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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 consumers are highly motivated to process. In contrast to these conclusions, the authors contend that depletion has important but previously hidden effects in such contexts. That is, although attitudes are equivalent in valence and extremity, consumers are more certain of their attitudes when they form them under conditions of depletion than nondepletion. 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 their purchase behavior. Three experiments, using different products and ad exposure times, confirm these hypotheses. Experiment 3 demonstrates the potential to vary consumers' naive beliefs about the relationship between depletion and thoroughness of processing, and this variation moderates the effect of depletion on attitude certainty. The authors discuss the theoretical contributions and implications for marketing.

Keywords: attitude certainty, self-regulatory depletion, perceived elaboration, advertising effectiveness, consumer behavior

The Effect of Regulatory Depletion on Attitude Certainty

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). 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) than on a task that is not resource demanding (i.e., nondepleting). Depletion effects may occur because any behavior involving the deliberate regulation of responses draws on the same pool of limited resources (Baumeister et al. 1998). Consequently, expending resources on a task limits the amount of resources available for subsequent tasks. Recent work has shown that being depleted from a prior task can have serious consequences, such as inhibiting consumers' restraint from excessive spending (Vohs and Faber 2007) or eating (Tice, Bratslavsky, and Baumeister 2001).

Of interest to marketers, recent research has also examined the implications of depletion for advertising effectiveness and information processing. Wheeler, Briñol, and Hermann (2007) find that when consumers are depleted from a prior task, they are more susceptible to (i.e., form more favorable attitudes toward) persuasive messages containing specious arguments. They suggest that depletion impairs consumers' ability to counterargue as they normally could,

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which in turn increases persuasion (see also Fennis, Janssen, and Vohs 2009). Schmeichel, Vohs, and Baumeister (2003) argue that depletion might instead hinder persuasion by reducing information comprehension. Specifically, they find that depleted consumers perform worse on reading comprehension tasks than nondepleted consumers, which suggests 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 common in the marketplace. For example, when message arguments are strong, which is the intent of most advertising, depleted and nondepleted consumers show equally favorable attitudes (Wheeler, Briñol, and Hermann 2007). Furthermore, when depleted consumers are motivated to perform a regulatory task, such as by verbal instructions or financial incentives, they can overcome deficits caused by a depletion task (Baumeister et al. 2005; Muraven and Slessareva 2003) and thus should not show any information processing deficits.

According to prior research, marketers might believe that there is no effect of depletion when consumers are motivated to attend to an advertisement. In contrast, we propose that in situations in which depletion effects seem to be eliminated (e.g., strong arguments, high motivation to process information), there might be important effects of depletion that have simply been hidden in prior research efforts. We further propose that under conditions in which advertising produces equally favorable attitudes and degrees of information processing, depletion might nonetheless affect consumers' attitude certainty. Specifically, from the hypothesis that feeling depleted might foster the perception that consumers have been more thorough in their information processing, we predict that feeling depleted leads consumers to be more certain of their attitudes following an advertisement, despite the lack of differences in their actual information processing or attitudes. Furthermore, we propose that by increasing attitude certainty, depletion can increase 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 a person'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 about an attitude, or the extent to which a person believes his or her 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. Two consumers holding

the same positive attitude toward a product after reading an advertisement could be differentially likely to buy the product as a function of differences in their 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) find that consumers are more likely to report purchase intentions consistent with their attitudes when they hold those attitudes with high rather than low certainty. In another investigation, Bassili (1996) finds that 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, it might be intuitively expected to be negative—that is, increasing self-regulatory depletion decreases the subjective feeling of attitude certainty. After all, depleted people should perceive ad processing as more difficult than nondepleted people. 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 increases attitude certainty. At first glance, this hypothesis might seem less plausible; however, this alternative view is based on research that suggests that (1) depletion fosters 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 fosters greater attitude certainty (e.g., Barden and Petty 2008).

Several studies suggest that compared with nondepleted people, depleted people believe that they 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. In turn, time and effort spent on a task 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 the perceived thoroughness of processing (i.e., elaboration) are positively associated with attitude certainty. Berger and Mitchell (1989) show that repeated advertisement exposure increases attitude certainty, arguably because ad repetition enhances consumers' actual product-relevant elaboration. Moreover, both Barden and Petty (2008) and Smith and colleagues (2007) find that perceived elaboration—the subjective assessment of how carefully the person has processed information—mediates the effect of actual elaboration on attitude certainty.

