undergraduates (29 females) from Hong Kong participated in exchange for payment and were randomly assigned to depletion or non-depletion conditions. To manipulate depletion, participants performed a six-minute thought-suppression task adopted from Vohs and Faber (2007). All participants were told that they would be writing about the thoughts entering their minds. In the depletion condition, participants were told that they could think of anything except a white bear. In the non-depletion condition, participants were allowed to think about anything (including a white bear).

Next, participants were exposed to a print ad for a new brand of snack (the Lengonia Bite Cracker) for 30 seconds, an exposure time allowing us to test our hypotheses in a situation similar to consumers reading short magazine ads or watching a typical TV commercial. To motivate all participants to process the ad carefully, we told them that they were selected as one of a handful of individuals providing their opinions of the product and that their input was extremely important (see Chaiken and Maheswaran 1994; Petty, Harkins, and Williams 1980). The ad described features of the snack such as taste, variety, and ingredients. Importantly, all features were described in strong, favorable terms (e.g., made with superior ingredients such as premier rolled oats and fresh sundried fruits).

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After exposure to the ad, participants reported their attitudes toward the snack on three nine-point semantic differentials (*unfavorable-favorable*, *negative-positive*, *dislike-like*), with higher numbers indicating more favorable attitudes. Attitude certainty was assessed by asking participants how *certain* and how *convinced* they were of their attitude (Rucker and Petty 2004). Responses were provided on 1 (*not at all*) to 9 (*extremely*) scales. Participants then completed a depletion manipulation check by indicating how tired they felt after completing the first task on a 1 (*not at all*) to 9 (*extremely*) scale (see Baumeister et al. 1998). At the end of the experiment participants were told that they could purchase one small pack of Lengonia Bite for HK$ 8 dollars (about 1 USD). Participants thus made a binary choice of purchasing a sample of the product or not.

Results.

All results were analyzed using one-way ANOVA unless otherwise noted.

Manipulation Check. Participants reported being more tired in the depletion condition (M = 6.66, SD = 1.69) than in the non-depletion (M = 5.56, SD = 1.75) condition ($F(1, 52) = 6.64$, $p < .02$), suggesting that our manipulation of depletion was successful.

Attitudes. Responses to the three attitude items were aggregated to form an attitude index ($\alpha = .89$). Participants in the depletion (M = 6.20, SD = 1.51) and non-depletion (M = 5.75, SD = 1.10) conditions did not differ in their reported attitudes ($F(1, 52) = 1.58$, $p > .22$).

Attitude Certainty. Responses to the two attitude certainty items were aggregated to form an attitude certainty index ($r = .55$, $p < .001$). Consistent with hypothesis 1, depleted participants were more certain of their attitudes (M = 5.98, SD = 1.32) than were non-depleted participants

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(M = 4.88, SD = 1.30, F(1, 52) = 9.50, $p < .01$). This result is incompatible with the alternative hypothesis that depletion would reduce attitude certainty due to increased processing difficulty.

Purchase Decision. Past research has suggested that attitudes held with higher (vs. lower) certainty serve as stronger guides for behavior (Tormala and Rucker 2007). One implication is that if consumers have favorable attitudes, increasing attitude certainty should produce more favorable behavior. To test this possibility in the current study, we examined whether there were mean differences in consumers' purchase decisions (1 = purchase, 0 = non-purchase) as a function of depletion.

We focused only on individuals with positive attitudes because it is only for those individuals that increasing certainty should produce more positive behaviors; for individuals with negative attitudes, increased certainty would be expected to lead to more negative behavior.[1] In addition, the number of participants who held negative attitudes (n = 9) was too small to submit to analysis. Among those with favorable product attitudes, there were no differences in attitudes between depleted (M = 6.78, SD = .73) and non-depleted participants (M = 6.45, SD = 1.69; F(1, 43) = 2.41, $p > .12$), but depleted participants were more certain (M = 6.07, SD = 1.05) than non-depleted ones (M = 4.86, SD = 1.19; F(1, 43) = 12.87, $p = .001$). An examination of participants' purchase choice indicated that depleted participants chose to purchase the snack more frequently (M = .83, SD = .38) than did non-depleted participants (M = .55, SD = .51, F(1, 43) = 4.35, $p < .05$), supporting hypothesis 2.

We then examined whether the effect of depletion on purchase choice was driven by attitude certainty following the recommendations of Baron and Kenny (1986) for testing mediation. Because our dependent variables included continuous (attitude certainty) and

dichotomous (purchase: yes or no) measures, we used linear regression in the mediation analysis which allowed us to focus on both the continuous and dichotomous nature of these measures. The effect of depletion on purchase in logistic regression yielded similar results. All independent variables in the regression analysis were mean-centered and standardized.

