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Does depletion have a bright side? Self-regulation exertion heightens creative engagement

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[Correction added on 20 December 2021, after first online publication: 3rd Author's first name and affiliation was updated.]

Abstract

Resource-based theories posit that exerting self-control to regulate one's thoughts, feelings, and behaviors depletes people's available self-regulatory resources, leaving them depleted and less able to exert self-control in subsequent activities. Although the detrimental effects of depletion are well-established, we challenge this prevailing view by proposing that depletion can have unexpected beneficial effects. Across multiple studies, our current research provides evidence that depletion shifts consumers' attention on benefits of creativity, and in turn influences their subsequent creative engagement. Specifically, we found that depletion increases consumers' persistence in creative activity, and this beneficial effect of depletion on creative engagement is explained by their attention on benefits of creativity. Furthermore, we explore a boundary conditions of this depletion-creative engagement effect by demonstrating that the effect could be attenuated for individuals who are not open to new experiences.

KEYWORDS

creative engagement, creativity, depletion, ego depletion, self-regulation

1 | INTRODUCTION

Exerting self-control is an essential and ubiquitous part of consumers' daily lives. For example, consumers must maintain concentration on their work in the face of distractions, control their budget while shopping, and monitor calories they are consuming while on a diet (Baumeister et al., 1998; Vohs et al., 2007; Waslund et al., 2015). Exerting self-control, however, drains people's limited pool of resources (Baumeister et al., 1998). When this pool is drained, people feel depleted, making them more vulnerable to impulses and less likely to exert subsequent self-control. For example, depleted individuals are less likely to regulate their emotions (Beedie & Lane, 2012) and resist temptations (Gino et al., 2011), and they are more likely to engage in impulsive behaviors (Barnes et al., 2015; Hofmann et al., 2008; Lin et al., 2016; Rosen et al., 2016), and being influenced by social influence techniques (Jassen et al., 2008).

The majority of research to date has focused on the detrimental effects of depletion (Gino et al., 2011; Lanaj et al., 2014; Lin et al., 2016). However, it is important to consider a wider range of consequences, including the possibility of positive ones. For example, Lisjak and Lee (2014) found that depletion could heighten individuals' sense of vulnerability, increasing their motivation to protect themselves, but generally research on the benefits of depletion is rare. Understanding beneficial outcomes of depletion is extremely important because consumers need to exert self-control almost every moment, and feeling cognitive depletion is a common experience (Johnson et al., 2018). If depletion could bring some beneficial outcomes to consumers, consumers could further utilize such beneficial outcomes and potentially choose the correct activity to participate in while depleted.

Building on Lisjak and Lee's (2014) initial work, we identify an activity that is possibly bolstered by depletion, and thus could be one that consumers allocate their attention to when depleted. Specifically, we propose that creative engagement is enhanced by depletion. When individuals are depleted, they have few self-regulatory resources to invest in goal pursuits, and thus they strive to find an easier and new way to achieve their goals given the remaining resources are not enough to exploit the existing strategy. The benefit of creativity may be salient to depleted individuals as being creative may be a way to achieve their goal. Thus, depleted individuals are more likely to pay more attention to the benefits of being creative as a way to break the current depleting cycle of regulation, resulting in more creative engagement.

This research provides several contributions to the literature. First, we pivot away from the prevailing view that cognitive depletion necessarily has detrimental effects on all behaviors. Understanding the possible beneficial effects of depletion is important because people have limited resources, and it is inevitable that they will experience cognitive depletion from time to time. If we understand the beneficial outcomes of depletion, depleted consumers could be encouraged to engage in certain activities that are harmed less or even benefited by depletion. Second, we draw on the attention allocation perspective to identify the mechanism mediating the relationship between depletion and creative engagement. Doing so is important because it aids our understanding of how the beneficial outcomes of depletion unfold. When individuals are depleted, they are more sensitive to the benefits of creativity. If we clarify this mechanism, more beneficial outcomes of depletion could potentially be investigated in the future. Finally, the current research contributes to the literature by examining the boundary conditions of depletion benefits. Specifically, we demonstrate that the benefits of depletion are contingent on how open individuals are to new experiences. If the beneficial effects of depletion only exist for

people who are open to new experiences, consumers could take steps to develop such a mindset, so that they can reap benefits from depletion. Below, we first review the resource-based theories of self-regulation. Next, we draw on the creativity literature to formulate our hypothesis that depletion triggers individuals' attention toward the benefits of creativity, leading to creative engagement. We then present four studies to test these hypotheses and the underlying mechanism.