Yet perceived elaboration can 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 believe that he or she was relatively thorough in processing the advertisement whereas the other might believe that he or she was not very thorough. We pro-

pose a variable that could produce such an outcome, namely, depletion. If depleted and nondepleted consumers are both motivated to process the same advertisement for the same amount of time (e.g., an attention-grabbing television commercial), 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, depleted people should perceive themselves as having been more elaborative in their processing (i.e., more effortful and thorough) than nondepleted people. Differences in this perceived elaboration should then lead to greater attitude certainty among depleted people.

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 the following:

H₁: Depleted and nondepleted consumers will form similar attitudes toward the product featured in an advertisement. However, depleted consumers will be more certain of their attitudes than nondepleted consumers.

As we discussed previously, it is important to assess attitude certainty because of its significant role in influencing one of the most valued measures of advertising effectiveness, namely, purchase behavior (e.g., Weiss and Windal 1980). Prior 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). Therefore, we hypothesize the following:

H₂: Compared with nondepleted consumers, depleted consumers will be more likely to purchase an advertised product toward which they hold positive attitudes.

We postulate that if people have sufficient motivation to process information, differences in certainty result from differences in perceived, not actual, elaboration. That is, providing a high motivation to process information should not lead depleted people to engage in more processing than nondepleted people but rather should eliminate any processing differences between the groups (Muraven and Slessareva 2003). However, depletion should lead people to believe that they have exerted more effort and been more thoughtful (e.g., Vohs and Schmeichel 2003; Wan and Sternthal 2008), which fuels differences in attitude certainty.

H₃: Depleted consumers will believe that they have engaged in greater processing of the target information than nondepleted consumers, and this inference will mediate the greater certainty found among depleted consumers.

For our initial examination of the effects of depletion on attitude certainty, we focus specifically on contexts associated with relatively high processing motivation (i.e., to overcome initial depletion) and everyday consumer decisions. In three experiments, we expose participants to an advertisement after manipulating their state of depletion. Although we expect no differences in participants' attitudes toward the target product, because we provide all participants with high motivation to read the advertisement, we anticipate differences in attitude certainty. We also examine the mecha-

nism underlying the effect of depletion on attitude certainty, as well as a boundary condition for the effect.

EXPERIMENT 1

Overview and Design

With Experiment 1, we tested our hypotheses by asking participants to complete a depleting versus nondepleting task and then to respond to a print advertisement for a snack product. To motivate all participants to process the advertisement carefully, we highlighted the importance of their participation in the study (e.g., Chaiken and Maheswaran 1994). We expected that motivating both groups to actively process the advertisement would induce equivalent attitudes between depleted and nondepleted participants (Muraven and Slessareva 2003). However, because of the differences in their perceived elaboration, we also expected attitude certainty to be greater for depleted than nondepleted participants. Furthermore, we predicted that these differences in certainty would create differences in purchasing behavior, such that depleted (versus nondepleted) participants with favorable attitudes would be more likely to purchase the advertised product.

The first experiment also provided a test of an alternative hypothesis for the effect of depletion on attitude certainty, based on an ease-of-processing perspective. As we already noted, 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 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 for a test of this competing proposition.

Procedure

Fifty-four undergraduate students (29 women) from a university in Hong Kong participated in exchange for payment and were randomly assigned to depletion or nondepletion conditions. For the depletion manipulation, the 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 nondepletion condition, participants were allowed to think about anything (including a white bear).

Next, the participants were exposed to a print advertisement for a new brand of snack (i.e., Lengonia Bite Crackers) for 30 seconds, an exposure time similar to short magazine advertisements and televised commercials. To motivate all participants to process the advertisement carefully, we told them that they had been selected as one of a handful of consumers providing their opinions of the product and that their input was extremely important (see Chaiken and Maheswaran 1994; Petty, Harkins, and Williams 1980). The advertisement described features of the snack, such as taste, variety, and ingredients. All the feature descriptions used strong, favorable terms (e.g., "made with superior ingredients such as premier rolled oats and fresh sundried fruits").