Insert figure 1 about here

We first regressed purchase choice on depletion (1= depletion, 0 = non-depletion), which indicated that depletion led to more purchasing of the product ($\beta = .30$, $t(1, 43) = 2.09$, $p < .05$). Consistent with the ANOVA analysis, regressing attitude certainty on depletion showed that depletion was associated with greater attitude certainty ($\beta = .48$, $t(1, 43) = 3.59$, $p = .001$). Next, regressing purchase choice on attitude certainty indicated that greater certainty led to more purchasing of the product ($\beta = .39$, $t(1, 43) = 2.78$, $p < .01$). Finally, when both depletion and attitude certainty were entered to predict purchase, the direct effect of depletion on purchase was no longer significant ($\beta = .15$, $p > .35$), but the effect of attitude certainty on purchase remained significant ($\beta = .32$, $t(1, 42) = 2.00$, $p = .05$; see figure 1), and there was statistical evidence for mediation using the 95% confidence interval calculation (95% CI = .01 to .17; Shrout and Bolger 2002). Thus, the effect of depletion on purchase choice was mediated by attitude certainty.[2]

Discussion.

Experiment 1 supports our view that in a context in which people were encouraged to process carefully, depleted and non-depleted participants formed similar attitudes toward a product. This outcome is consistent with no differences in actual message elaboration. Of primary interest, however, was that participants were more certain of their attitudes when they

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were depleted versus non-depleted (H1) and this differential certainty had clear implications for their purchasing behavior (H2). These findings reveal a previously hidden effect of regulatory depletion and highlight effects on advertising effectiveness beyond the attitude itself. Finally, although intuitively one might expect depletion to reduce attitude certainty by increasing processing difficulty, the attitude certainty findings from Experiment 1 do not support this alternative hypothesis.

EXPERIMENT 2

Overview and Design.

The primary goal of Experiment 2 was to directly test the mechanism underlying the effect of depletion on attitude certainty. We have hypothesized (H3) that even when depleted and non-depleted individuals have engaged in similar levels of actual information processing, the differences in certainty stem from depleted individuals *perceiving* that they have been more thorough in their processing. To test this mechanism, we measured participants' perceived elaboration of the ad and examined its role in the effect of depletion on attitude certainty.

Experiment 2 also sought to enhance the generalizability of the results by making several procedural changes. First, we delivered a new advertisement focused on a new brand of toothpaste. Second, to test our effects in situations similar to consumers reading a text-based print ad, we changed the ad exposure time to two minutes. Finally, we used a different regulatory depletion manipulation.

Procedure.

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Fifty-five undergraduates (30 females) from Hong Kong were paid for their participation and randomly assigned to depletion or non-depletion conditions. Participants first completed a pen and paper task in which they were instructed to cross off letters on a page of text from a graduate statistics textbook, a depletion manipulation adopted from past research (e.g., Baumeister et al. 1998). In the non-depletion condition, the task was to simply scan the text and cross off all instances of the letter 'e.' In the depletion condition, the task required crossing off all instances of the letter 'e' when two rules were met: 1) the letter 'e' was not adjacent to a vowel; and 2) it was not one letter away from another vowel. Thus, the depletion condition required thinking about complex rules and inhibiting the impulse to cross off each letter 'e.'

Upon completing the initial task, participants moved to the computer where they were instructed to read a print ad for Avalanche Toothpaste. Similar to Experiment 1, we explicitly instructed participants to process the information carefully (e.g., Chaiken and Maheswaran 1994). The ad presented strong and favorable arguments about Avalanche Toothpaste (e.g., reduces gingivitis more than other leading brands) and exposure time was two minutes. After reading the ad, participants indicated their attitudes and attitude certainty on the same scales as in Experiment 1, and responded to three questions adapted from prior research (i.e., Barden and Petty 2008; Smith et al. 2007) to measure their perceived elaboration on 1 (*not at all*) to 9 (*very much*) scales: "How thorough were you in processing information about Avalanche Toothpaste?" "How careful were you in processing information about Avalanche Toothpaste?" "How much attention did you pay to the message when reading the ad about Avalanche Toothpaste?" Finally, participants completed the same depletion manipulation check used in Experiment 1.

Results.

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All results were conducted using one-way ANOVA unless otherwise specified.

Manipulation Check. Confirming the manipulation, participants in the depletion condition reported that they felt more tired (M = 6.58, SD = 1.41) than those in the non-depletion condition (M = 5.29, SD = 1.77; F(1, 53) = 8.55, $p < .01$).

Attitudes. Responses on the three attitude measures were averaged to form a composite attitude index ($\alpha = .91$). There was no difference in attitudes between non-depleted (M = 6.69, SD = 1.02) and depleted participants (M = 6.73, SD = 1.19, F < 1).

Attitude Certainty. Responses to the two attitude certainty questions were averaged to form a single measure (r = .87, $p < .001$). Again supporting hypothesis 1, depleted participants were more certain of their attitudes (M = 6.27, SD = 1.39) than were non-depleted participants (M = 5.40, SD = 1.68, F(1, 53) = 4.16, $p < .05$).