2 | RESOURCE-BASED THEORIES OF SELF-REGULATION

According to resource-based theories of self-regulation, people have a limited pool of self-regulatory resources (Baumeister et al., 1998; Muraven et al., 1998; Muraven & Baumeister, 2000). Engaging in self-regulatory activities drains peoples' resources, leaving them mentally fatigued or depleted. Such depletion impairs individuals' in-role performance (Lin & Johnson, 2015), damages their ability to comply with professional standards (Dai et al., 2015), reduces their prosocial behavior (Johnson et al., 2014; Trougakos et al., 2015), increases their impulsive buying (Vohs & Faber, 2007), and increases their unethical and abusive behavior (Gino et al., 2011; Lin et al., 2016; Yam et al., 2014).

As previously noted, research on depletion thus far has focused almost exclusively on the detrimental outcomes of depletion. Failing to consider the potential benefits of depletion is a significant oversight considering that a nascent emerging body of research hints that depletion and the psychological consequences following depletion can, surprisingly, be beneficial. In fact, when people feel depleted, it signals that the current goal pursuit strategies are failing. Thus, such depletion states are a form of negative feedback that motivates people to take reparative action to protect their remaining regulatory resources. For example, Lisjak and Lee (2014) showed that when people are depleted, they are more likely to protect their remaining resources by engaging in self-protective behaviors and purchasing self-protective products (e.g., sun screen). Given that when current goal pursuit strategies are failing, people must search for new and more efficient strategies rather than continuing to use their existing strategy. In fact, Moreau and Dahl (2005) found that when people perceive input and time constraints, they tend to abandon existing strategies for pursuing their current goal and engage in more creative processing. Depletion could be another type of constraint. Indeed, when people's resources are limited, it is necessary for them to abandon the existing strategies for goal pursuit. Doing so may prompt them to adopt creative ways to perform their tasks. Therefore, this line of research suggests that when depleted, people are more likely to engage in and persist on creative activities.

Moreover, recent research has suggested that exertion of self-control shifts peoples' attention away from the existing self-control to the cues that signal benefits and rewards (Inzlicht & Schmeichel, 2012; Muraven et al., 2006). For example, Inzlicht and Schmeichel (2012) proposed that after exerting self-control, people are less motivated to engage in tasks that lack rewards and incentives, and instead are more interested in those that signal rewards and benefits. Muraven et al. (2006) also showed that after engaging in self-control, people are more likely to allocate their remaining resources to those activities that are essential and beneficial to them. Thus, when depleted, it is possible that the benefit of creativity is salient to individuals because adopting creative ways to pursue the current self-control activities is likely to help with the current impaired self-control. Therefore, depletion could be beneficial to individuals by altering their attention on the benefits of creativity, given that resource depletion forces

individuals to search for a novel strategy to complete their goals. Based on the above rationale and examples, we surmise that exertion of self-control can benefit individuals even if it significantly depletes their resources. One possible benefit of depletion, discussed next, is creative engagement.