After exposure to the advertisement, the participants reported their attitudes toward the snack on three nine-point semantic differentials ("unfavorable/favorable," "negative/positive," and "dislike/like"), with higher numbers indicat-

ing more favorable attitudes. To assess attitude certainty, we asked participants how certain and how convinced they were of their attitude (Rucker and Petty 2004). They provided their responses 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 Crackers for HK\$8 (approximately US\$1). Thus, participants made a binary choice to purchase a sample of the product or not.

Results

We analyzed all the results using one-way analyses of variance (ANOVA), unless otherwise noted.

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

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

Attitude certainty. We aggregated responses to the two attitude certainty items to form an attitude certainty index ($r = .55$, $p < .001$). Consistent with H_1 , depleted participants were more certain of their attitudes ($M = 5.98$, $SD = 1.32$) than nondepleted participants ($M = 4.88$, $SD = 1.30$; $F(1, 52) = 9.50$, $p < .01$). This result is incompatible with the alternative hypothesis that depletion would reduce attitude certainty because of the increased processing difficulty.

Purchase decision. Prior research has suggested that attitudes held with higher (versus lower) certainty serve as stronger guides for behavior (Tormala and Rucker 2007). Therefore, if consumers have favorable attitudes, increasing attitude certainty should produce more favorable behavior. To test this possibility, we examined whether there were mean differences in consumers' purchase decisions (1 = purchase, 0 = nonpurchase) as a function of depletion.

We focused only on participants with positive attitudes, because only for these people should increasing certainty produce more positive behaviors; for participants with negative attitudes, increased certainty should lead to more negative behavior.¹ In addition, the number of participants who held negative attitudes ($n = 9$) was too small to submit to an analysis. Among those with favorable product attitudes, there were no differences in attitudes between depleted ($M = 6.78$, $SD = .73$) and nondepleted ($M = 6.45$, $SD = 1.69$; $F(1, 43) = 2.41$, $p > .12$) participants, though depleted participants were more certain ($M = 6.07$, $SD = 1.05$) than nondepleted ones ($M = 4.86$, $SD = 1.19$; $F(1, 43) = 12.87$, $p = .001$). An examination of participants' purchase choices indicated that depleted participants chose to purchase the snack more frequently ($M = .83$, $SD = .38$) than nondepleted participants ($M = .55$, $SD = .51$; $F(1, 43) = 4.35$, $p < .05$), in support of H_2 .

¹Attitude scores above the midpoint of the nine-point scale on our attitude measure indicate positive attitudes.

We next examined whether the effect of depletion on purchase choice resulted from attitude certainty, following Baron and Kenny's (1986) recommendations 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 enabled us to focus on both the continuous and the dichotomous nature of these measures. The effect of depletion on purchase in logistic regression yielded similar results. We mean-centered and standardized all independent variables in the regression analysis.

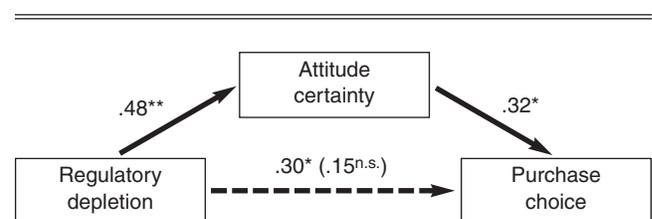
We first regressed purchase choice on depletion (1 = depletion, 0 = nondepletion), which indicated that depletion led to more purchases of the product ($\beta = .30$, $t(1, 43) = 2.09$, $p < .05$). Consistent with the ANOVA, regressing attitude certainty on depletion showed that depletion was associated 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 greater purchasing ($\beta = .39$, $t(1, 43) = 2.78$, $p < .01$). Finally, when we entered both depletion and attitude certainty into the model 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 based on the 95% confidence interval calculation (95% CI = .01 to .17; Shrout and Bolger 2002). Thus, attitude certainty mediated the effect of depletion on purchase choice.²

Discussion

Experiment 1 supports our view that in a context that encouraged people to process carefully, depleted and nondepleted participants formed similar attitudes toward a product. This outcome is consistent with a lack of differences in actual message elaboration. Of primary interest, however, was our finding that participants were more cer-

²We 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 nondepleted 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.