Perceived Elaboration as a Mediator. Responses to the three perceived elaboration questions were averaged to form a single measure ($\alpha = .89$). To test the hypothesis (H3) that differences in attitude certainty were driven by perceived elaboration, we first examined the perceived elaboration measure in ANOVA. As predicted, depleted participants reported that their processing was more thorough (M = 6.63, SD = 1.03) than did non-depleted participants (M = 5.81, SD = 1.60; F(1, 53) = 4.73, $p < .05$). Next, we followed Baron and Kenny's (1986) procedure to test mediation. All independent variables were mean-centered and standardized prior to the analysis.

Insert figure 2 about here

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First, a regression of attitude certainty on depletion (1 = depletion, 0 = non-depletion) showed that depleted participants were more certain of their attitudes than non-depleted participants ($\beta = .27$, $t(53) = 2.04$, $p < .05$). Next, regressing participants' perceived elaboration on depletion revealed that depleted participants perceived themselves as being more thorough in processing the message than did non-depleted ones ($\beta = .29$, $t(53) = 2.18$, $p < .04$). When we regressed attitude certainty on perceived elaboration, greater perceived elaboration was associated with greater attitude certainty ($\beta = .47$, $t(53) = 3.82$, $p < .001$). Finally, using both depletion and perceived elaboration to predict attitude certainty, we found that perceived elaboration was significantly related to attitude certainty ($\beta = .42$, $t(52) = 3.34$, $p < .01$), but depletion level was not ($\beta = .15$, $p > .24$; see figure 2). A 95% confidence interval around the indirect effect (Shrout and Bolger 2002) revealed that the indirect effect was significantly different from zero (95% CI = .04 to .40). Thus, perceived elaboration mediated the relationship between depletion and attitude certainty, supporting hypothesis 3.

Discussion.

Replicating Experiment 1 in a different product category with a different ad exposure time and a different depletion manipulation, we found that depleted participants were more certain about their attitudes than non-depleted participants despite the fact that the attitudes themselves (i.e., valence and extremity) were similar (H1). We also documented that depleted (vs. non-depleted) participants *perceived* they were more thorough in their processing of the advertisement, and that perceived elaboration mediated the certainty effect (H3). Combined with Experiment 1, then, we have demonstrated that despite holding identical attitudes as non-depleted consumers, depleted consumers perceive they have thought more about an advertised

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product, feel more certain of their attitudes toward that product, and make more attitude-consistent purchase decisions with respect to that product (i.e., more likely to purchase when attitudes are favorable). These findings suggest that regulatory depletion can have hidden effects on consumer's attitudes, effects that have positive consequences for advertising effectiveness under conditions previously identified as unaffected by regulatory depletion (e.g., high processing motivation; Muraven and Slessareva 2003).

EXPERIMENT 3

Overview and Design.

Experiment 3 was designed to examine whether changing consumers' naïve beliefs about the relationship between feeling depleted and thoroughness of information processing affected attitude certainty. We chose to examine the role of naïve beliefs in moderating the effect of depletion on advertising effectiveness. Examining the moderating effect of consumers' naïve belief provides another means to establish the explanatory role of perceived elaboration in the present work. As long as people believe that depletion indicates greater processing, depletion should enhance attitude certainty. In theory, though, if people believe that depletion indicates *less* thorough processing, we would expect to observe a negative effect of depletion on certainty. Put differently, we can use a moderation approach to inform the mechanism for the current effects by manipulating perceptions of the depletion-elaboration association (Spencer, Zanna, and Fong 2005). By manipulating the proposed mechanism directly and demonstrating that perceived elaboration affects attitude certainty, we would acquire additional evidence that this mechanism is responsible for the observed difference in certainty (e.g., Harmon-Jones et al.

2008; Spencer, Zanna, and Fong 2005). Prior research has separately suggested that people can form their own naïve beliefs about both self-regulation (e.g., Mukhopadhyay and Johar 2005) and persuasion (e.g., Friestad and Wright 1995), and that such beliefs are malleable.

We put forth the following hypothesis.

H_4: Holding the naïve belief that depletion indicates that one is more (less) thorough on a subsequent task should lead depleted consumers to be more (less) certain of their attitudes than non-depleted consumers.

In Experiment 3 we also aimed to rule out the possibility that our effects were due to differences in actual elaboration. For example, one might argue that perhaps depleted individuals actually process the information more thoroughly and thus the increase in certainty stems from differences in actual elaboration. While this would still be important to know as it would still reveal a hidden effect of depletion, this perspective is different from the one we have taken. To address this issue, we took several steps to rule out the explanation related to differences in actual information processing. First, we manipulated consumers' naïve beliefs after the target advertisement to prevent it from affecting consumers' motivation or interest while processing the advertisement. That is, because the manipulation occurred after message processing, the manipulation itself would not be expected to alter the actual information processing.