3 | DEPLETION AND CREATIVE ENGAGEMENT

Creativity refers to the ability to generate novel cognitive content to solve a problem (Hirschman, 1980). Creativity is important because it brings a number of beneficial outcomes to firms. For example, consumers' creativity can increase firm innovation (Liu et al., 2017) and customer satisfaction (Gilson et al., 2005). Besides the benefits to the firms, consumers and individuals also reap the benefits from creative engagement. Here, we define creative engagement as individuals persist on engaging in creative activities. Indeed, Amabile (1983) highlighted the importance of creative engagement as noted "concentrat[ing] effort for longer periods of time" and "perserver[ing] in the face of frustration" (p. 365). Previous research has shown that there are a number of benefits associated with creative engagement, including enhancing individuals' resilience (McFadden & Basting, 2010), increasing their intrinsic motivation and long-term retention (Conti et al., 1995), improving their critical thinking ability (Kivunja, 2015). Given the existence of such benefits of creativity and creative engagement, the majority of research has focused on understanding the antecedents of creativity (Gilson et al., 2005; Liu et al., 2017). Previous research shows that when individuals are faced with challenges and setbacks, which are signified by a state of depletion, such challenges and setbacks can motivate them to be creative in order to improve their circumstances. Although without direct evidence, previous literature infers this possibility by showing that such interference could enhance consumers' creativity. For example, Mehta et al. (2012) showed that environmental interference, such as noise, could influence individuals' creativity. Such environmental interference is likely depleting, because people must use self-control to block out distractions. Thus, the availability of self-control resources may account for these effects of interference on creative engagement.

As another example, Mehta and Zhu (2015) found that resource scarcity prompted greater creative engagement. They found that when individuals perceive that they have limited (vs. abundant) resources, they are less likely to adopt a familiar (but unhelpful) method to solve the problem they are faced with. Instead, they are more likely to use products in novel ways because they are more open to use the products in multiple ways. Given that regulatory resource depletion could be considered as a type of regulatory resource scarcity, this suggests that depletion may have similar effects on creative engagement. Specifically, depleted individuals may be more likely to persist on creative tasks. Thus, extrapolating from these examples and from self-regulation theory we predict that depletion is likely to increase consumers' creative engagement.

Hypothesis 1. *Depletion increases individuals' creative engagement.*

We propose that depletion increases individuals' creative engagement through shifting their attention to the benefits of creativity. Prior research has suggested that obstacles and interferences prompt people to adopt novel ways to deal with existing problems (Hirschman, 1980). That is, when individuals face an obstacle, which prevents them from using existing methods to

deal with a problem, they would be more likely to pay attention to the benefits of novel approaches, and thus are inclined to adopt those approaches to solve the issue. For example, Clarkson et al. (2012) showed that when individuals cannot use existing knowledge to make decisions, the benefit of gaining new and novel information is more salient to the individuals. We posit that depletion could be perceived as an obstacle or source of interference, which may alter consumers' attention on the benefits of creativity. One reason is that depletion often interferes with individuals' pursuit of their current goal. For example, as previous research has shown, depleted individuals have less working memory available, which can make it difficult for them to reach their goal using their existing strategy (Schmeichel, 2007). Depletion can thus be seen as a type of internal feedback, warning individuals of impediments to goal pursuit. This feedback indicates that a different action or strategy is needed. Therefore, similar to other types of obstacles or interference (e.g., noise), depletion may direct individuals to pay more attention to creative information, making them significantly aware of the benefits of being creative.

In addition, depletion is a state, which indicates that people have resource scarcity. According to Baumeister et al. (1998), people experience depletion when they run out of their resources. When people perceive that they have scarce resources, they could pay more attention to activities that are more rewarding to them (Inzlicht & Schmeichel, 2012). Such a shift of their attention to rewards may also trigger a focus on the benefits of creativity that is apparently the best way to effectively exploit remaining regulatory resources. Depleted individuals may have greater attention on the benefits of creativity while searching for new strategies that make it easier for them to complete the current task, and thus guide them to persist on creative tasks. We hypothesize, therefore, that depleted individuals are more likely to become aware of the benefits of being creative, and that attention will ultimately increase their creative engagement.

> **Hypothesis 2.** *Attention on the benefits of creativity mediates the positive effect of depletion on creative engagement.*

4 | OVERVIEW OF RESEARCH PLAN

Across four studies, we document the impact of depletion on creative engagement. Specifically, we demonstrate that (i) depletion increases consumers' persistence in creative activities (Study 1), (ii) this increased creative engagement is due to greater attention on the benefits of creativity (Study 2 and 3), and (iii) when consumers are open to new experiences (Study 4). Collectively, these findings provide unique insight into how depletion could be beneficial to individuals.