Figure 1
PATH MODEL OF MEDIATION ANALYSIS IN EXPERIMENT 1



*Significant at the .05 level.

**Significant at the .001 level.

Notes: Values in parentheses indicate the effects from the simultaneous regression that included both depletion condition and attitude certainty as predictors. n.s. = not significant.

tain of their attitudes when they were depleted versus non-depleted (H_1) and that this differential certainty had clear implications for their purchasing behavior (H_2). These findings reveal a previously hidden effect of regulatory depletion and highlight effects on advertising effectiveness beyond the attitude itself. Finally, although intuitively we 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 hypothesized (H_3) that even when depleted and nondepleted people engage in similar levels of actual information processing, differences in certainty stem from depleted people's belief that they have been more thorough in their processing. To test this mechanism, we measured participants' perceived elaboration of the advertisement and examined its role with regard to the effect of depletion on attitude certainty.

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

Procedure

Fifty-five undergraduate students (30 women) from a university in Hong Kong received payment for their participation and were randomly assigned to depletion or nondepletion conditions. Participants first completed a pen-and-paper task that instructed them to cross out letters on a page of text from a graduate statistics textbook, a depletion manipulation adopted from prior research (e.g., Baumeister et al. 1998). In the nondepletion condition, the task was to scan the text and cross out all instances of the letter "e." In the depletion condition, the task required participants to cross out all instances of the letter "e" if two rules were met: (1) the letter "e" was not adjacent to another 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 out each letter "e."

After completing the initial task, participants moved to a computer, where they were instructed to read a print advertisement for Avalanche Toothpaste. Similar to Experiment 1, we explicitly instructed participants to process the information carefully (e.g., Chaiken and Maheswaran 1994). The advertisement presented strong and favorable arguments about Avalanche Toothpaste (e.g., reduces gingivitis more than other leading brands), and the exposure time was two minutes. After reading the advertisement, participants indicated their attitudes and attitude certainty on the same scales as in Experiment 1, and they 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?" and "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

We obtained all the results using one-way ANOVA, unless otherwise specified.

Manipulation check. In confirmation of the manipulation, participants in the depletion condition reported that they felt more tired ($M = 6.58$, $SD = 1.41$) than those in the nondepletion condition ($M = 5.29$, $SD = 1.77$; $F(1, 53) = 8.55$, $p < .01$).

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

Attitude certainty. We averaged the responses to the two attitude certainty questions to form a single measure ($r = .87$, $p < .001$). Again, in support of H_1 , depleted participants were more certain of their attitudes ($M = 6.27$, $SD = 1.39$) than nondepleted participants ($M = 5.40$, $SD = 1.68$; $F(1, 53) = 4.16$, $p < .05$).

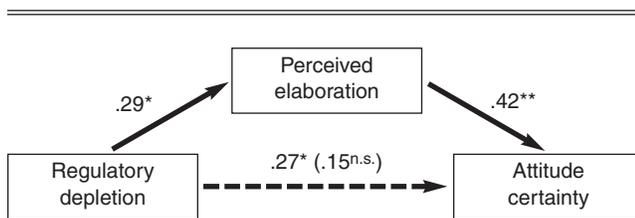
Perceived elaboration as a mediator. We averaged responses to the three perceived elaboration questions to form a single measure ($\alpha = .89$). To test the hypothesis that differences in attitude certainty result from perceived elaboration, we first examined the perceived elaboration measure with an ANOVA. As we predicted, depleted participants reported that their processing was more thorough ($M = 6.63$, $SD = 1.03$) than nondepleted 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 for mediation. We mean-centered and standardized all independent variables before the analysis.

First, a regression of attitude certainty on depletion (1 = depletion, 0 = nondepletion) showed that depleted participants were more certain of their attitudes than nondepleted participants ($\beta = .27$, $t(53) = 2.04$, $p < .05$). Second, regressing participants' perceived elaboration on depletion revealed that depleted participants perceived themselves as more thorough in processing the message than nondepleted participants ($\beta = .29$, $t(53) = 2.18$, $p < .04$). Third, 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 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, in support of H_3 .