In addition, Experiment 3 also manipulated the strength of the arguments presented in the advertisement. Past research has shown that the degree of attitudinal difference between weak and strong argument conditions is a clear indicator of message processing, such that greater processing leads to greater discrimination between strong and weak arguments (Petty and Cacioppo 1986; Petty and Wegener 1998). If elaboration is equally high among depleted and

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non-depleted individuals, the distinction between weak and strong arguments should be equivalent for both groups. Importantly, while past research suggests that depleted individuals are more susceptible to weak arguments due to reduced counterarguing (Wheeler, Briñol, and Hermann 2007), in the present research we encouraged extensive processing among all participants, as in Experiments 1 and 2, and we anticipated that both depleted and non-depleted participants would be equally capable of processing and thus show similar attitudes within the strong and weak argument conditions.

As a final means of testing for differences in actual elaboration, Experiment 3 also measured participants' thoughts related to the ad, a measure highly sensitive to actual processing differences (see Petty and Wegener 1998). While we anticipated no differences in actual elaboration (i.e., differences in thoughts or in discrimination between strong and weak arguments), we included measures of perceived elaboration to determine if such perceptions accounted for our certainty effects as in Experiment 2.

Thus, Experiment 3 employed a 2 (regulatory depletion: depletion vs. non-depletion) × 2 (naïve belief: depletion indicates more thorough processing vs. depletion indicates less thorough processing) × 2 (argument strength: strong vs. weak) between-subjects design. For attitudes, we predicted only a main effect of argument quality, such that consumers would be more favorable to strong arguments than weak arguments. This outcome would indicate equivalent processing across conditions. For attitude certainty, we predicted a depletion × naïve belief interaction that was unaffected by argument strength.

Procedure.

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One hundred and seventeen undergraduates (65 females) from Hong Kong were paid for their participation and were randomly assigned to one of the eight experimental conditions. Following the procedure used in Experiment 1, participants completed a thought suppression task (Vohs and Faber 2007) followed by a 30-second exposure to a print ad describing the major features of the Lengonia Bite Cracker. All participants received the same high processing induction as used in Experiment 1. In the strong argument condition, participants received the same message from Experiment 1 describing the Lengonia Bite product as having superior ingredients. In the weak argument condition, the product was described as having less impressive ingredients such as "traces of oats and concentrated fruit syrups". The strong and weak arguments were pre-tested using a separate sample of 40 participants to establish that, though they all argued unambiguously in favor of the snack food, they differed in their perceived strength.

After reading the ad, participants reported their attitudes on the same items used in the previous experiments, followed by a bogus debriefing that manipulated their naïve belief about the relationship between depletion and elaboration. All participants were told in the "debriefing" that they had completed the experimental tasks and that the researcher would like to provide them with extra information about these tasks. Participants in the "depletion indicates more (less) thorough information processing" condition read the following message as part of the ostensible debriefing script: "Substantial research in psychology and education has demonstrated that when people feel mentally fatigued and tired, their processing of message or product information will be more (less) thorough and more (less) careful. The theory is that if people are mentally fatigued, they will actually be more (less) engaged and task-focused and hence be more (less)

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thorough in their information processing. Conversely, if people do *not* feel mentally fatigued, their processing of message information will be less (more) thorough or less (more) careful." Importantly, the naïve belief manipulation was inserted *after* participants had already processed the ad. This timing provided an additional safeguard that any effect of the naïve belief manipulation would not be a result of changing participants' actual message processing.

Next, participants reported their attitude certainty and perceived elaboration on the same scales as used in Experiment 2, with the order of the two sets of questions counterbalanced. Then, participants were asked to list all of the thoughts they had about Lengonia Bite following the procedure developed by Cacioppo and Petty (1981). Finally, they responded to the same depletion manipulation check as in previous experiments.

Results.

Manipulation Check. A 2 × 2 × 2 ANOVA performed on the manipulation check revealed only a significant main effect of depletion: Participants in the depletion condition reported that they felt more tired (M = 6.44, SD = 1.06) than did participants in the non-depletion condition (M = 5.85, SD = 1.56, F(1, 109) = 5.73, $p < .05$). No other effects were significant ($p > .22$).

Message-Related Thoughts. Participants' thoughts were classified as favorable, unfavorable, or neutral toward the product by two judges unaware of the conditions and hypotheses. Judges agreed on 95% of the thoughts, and disagreements were resolved by discussion. Two indices were computed. One was the total number of message-related thoughts. The other was a thought favorability index formed by subtracting the number of unfavorable message-related thoughts from the number of favorable message-related thoughts and dividing

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this difference by the total number of message-related thoughts (e.g., Cacioppo and Petty 1981). A three-way ANOVA on the total number of message-related thoughts revealed that neither the three-way interaction, nor the two-way interactions, nor any main effects were significant (*ps* > .12). A three-way ANOVA on the thought favorability index showed only a main effect of argument quality: participants in the strong argument condition had more favorable thoughts (M = .49, SD = .44) than did participants in the weak argument condition (M = -.26, SD = .61; F(1, 104) = 52.37, p <.001). All other effects were not significant (p > .29). These results showed that participants across conditions generated an equal number of thoughts and differentiated equally well between strong and weak arguments, suggesting that depleted and non-depleted participants did not differ in their actual processing of the ad.