5 | STUDY 1

The purpose of this experiment was to provide initial evidence of the effect of depletion on creative engagement by examining individuals' persistence in a creativity task. We expected those who initially exerted self-control (vs. those who did not) would be more likely to persist longer on a creative activity. In addition, we manipulated depletion using an emotion suppression task, which was adapted from prior studies (Gross & Levenson, 1997; Hofmann

et al., 2007). We expected that the positive effect of depletion on creative engagement would remain even when a different manipulation and different dependent variable measure were used.

5.1 | Method

5.1.1 | Participants and design

Participants were 180 members of an online panel (Amazon Mechanical Turk, 38.4% female, $M_{Age} = 36.96$) who participated in exchange for payment. The design employed a 2 (depletion: depletion vs. control) × 2 (task: creativity vs. control) between-subjects design.

5.1.2 | Procedure

In this experiment, we applied an emotion suppression task as the manipulation of depletion (Gross & Levenson, 1997; Hofmann et al., 2007). Participants first were asked to watch two video clips of a football game. One of the clips contained positive emotion elements (e.g., a touchdown, a celebration) and the other one contains negative emotion elements (e.g., an interception, a loss). In the depletion condition, participants were asked to remain completely neutral by suppressing any feelings while watching the videos. In the control condition, participants were asked to watch the videos as if they were at home.

After watching the video clips, participants were told that they would be taking part in an ostensibly unrelated study regarding people's verbal ability. In the creativity condition, participants were told that the purpose of this task was to help individuals improve their creativity. In the control condition, they were told that the purpose of the task was to test their verbal aptitude. In addition, they were told that they would view various unordered letters (e.g., "rdow") and would need to reorder them to create a meaningful word (e.g., "word"). Moreover, they were told they could work on the task for 3 min but could submit their responses earlier if they wished to do so. The creative engagement was assessed by a behavioral measure reflected in the amount of time that each participant persisted on the task (see Data S1 for the measure). Afterwards, they were asked to report their level of depletion as our manipulation check. Depletion was assessed using five items (e.g., "I feel drained," and "My mental energy is running low") developed by Twenge et al. (2004) and validated by Johnson et al. (2014) and Lanaj et al. (2014). Responses were obtained on a 5-point scale (*1—strongly disagree*, *5—strongly agree*), such that higher values indicated more depletion. Finally, participants completed several demographic items before being debriefed and thanked for their participation.

5.2 | Results and discussion

5.2.1 | Manipulation check

The depletion items were submitted to an independent t-test. Consistent with predictions, participants in the depletion condition ($M = 3.28$, SD = 1.11) reported a higher depletion level than those in the control condition ($M = 2.81$, SD = 1.35) ($t(178) = -2.53$, $p = 0.012$, $d = 0.383$).

5.2.2 | Creative engagement

We found a main effect of task, $F(1, 176) = 8.35$, $p = 0.004$, $\widehat{\omega}_p{}^2 = 0.039$, such that participants persisted longer in creative ($M = 134.76$, SD $= 59.11$) than control condition ($M = 107.67$, SD $= 66.28$). Persistence did not differ between depletion ($M = 127.21$, SD $= 57.45$) and non-depletion condition ($M = 116.66$, SD $= 69.47$; $F(1, 176) = 0.39$, $p = 0.53$, $\widehat{\omega}_p{}^2 = -0.003$). More importantly, An analysis of variance (ANOVA) on the persistence measure revealed a significant effect between the two conditions ($F(1, 176) = 5.86$, $p = 0.016$, $\widehat{\omega}_p{}^2 = 0.027$). Specifically, participants in the depletion condition persisted longer in the creativity task ($M = 147.46$, SD $= 48.88$) than the normal task ($M = 97.96$, SD $= 56.86$; $F(1, 176) = 13.62$, $p < 0.001$, $\widehat{\omega}_p{}^2 = 0.066$). Persistence did not differ between participants in the creativity task ($M = 119.09$, SD $= 67.05$) and normal task ($M = 114.67$, SD $= 72.06$) when they were not depleted ($F < 1$) (Figure 1).