Discussion

By replicating Experiment 1 in a different product category with a different ad exposure time and a different deple-

Figure 2
PATH MODEL OF MEDIATION ANALYSIS IN EXPERIMENT 2



*Significant at the .05 level.

**Significant at the .01 level.

Notes: Values in parentheses indicate the effects from the simultaneous regression that included both depletion and perceived elaboration as predictors. n.s. = not significant.

tion manipulation, we found that depleted participants were more certain about their attitudes than nondepleted participants, even though their attitudes (i.e., valence and extremity) were similar (H_1). We also documented that depleted (versus nondepleted) participants believed that they were more thorough in their processing of the advertisement, and their perceived elaboration mediated the certainty effect (H_3).

Combined with Experiment 1, the results from Experiment 2 demonstrate that despite holding identical attitudes to those of nondepleted consumers, depleted consumers believe that they have thought more about an advertised product, feel more certain about their attitudes toward that product, and make more attitude-consistent purchase decisions with respect to the product (i.e., are more likely to purchase when their attitudes are favorable). These findings suggest that regulatory depletion can have hidden effects on consumers' attitudes, which 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

We designed Experiment 3 to examine whether changing consumers' naive beliefs about the relationship between feeling depleted and the thoroughness of their information processing would affect their attitude certainty. We chose to examine the role of naive beliefs in moderating the effect of depletion on advertising effectiveness and thereby further establish the explanatory role of perceived elaboration. As long as people believe that depletion indicates greater processing, depletion should enhance their attitude certainty. In theory, however, if people believe that depletion indicates less thorough processing, we would expect to observe a negative effect of depletion on certainty. In other words, we used a moderation approach to determine the mechanism for the effects in Experiments 1 and 2 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 can 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 form their own naive 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. Therefore, we put forth the following hypothesis.

H_4 : Holding the naive belief that depletion indicates more (less) thoroughness on a subsequent task should lead depleted consumers to be more (less) certain of their attitudes than nondepleted consumers.

In Experiment 3, we also aimed to rule out the possibility that the preceding effects were due to differences in actual elaboration. For example, perhaps depleted people actually process the information more thoroughly, so the increase in their certainty stems from differences in their actual elaboration. Although this effect would be important to identify because it would reveal a hidden effect of depletion, this perspective differs from the one we have taken. Therefore, we took several steps to rule out an explanation based on differences in actual information processing. First, we manipulated consumers' naive beliefs after the target advertisement to prevent it from affecting their motivation or interest while they processed the advertisement. Because the manipulation occurred after message processing, the manipulation itself could not alter actual information processing.

Second, in Experiment 3, we manipulated the strength of the arguments in the advertisement. Prior 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 between depleted and nondepleted people, the distinction between weak and strong arguments should be equivalent for both groups. Although previous research has suggested that depleted people are more susceptible to weak arguments, because of their reduced counterarguing (Wheeler, Briñol, and Hermann 2007), we encouraged extensive processing among all participants, as in Experiments 1 and 2, and therefore both depleted and nondepleted participants should be equally capable of processing and exhibit similar attitudes across the strong and weak argument conditions.

Third, as a final means to test for differences in actual elaboration, we measured participants' thoughts related to the advertisement, which are highly sensitive to actual processing differences (see Petty and Wegener 1998). We anticipated no differences in actual elaboration (i.e., in thoughts or discrimination between strong and weak arguments), and we included measures of perceived elaboration to determine whether such perceptions accounted for the certainty effects in Experiment 2.

Thus, Experiment 3 employed a 2 (regulatory depletion: depletion versus nondepletion) \times 2 (naive belief: depletion indicates more thorough processing versus depletion indicates less thorough processing) \times 2 (argument strength: strong versus 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 to weak arguments. This outcome would indicate equivalent processing across conditions. For attitude

certainty, we predicted a depletion \times naive belief interaction that was unaffected by argument strength.

Procedure

One hundred seventeen undergraduate students (65 women) from a university in Hong Kong received payment 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 advertisement that described the features of the Lengonia Bite Crackers. All participants received the same high processing induction as in Experiment 1. In the strong argument condition, participants received the same message from Experiment 1, which described Lengonia Bite Crackers' superior ingredients. In the weak argument condition, the product description contained less impressive ingredients, such as "traces of oats and concentrated fruit syrups." A pretest of the strong and weak arguments, using a separate sample of 40 participants, established that though the conditions argued unambiguously in favor of the snack food, they differed in their perceived strength.