Attitudes. Responses to the three attitude items were aggregated to form an attitude index (α = .95). A three-way ANOVA performed on the attitude index revealed only a main effect of argument quality: Participants in the strong argument condition evaluated Lengonia Bite more favorably (M = 6.33, SD = 1.39) than did participants in the weak argument condition (M = 4.87, SD = 1.71, F(1, 109) = 23.41, p < .001). All other effects were not significant (Fs < 1). Thus, participants in all conditions, whether depleted or not, were equally able to differentiate the quality of arguments in the ad, indicating both groups thought carefully and to a similar extent.

Attitude Certainty. Responses to the two attitude certainty items were aggregated to form an attitude certainty index (r = .71, p < .001). A three-way ANOVA performed on the attitude certainty index indicated only a significant depletion × naive belief interaction (F(1, 109) = 17.41, p < .001, see figure 3). When the naive belief was that depletion indicates more thorough processing, participants in the depletion condition were more certain (M = 6.59, SD = 1.43) than

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participants in the non-depletion condition (M = 5.18, SD = 1.61, F(1, 109) = 11.46, p = .001). When the naive belief was that depletion indicates less thorough processing, the reverse was true: depleted participants were less certain (M = 5.62, SD = 1.66) than non-depleted participants (M = 6.54, SD = 1.23, F(1, 109) = 6.15, p < .02). Thus, hypothesis 4 was supported. Viewed differently, these results suggest that when the initial task was depleting, participants who believed that depletion indicates more thorough processing were *more* certain of their attitudes than those who believed that depletion leads to less thorough processing (F(1, 109) = 5.81, p < .02). In contrast, when the initial task was non-depleting, participants who believed that depletion indicates more thorough processing were *less* certain about their attitude than those who believed that depletion leads to less thorough processing (F(1, 109) = 12.21, p < .001).

Insert figures 3 and 4 about here

Perceived Elaboration as a Mediator. Responses to the three items were aggregated to form a single measure (α = .80). To examine whether the moderation effect of naïve belief on the link between depletion and attitude certainty was driven by participants' perceived elaboration, we first performed a three-way ANOVA on the perceived elaboration measure. The results indicated only a significant depletion × naive belief interaction (F(1, 109) = 15.47, p < .001). All other effects were not significant (p > .27). Simple contrasts showed when the naive belief was that depletion indicates more thorough processing, depleted participants reported greater perceived elaboration (M = 6.59, SD = 1.10) than did non-depleted participants (M = 5.79, SD = 1.29, F(1, 109) = 5.72, p < .02). When the naive belief was that depletion indicates less thorough processing, the opposite pattern emerged: depleted participants reported less perceived

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elaboration (M = 5.55, SD = 1.38) than did non-depleted participants (M = 6.54, SD = 1.12, F(1, 109) = 10.34, $p < .01$).

Next, we performed a mediated moderation analysis following the recommendations of Muller, Judd, and Yzerbyt (2005). Prior to regression analyses, all independent variables were mean-centered and standardized. The argument quality variable was not used in the regression models because it does not affect attitude certainty or perceived elaboration. We regressed attitude certainty on depletion condition, naïve belief, and their interaction. The results indicated only a significant interaction effect (β = .37, t(113) = 4.23, $p < .001$). Next, we regressed perceived elaboration on depletion condition, naïve belief, and their interaction. This also produced only a significant interaction (β = .35, t(113) = 3.94, $p < .001$). Finally, we regressed attitude certainty on depletion condition, naïve belief, the depletion × naïve belief interaction, perceived elaboration, and the perceived elaboration × naïve belief interaction. A significant main effect of perceived elaboration emerged (β = .64, t(111) = 9.00, $p < .001$), and the depletion × naïve belief interaction remained significant (β = .15, t(111) = 2.05, $p < .05$). However, the coefficient of the depletion × naïve belief interaction on attitude certainty was significantly reduced compared to when perceived elaboration was not included in the model (see figure 4). A 95% confidence interval around the indirect effect revealed that the indirect effect was significantly different from zero (95% CI = .18 to .56; Shrout and Bolger 2002). These results suggest that perceived elaboration played a significant mediating role in the depletion × naïve belief interaction effect on attitude certainty.

Discussion.

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Results from Experiment 3 indicated that the effect of depletion on attitude certainty was moderated by participants' naïve belief about the relationship between depletion and thoroughness of information processing, and that the moderation effect was mediated by perceived elaboration. Furthermore, multiple measures (argument quality, thought listings) suggested no differences in actual elaboration. And, given that the naïve belief manipulation occurred after message processing, it seems unlikely that differences in certainty were due to any actual differences in processing activity.