In short, and consistent with what we expected, depletion enhanced individuals' persistence on creative tasks—here, individuals persisted longer in the task to improve their creativity while depleted.

6 | STUDY 2

The purpose of Study 2 is to test our proposition that the effect of depletion on creative engagement is driven by changes in individuals' attention on the benefits of creativity. That is, we propose that depletion alters individuals' attention on the benefits of creativity, leading them to engage in creative activities (Mehta et al., 2017; Moreau & Dahl, 2005). Thus, in this study, we tested whether individuals' attention on the benefits of creativity mediated the effect of depletion on creative engagement.

To test our proposed mediation effect, we manipulated depletion before having participants indicate their attention on the benefits of creativity. Next, participants were asked to engage in

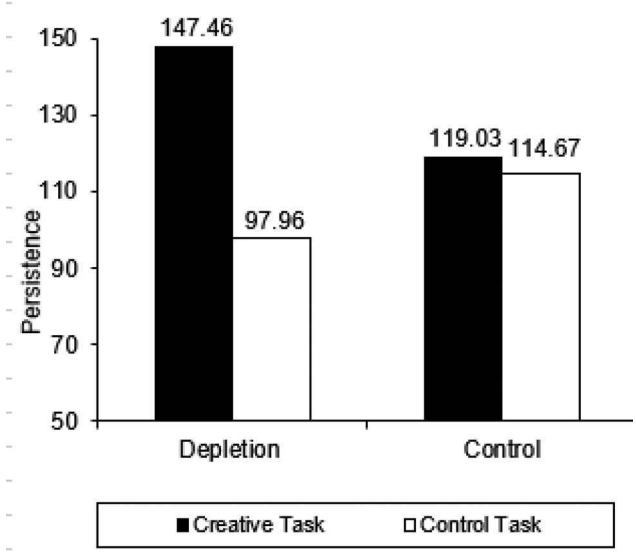

FIGURE 1 The effect of depletion on creative engagement in Study 1

a word association task (remote-association test [RAT]) which was supposed to understand their creative thinking (Zhong, Dijksterhuis, & Galinsky, 2008). We proposed that depletion impacts creative engagement by stimulating individuals' attention on the benefits of creativity.

6.1 | Method

6.1.1 | Participants and design

Participants were 114 members of an online panel (Amazon Mechanical Turk, 49.1% female, $M_{Age} = 39.28$) who participated in exchange for payment. The design was a one-factor (depletion: depletion vs. control) between-subjects design.

6.1.2 | Procedure

Participants were randomly assigned to either a depletion or a control condition. In this experiment, we also applied the emotion suppression task (identical to Study 1) as the manipulation of depletion. Following the manipulation, participants were asked to participate in an ostensibly unrelated study about their creative thinking. Specifically, participants had 3 min to complete 10 RAT questions. RAT was a classic test to measure consumers' creativity. In the RAT, participants were provided three words (e.g., square/cardboard/open), and ask to compose the answer (e.g., box) that was linked with the three words. In the RAT test, we made the last four questions unsolvable. We measure creativity engagement by how long the participants are willing to persist in this task. Afterwards, participants indicated their attention on the benefits of creativity through a 4-item scale modified from prior studies (Goldberg, 1999; Lin & Johnson, 2015). The sample items were "I notice the benefits of being creative," "I am usually aware of the positive outcomes that I will get if I am creative." Responses were provided via a 7-point scale (*1—not at all*, *7—very much*) and averaged ($\alpha = 0.87$), such that higher values indicated higher levels of attention on benefits of creativity. Finally, participants completed manipulation check items for depletion (identical to Study 1) and several demographic items before being debriefed and thanked for their participation.

6.2 | Results and discussion

6.2.1 | Manipulation check

The depletion items were submitted to an independent samples *t*-test. Consistent with predictions, participants in the depletion condition ($M = 3.43$, SD = 1.30) reported being more depleted than those in the control condition ($M = 2.81$, SD = 1.26; $t(112) = -2.58$, $p = 0.011$, $d = 0.487$).