After reading the advertisement, participants reported their attitudes on the same items used in the previous experiments, followed by a bogus debriefing that manipulated their naive beliefs about the relationship between depletion and elaboration. All participants were told in the "debriefing" that the researcher would like to provide them with extra information about the tasks they had just completed. 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) 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.

The naive belief manipulation was inserted after participants already had processed the advertisement. This timing provided an additional safeguard that any effect of the naive belief manipulation would not result from changes to the participants' actual message processing.

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

Results

Manipulation check. A $2 \times 2 \times 2$ 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 participants in the nondepletion condition ($M = 5.85$, $SD = 1.56$; $F(1, 109) = 5.73$, $p < .05$). No other effects were significant ($p > .22$).

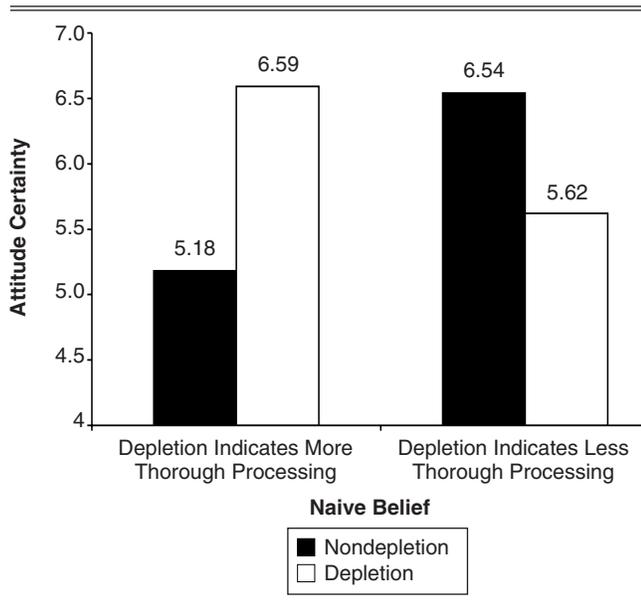
Message-related thoughts. Two judges, who were unaware of the conditions and hypotheses, classified participants' thoughts as favorable, unfavorable, or neutral toward the product. The judges agreed on 95% of the thoughts, and they resolved disagreements through discussion. Two indexes were computed: the total number of message-related thoughts and a thought favorability index formed by subtracting the number of unfavorable message-related thoughts from the number of favorable message-related thoughts and dividing the 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 the three-way interaction, two-way interactions, and main effects were not 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 participants in the weak argument condition ($M = -.26$, $SD = .61$; $F(1, 104) = 52.37$, $p < .001$). No other effects were significant ($p > .29$). These results show that participants across conditions generated an equal number of thoughts and differentiated equally well between strong and weak arguments, which suggests that depleted and nondepleted participants did not differ in their actual processing of the advertisement.

Attitudes. We aggregated responses to the three attitude items to form an attitude index ($\alpha = .95$). 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 Crackers more favorably ($M = 6.33$, $SD = 1.39$) than participants in the weak argument condition ($M = 4.87$, $SD = 1.71$; $F(1, 109) = 23.41$, $p < .001$). No other effects were significant ($F_s < 1$). Thus, participants in all conditions, whether depleted or not, were equally able to differentiate the quality of the arguments in the advertisement, indicating that both groups thought carefully and to a similar extent.

Attitude certainty. We aggregated the responses to the two attitude certainty items 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 \times naive belief interaction ($F(1, 109) = 17.41$, $p < .001$; see Figure 3). When the naive belief was that depletion indicated more thorough processing, participants in the depletion condition were more certain ($M = 6.59$, $SD = 1.43$) than participants in the nondepletion condition ($M = 5.18$, $SD = 1.61$; $F(1, 109) = 11.46$, $p = .001$). When the naive belief was that depletion indicated less thorough processing, the reverse was true; depleted participants were less certain ($M = 5.62$, $SD = 1.66$) than nondepleted participants ($M = 6.54$, $SD = 1.23$; $F(1, 109) = 6.15$, $p < .02$). Thus, the results support H_4 . They also suggest that when the initial task was depleting, participants who believed that depletion indicated more thorough processing were more certain of their attitudes than those who believed that depletion led to less thorough processing ($F(1, 109) = 5.81$, $p < .02$). In contrast, when the initial task was nondepleting, participants who believed that depletion indicated more thorough pro-

Figure 3

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



cessing were less certain about their attitude than those who believed that depletion led to less thorough processing ($F(1, 109) = 12.21, p < .001$).