Notably, our direct manipulation of naïve beliefs might raise possible concerns about demand. Although the directness of this manipulation is a limitation in this experiment, we believe that this manipulation also has several distinct advantages. First, the directness of the manipulation gives us added confidence that it is perceived elaboration, and not another construct, that was affected by our manipulation. Second, although we manipulated the relation between depletion and perceived elaboration directly, our manipulation did not discuss or imply what the implications of this should be for attitude certainty. Thus, the manipulation of perceived elaboration was direct and explicit, but participants spontaneously used this perception to infer certainty, which was the more crucial aspect of this study. Finally, across experiments we have converging evidence that the affect of depletion on certainty is due to perceived elaboration. Thus, we think the strengths of our approach and the convergence across experiments reduce concerns about demand effects.

Experiment 3 also demonstrated that when the ad message contained weak arguments, participants—depleted or not—generated more unfavorable than favorable thoughts about the advertised product. This finding, in concert with past research (e.g., Muraven and Slessareva

2003; Wan and Sternthal 2008), suggests that processing deficits from depletion (e.g., Wheeler, Briñol, and Hermann 2007) can be overcome by motivation, thus fostering similar attitudes and thought patterns. Of importance, however, we found that depleted (vs. non-depleted) participants were more (less) certain of their unfavorable reactions when they believed that depletion indicates more (less) thorough processing. Thus, whereas Wheeler, Briñol, and Hermann (2007) suggest that advertisers with weak arguments might be more successful targeting depleted than non-depleted consumers, the present work makes the opposite recommendation, provided consumers are sufficiently motivated to process. That is, if depleted consumers were as motivated as non-depleted consumers to process, they would not only hold attitudes and thoughts that were equally unfavorable in response to weak arguments, but they would also be more certain of those attitudes. Taken together, the two streams of research suggest that processing motivation might be an important moderator of whether depletion hinders or helps marketers with weak arguments.

GENERAL DISCUSSION

In marketing contexts in which the ad induces high processing motivation, depleted and non-depleted individuals exhibit no difference in their attitudes toward the advertised product (Experiments 1-3), thoughts related to the ad (Experiment 3), or their ability to differentiate between strong and weak arguments (Experiment 3). As predicted, however, the present work uncovered a previously hidden effect by considering the role of attitude certainty. Compared to non-depleted consumers, depleted consumers are more certain of their attitudes toward the

advertised product (Experiments 1-3). Moreover, this difference in certainty yields more favorable purchase decisions for favorable attitudes (Experiment 1).

Using both mediation (Experiments 2 and 3) and moderation approaches (Experiment 3), we also found that the effect of depletion on attitude certainty is driven by a perception of greater processing or elaboration among depleted individuals, despite equivalence in actual processing as measured by ad-related thoughts, attitudes, and strong-weak argument differentiation. Moreover, we have also documented a boundary condition for the effect. Specifically, the positive effect of depletion on attitude certainty can be moderated by altering consumers' naïve belief about the relationship between depletion and thoroughness of information processing (Experiment 3).

Theoretical Contribution.

The present research extends the literature on consumer self-regulation and advertising. For example, prior research has examined how consumers' regulatory focus (Zhao and Pechmann 2007) as well as their regulation of others' impression of them (Puntoni and Tavassoli 2007) can influence their responses to advertising. In this research, we investigated the effect of regulatory *depletion*—a seemingly common state among today's consumers resulting from exerting self-regulatory resources—on consumers' responses to advertising. We found that although consumers' attitudes and ad-related thoughts can remain unaffected by depletion when processing motivation is sufficiently high, depletion increases consumers' attitude certainty and fosters greater influence of attitudes on purchase decisions. Our findings suggest attitude certainty as an important indicator of advertising effectiveness in addition to the commonly used measures such as advertising memory and attitudes.

Our findings also contribute to research on regulatory depletion and persuasion by revealing a previously hidden effect of depletion on people's attitudes. Prior research has shown that depletion can inhibit the generation of counterarguments against weak persuasive messages, and thus lead to more persuasion among depleted than non-depleted individuals (Fennis, Janssen, and Vohs forthcoming; Wheeler, Briñol, and Hermann 2007). However, Wheeler and colleagues found that depletion does not affect consumers' attitudes when arguments are strong. The present research (Experiment 3) documented that, when motivated, depleted consumers can overcome processing deficits even under weak argument conditions, a finding consistent with past research showing that depletion effects on self-regulation can be eliminated when individuals are adequately motivated (e.g., Muraven and Slessareva 2003; Wan and Sternthal 2008). Importantly, the present research suggests that even when consumers are motivated to overcome the effects of depletion on processing and attitudes, there can be important effects on attitude certainty.