6.2.2 | Attention on benefits of creativity

Attention on benefits of creativity items were submitted to an independent samples *t*-test. Consistent with predictions, participants in the depletion condition ($M = 5.62$, SD = 0.89)

reported higher attention on benefits of creativity than did participants in the control condition ($M = 4.85$, SD = 1.79; $t(112) = -2.75$, $p = 0.007$, $d = 0.524$).

6.2.3 | Creative engagement

The time participants engaged in the RAT was submitted to an independent samples t-test. Consistent with predictions, participants in the depletion condition ($M = 136.11$, SD = 58.07) persisted longer than did participants in the control condition ($M = 108.86$, SD = 66.17; $t(112) = -2.29$, $p = 0.024$, $d = 0.438$).

6.2.4 | Mediation analyses

We expected that the depletion manipulation would influence participants' attention on benefits of creativity and that this difference in attention on benefits of creativity would explain observed differences in participants' creative engagement (i.e., time they engaged in the RAT). We tested the significance of the indirect pathway by computing a confidence interval for the indirect effect of depletion on creative engagement through attention on benefits of creativity (PROCESS Model 4; Hayes, 2013). Consistent with our conceptual model, the pathway from depletion to creative engagement through attention on benefits of creativity was significant (indirect effect = 7.14; 95% CI: 0.23, 17.52) (Figure 2).

In sum, and consistent with our expectations, Study 2 showed that the effect of depletion on creative engagement was driven by attention on benefits of creativity. That is, when individuals are depleted, they are more likely to pay attention to the benefits of creativity, and this change in their attention in turn heightens their creative engagement—here, individuals were more likely to persist in the creativity task.

7 | STUDY 3

The findings thus far demonstrate that depletion heightens individuals' creative engagement, and that this effect is driven by the attention on the benefits of creativity. To strengthen our

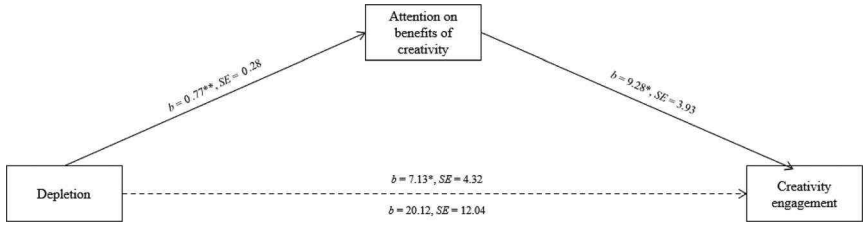

FIGURE 2 The mediation model in Study 2. The statistics below the dashed arrow indicate the direct effect of depletion on creativity engagement, not accounting for attention on benefits of creativity. The statistics above the dashed arrow indicate the total effect of depletion on creativity engagement, while accounting for attention on benefits of creativity

proposed mechanism between the effect of depletion and creative engagement, we applied a moderation-as-mediation methodology to provide another evidence of our process (Spencer, Zanna, & Fong, 2005).

To do so in Study 3, participants were asked to partake in an emotion suppression task (identical to that in Study 1) as the depletion manipulation. Then, we used the same creativity task as in Study 1 (i.e., participants were asked to participate the word scramble task). They were informed the benefit of being creative or not depending on their assigned conditions. As in prior experiments, we expected that a replication when participants were not provided the benefit of creativity (not salient condition). However, we expected creative engagement should be high regardless of depletion level when they are provided the benefit of creativity (salient condition).

7.1 | Method

7.1.1 | Participants and design

Participants were 246 members of an online panel (Amazon Mechanical Turk, 43.9% female, $M_{Age} = 37.1$) who participated in exchange for payment. The design employed a 2 (depletion: depletion vs. control) × 2 (benefit of creativity: salient vs. not salient) between-subjects design.