Perceived elaboration as a mediator. We aggregated responses to the three items to form a single measure ($\alpha = .80$). To examine whether the moderating effect of naive beliefs about the link between depletion and attitude certainty resulted from participants' perceived elaboration, we first performed a three-way ANOVA on the perceived elaboration measure. The results indicated only a significant depletion \times naive belief interaction ($F(1, 109) = 15.47, p < .001$). No other effects were significant ($p > .27$). Simple contrasts showed that when the naive belief was that depletion indicated more thorough processing, depleted participants reported greater perceived elaboration ($M = 6.59, SD = 1.10$) than nondepleted participants ($M = 5.79, SD = 1.29; F(1, 109) = 5.72, p < .02$). When the naive belief was that depletion indicated less thorough processing, the opposite pattern emerged; depleted participants reported less perceived elaboration ($M = 5.55, SD = 1.38$) than nondepleted 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). Before the regression analyses, we mean-centered and standardized all the independent variables. We did not include the argument quality variable in the regression models because it does not affect attitude certainty or perceived elaboration. We regressed attitude certainty on depletion condition, naive belief, and their interaction. The results indicated only a significant interaction effect ($\beta = .37, t(113) = 4.23, p < .001$). Next, we regressed perceived elaboration on depletion condition, naive belief, and their interaction. This also produced only a significant interaction ($\beta = .35, t(113) = 3.94, p < .001$). Finally, we regressed attitude certainty on depletion condition, naive belief, the

depletion \times naive belief interaction, perceived elaboration, and the perceived elaboration \times naive belief interaction. A significant main effect of perceived elaboration emerged ($\beta = .64, t(111) = 9.00, p < .001$), and the depletion \times naive belief interaction remained significant ($\beta = .15, t(111) = 2.05, p < .05$). However, the coefficient of the depletion \times naive belief interaction on attitude certainty declined significantly compared with the model without perceived elaboration (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 \times naive belief interaction effect on attitude certainty.

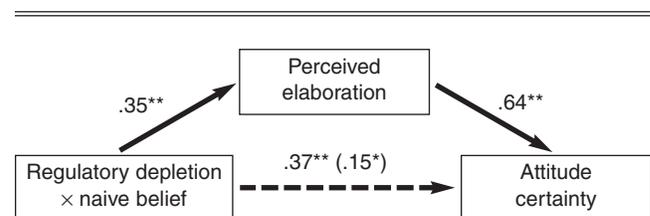
Discussion

The results from Experiment 3 indicate that participants' naive beliefs about the relationship between depletion and thoroughness of information processing moderated the effect of depletion on attitude certainty and that perceived elaboration mediated the moderation effect. Furthermore, multiple measures (argument quality, thought listings) suggested no differences in actual elaboration. Because the naive 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 naive beliefs might raise concerns about demand. Although the directness of this manipulation is a limitation in this experiment, we believe that the manipulation also has several distinct advantages. First, the directness of the manipulation gave us added confidence that perceived elaboration, not another construct, was affected by our manipulation. Second, although we manipulated the relationship between depletion and perceived elaboration directly, our manipulation did not pertain to the potential implications for attitude certainty. Thus, the manipulation of perceived elaboration was direct and explicit, but participants spontaneously used their perceptions to infer certainty, which was the more crucial aspect of this study. Third, across experiments, we attained converging evidence that the effect of depletion on certainty resulted from perceived elaboration. Thus, the strengths of our approach and the convergence across experiments should reduce concerns about demand effects.

Figure 4

PATH MODEL OF MEDIATION ANALYSIS IN EXPERIMENT 3



*Significant at the .05 level.

**Significant at the .001 level.

Notes: The value in parentheses indicates the effects from the simultaneous regression that included both the depletion \times naive theory interaction and perceived elaboration as predictors.