We believe this finding provides a particularly interesting insight as it suggests that a variable that attenuates or removes the effects of depletion on one measure (e.g., processing or attitudes) should not necessarily be taken as evidence that there is no effect of depletion. Measuring attitude certainty can provide an additional layer of insight into consumer behavior in this domain. In addition, the current research demonstrated an effect of depletion on actual purchase decision, which is relatively uncommon in the depletion literature (see Baumeister, Vohs, and Tice 2007).

The current research focuses on examining depletion and persuasion in relatively high processing contexts and demonstrates a compelling and counterintuitive effect. Here, individuals are likely to process messages systematically, whether depleted or not. Future research is needed

to examine how depletion will influence attitude certainty and behavior in contexts where consumers are not motivated to process information systematically. For example, in situations where processing motivation is low there might be little link between depletion and attitude certainty as consumers might not reflect on the amount of time they have spent. In addition, when processing motivation is moderate depletion might affect the amount of processing and thus attitudes, as alluded to in past work, but have little effect on attitude certainty. More fully studying the effect of depletion across the continuum of processing motivation will be an important task for future research.

Practical Implications.

While the present paper is conceptual in nature, we believe it can serve as a springboard for practice as well. For example, one implication of our research is that marketers with highly involving or engaging messages might benefit from targeting consumers at times where they are likely to be depleted (e.g., in the evening after a day of work). At such times, if consumers are motivated to process a strong message due to its high relevance or interest, they are likely to be more certain of their favorable attitudes and thus more inclined to act in accordance with those attitudes (e.g., purchase). Indeed, applying the counterintuitive findings of the present research to real marketing contexts represents a ripe area for future work.

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FOOTNOTES

1. Attitude scores above the midpoint of the nine-point scale on our attitude measure are regarded as positive attitudes.
2. We also analyzed the attitude-behavior correspondence in the entire sample (N = 54). We found that: (1) the attitude-purchase correlation was significantly stronger among depleted participants (r = .55, $p < .01$) than among non-depleted participants (r = .05, $p = .81$; z = -1.96, $p < .05$), and (2) the effect of depletion on attitude-behavior correspondence was mediated by attitude certainty (95% CI = .02 to .19). These results provide convergent evidence for the behavioral consequence of depletion due to differences in attitude certainty.

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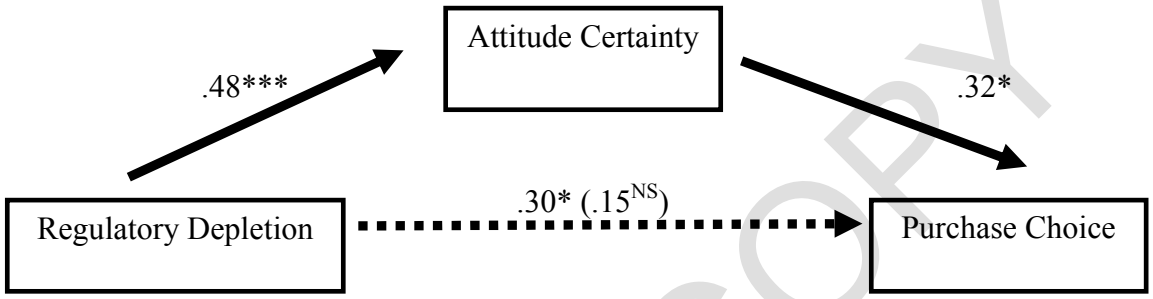
Figure 1

PATH MODEL OF MEDIATION ANALYSIS IN EXPERIMENT 1



Note: Values in the parentheses indicate the effects from the simultaneous regression including both depletion condition and attitude certainty as predictors.
*significant at .05 level; ***significant at .001 level.

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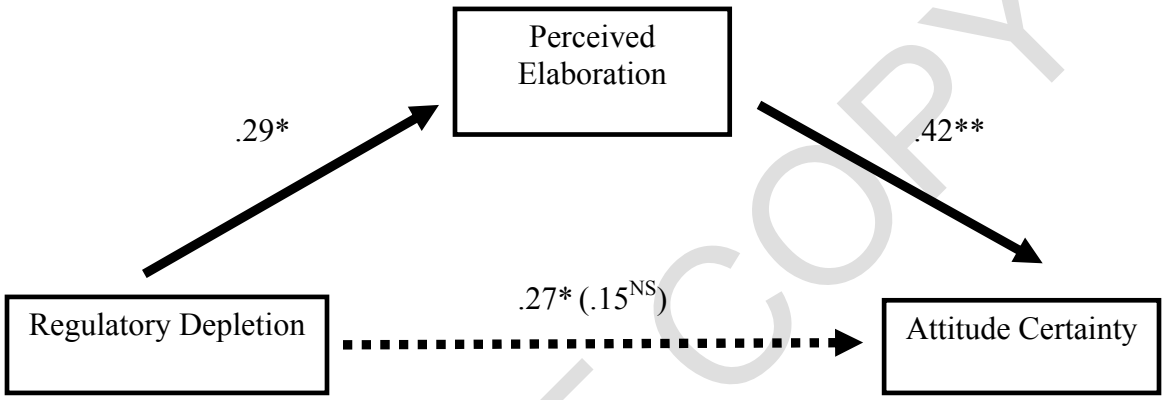
Figure 2

PATH MODEL OF MEDIATION ANALYSIS IN EXPERIMENT 2



Note: Values in the parentheses indicate the effects from the simultaneous regression including both depletion and perceived elaboration as predictors.
*significant at .05 level; **significant at .01 level.