7.1.2 | Procedure

In this experiment, we adopted the same manipulation of depletion as in Study 1 by asking participants to complete an emotion suppression task. Afterwards, we also utilized the same creativity improvement task as in Study 1 by asking participants to participate a word scramble task to improve their creativity. In the salient condition, they were asked to read some statements about the benefit of creativity. In the not salient condition, participants were not provided any information about the benefit of creativity. The creative engagement was assessed by a behavioral measure reflected in the amount of time that each participant persisted in the task (identical to Study 1).

Finally, participants completed a manipulation check for depletion (items were identical to Study 1) and several demographic items before being debriefed and thanked for their participation.

7.2 | Results and discussion

7.2.1 | Manipulation check

The depletion items were submitted to an independent samples *t*-test. Consistent with predictions, participants in the depletion condition ($M = 3.45$, SD = 1.06) reported being more depleted than those in the control condition ($M = 3.15$, SD = 0.99; $t(244) = -2.31$, $p = 0.022$, $d = 0.298$).

7.2.2 | Creative engagement

ANOVA on the creative engagement measure revealed a significant effect among conditions ($F(1, 242) = 5.69$, $p = 0.021$, $\widehat{\omega}_p{}^2 = 0.019$). Specifically, participants in the not salient condition

persisted longer in the depletion condition ($M = 131.19$, SD = 66.35) than the control condition ($M = 98.63$, SD = 71.12; $F(1, 242) = 6.46$, $p = 0.012$, $\widehat{\omega}_p{}^2 = 0.022$). Creative engagement did not differ between participants in the depletion or control condition when participants were in the salient condition ($F < 1$) (Figure 3).

In short, and consistent with our predictions, Study 3 used a moderation-as-mediation methodology to strengthen our evidence of process. That is, participants persist longer in the creativity activity when they are attentive to the benefits of creativity (e.g., being depleted or salient of the benefits).

8 | STUDY 4

The findings thus far demonstrate that depletion heightens individuals' creative engagement, and that this effect is driven by attention on the benefits of creativity. As noted earlier, individuals' openness to new experiences could shape how they respond to new information (Baer & Oldham, 2006; McCrae, 1987). Indeed, openness to experience has shown to be strongly and positively related to one's creativity because those with high openness with new experiences are more motivated to try something new, and be creative (McCrae, 1987). Thus, it is important to consider how individual differences may moderate the relationship between depletion and creative engagement. Specifically, we focus on how consumers' openness to new experiences would moderate the relationship between depletion and creative engagement. We propose that depletion will have a stronger effect on creative engagement for those who are open to new experiences but has little effect those who are not open to new experiences. That is, consumers with higher openness to new experiences should be more likely to seek creative options when depleted, given that they are more willing to try new and original activities.

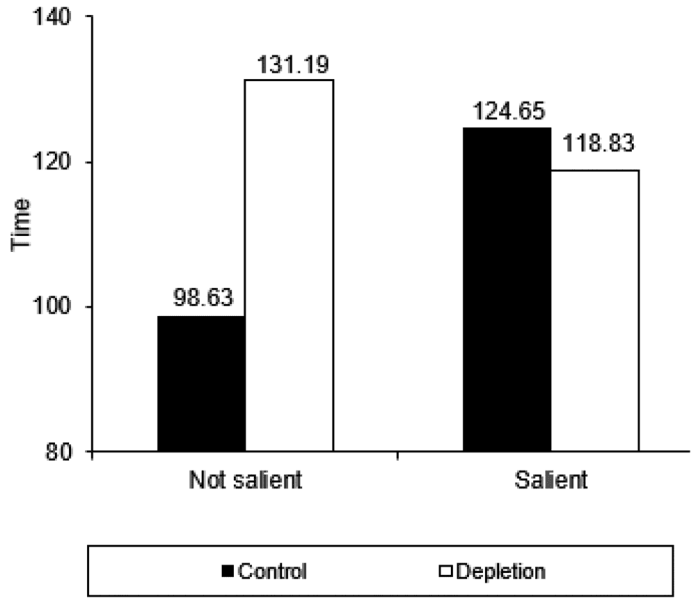

FIGURE 3 The interactive effect of depletion and salience of benefit on persistence in Study 3

To test this proposition in Study 4, participants were asked to partake in a write-a-story task as the depletion manipulation. Then, same as Study 2, we asked participants to engage in a RAT. Afterwards, participants were then exposed to questions about their openness to new experiences, as well as some filler questions. As in prior experiments, we expected those in the depletion condition (vs. control condition) would be more likely to persist longer when they are depleted. However, we expected this effect would only be observed for those who are open to new experiences.