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 prior research (e.g., Muraven and Slessareva 2003; Wan and Sternthal 2008), suggests that processing deficits attributable to depletion (e.g., Wheeler, Briñol, and Hermann 2007) can be overcome by motivation, thus fostering similar attitudes and thought patterns. However, we also found that depleted (versus nondepleted) participants were more (less) certain of their unfavorable reactions when they believed that depletion indicated more (less) thorough processing. Thus, whereas Wheeler, Briñol, and Hermann (2007) argue that advertisers with weak arguments might be more successful targeting depleted than nondepleted consumers, we make an opposite recommendation, provided consumers are sufficiently motivated to process. That is, if depleted consumers were as motivated as nondepleted consumers to process, they would not only hold attitudes and thoughts equally unfavorable in response to weak arguments but also be more certain of those attitudes. Thus, 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 advertisement induces high processing motivation, depleted and nondepleted consumers should exhibit no differences in their attitudes toward the advertised product (Experiments 1–3), thoughts related to the advertisement (Experiment 3), or their ability to differentiate between strong and weak arguments (Experiment 3). As we predicted, however, this study uncovered a previously hidden effect by considering the role of attitude certainty. Compared with nondepleted consumers, depleted consumers were more certain of their attitudes toward the advertised product (Experiments 1–3). Moreover, this difference in certainty yielded more favorable purchase decisions in response to favorable attitudes (Experiment 1).

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

Theoretical Contribution

The current research extends the literature on consumer self-regulation and advertising. For example, prior research has examined how consumers' regulatory focus (Zhao and Pechmann 2007) and 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, who exert self-regulatory resources—on consumers' responses to advertising. We

found that though consumers' attitudes and ad-related thoughts can remain unaffected by depletion when their processing motivation is sufficiently high, depletion increases consumers' attitude certainty and fosters a greater influence of attitudes on purchase decisions. Our findings suggest that attitude certainty is an important indicator of advertising effectiveness, in addition to the commonly used measures such as advertising memory and attitudes.

The 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 among nondepleted people (Fennis, Janssen, and Vohs 2009; Wheeler, Briñol, and Hermann 2007). However, Wheeler, Briñol, and Hermann (2007) find that depletion does not affect consumers' attitudes when arguments are strong. In Experiment 3, we documented that when they are motivated, depleted consumers can overcome processing deficits, even in response to weak arguments, which is consistent with prior research that shows that depletion effects on self-regulation can be eliminated if people are adequately motivated (e.g., Muraven and Slessareva 2003; Wan and Sternthal 2008). Furthermore, even when consumers are motivated to overcome the effects of depletion on processing and attitudes, there may be other important effects on attitude certainty.

This finding provides a particularly noteworthy insight because it suggests that a variable that attenuates or removes the effects of depletion on one measure (e.g., processing, attitudes) does not necessarily mean there is no effect of depletion. Measuring attitude certainty can provide an additional layer of insight into consumer behavior in this domain. In addition, we demonstrated an effect of depletion for actual purchase decisions, which is relatively uncommon in prior depletion literature (see Baumeister, Vohs, and Tice 2007).

This research also focused on examining depletion and persuasion in relatively high processing contexts and demonstrated a compelling and counterintuitive effect. In some contexts, people are likely to process messages systematically, whether depleted or not. Further research should examine how depletion might influence attitude certainty and behavior in contexts in which consumers are not motivated to process information systematically. For example, if processing motivation is low, there might be little connection between depletion and attitude certainty, because consumers might not reflect on the amount of time they have spent processing the information. In addition, when processing motivation is moderate, depletion might affect the amount of processing and, thus, attitudes but have little effect on attitude certainty. Studying the effect of depletion across the continuum of processing motivation represents an important task for further research.

Practical Implications

Although this study is conceptual in nature, we believe it can serve as a springboard for practice as well. For example, marketers with highly involving or engaging messages might benefit from targeting consumers at times when they are likely to be depleted (e.g., in the evening, after work). At such times, if consumers are motivated to process a

strong message because it offers high relevance or interest, they also are likely to be more certain of their favorable attitudes and thus more inclined to act in accordance with those attitudes (e.g., purchase). Applying the counterintuitive findings of this study to real marketing contexts represents another ripe area for research.

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