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Figure 3

ATTITUDE CERTAINTY AS A FUNCTION OF
REGULATORY DEPLETION AND NAÏVE BELIEF (EXPERIMENT 3)

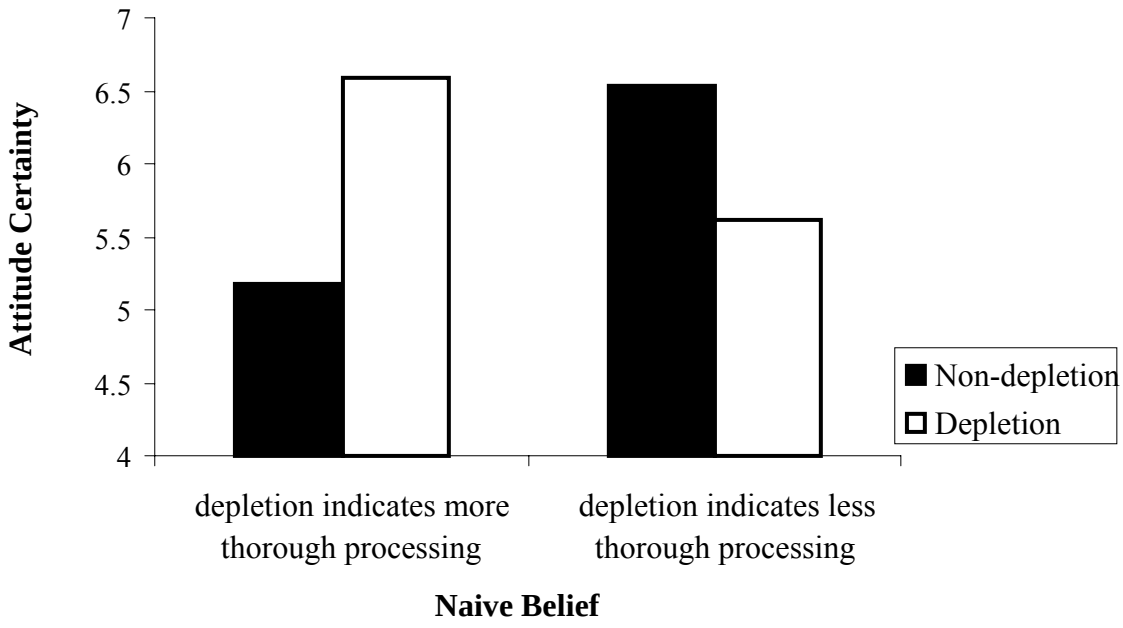

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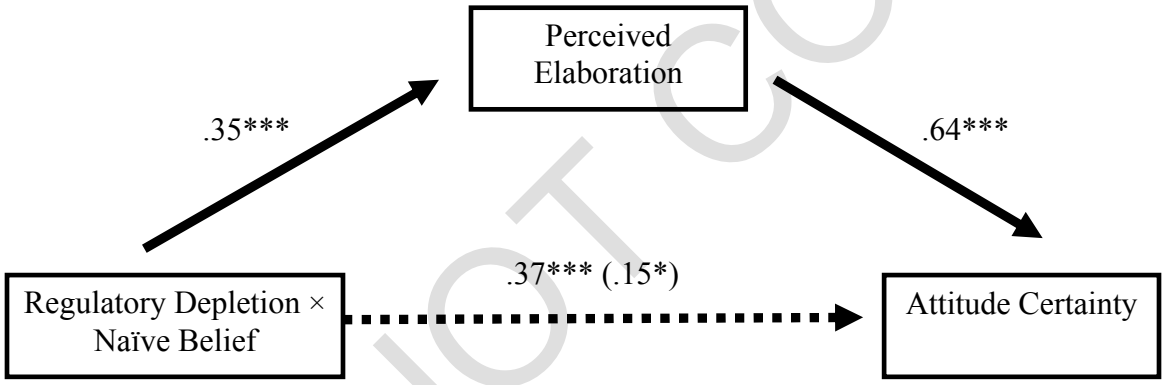
Figure 4

PATH MODEL OF MEDIATION ANALYSIS IN EXPERIMENT 3



Note: Values in the parentheses indicate the effects from the simultaneous regression including both depletion x naïve theory interaction and perceived elaboration as predictors.
*significant at .05 level; ***significant at .001 level.