8.1 | Method

8.1.1 | Participants and design

Participants were 145 members of an online panel (Amazon Mechanical Turk, 51.7% female, $M_{Age} = 38.91$) who participated in exchange for payment. The design was a one-factor (depletion: depletion vs. control) between-subjects design.

8.1.2 | Procedure

Participants were first asked to write a story about a recent trip they took (Kohn et al., 2012; Schmeichel, 2007; Schmeichel & Vohs, 2009). In the depletion condition, participants were asked to avoid using A and N in their story. In the control condition, they received no special instructions. This is an effective manipulation because people in the depletion condition need to exercise considerable self-control to avoid using A and N while writing their story, leaving them depleted, while people in the control condition did not need to exert substantial self-control.

Afterwards, we asked participants to engage a RAT to know about their creative thinking (identical to Study 2). We measured their creative engagement by the time they persist on completing the RAT. After finishing RAT, participants were requested to report their openness to new experiences through an 6-item scale created by Goldberg (1992). Example items are "I enjoy hearing new ideas" and "I have a vivid imagination." Responses were obtained on a 7-point scale (*1—strongly disagree*, *7—strongly agree*) and averaged ($\alpha = 0.77$), such that higher values indicated that they are more open to new experiences.

Finally, participants completed a manipulation check for depletion (items were identical to Study 1) and several demographic items before being debriefed and thanked for their participation.

8.2 | Results and discussion

8.2.1 | Manipulation check

The depletion items were submitted to an independent samples *t*-test. Consistent with predictions, participants in the depletion condition ($M = 3.17$, SD $= 1.28$) reported being more depleted than those in the control condition ($M = 2.66$, SD $= 1.17$; $t(143) = -2.54$, $p = 0.012$, $d = 0.431$).

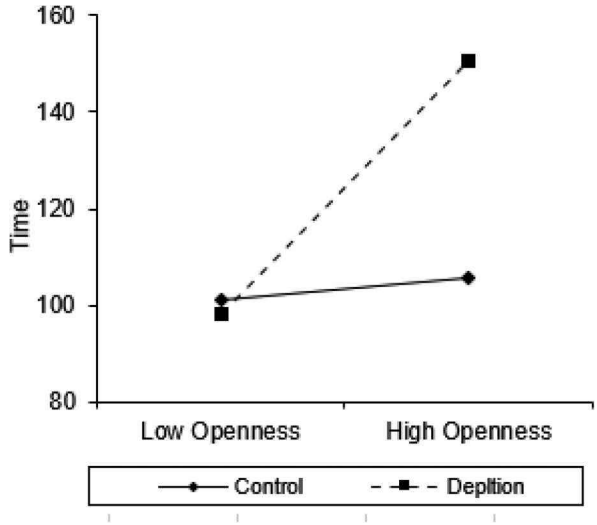

FIGURE 4 The interactive effect of depletion and openness to new experiences on creative engagement in Study 4

8.2.2 | Moderation analyses

We found a main effect of depletion condition, $t(143) = -2.06$, $p = 0.041$, $d = 0.346$, such that participants persisted longer in depletion ($M = 125.17$, SD = 61.97) than the control condition ($M = 103.13$, SD = 66.21). More importantly, We conducted moderation analyses (PROCESS model 1; Hayes, 2013) to test whether openness to experience moderated the relationship between depletion and creative engagement (persistence in RAT). The interaction between depletion and openness to new experiences on persistence was significant ($\beta = 19.69$, $p = 0.036$). Our simple slope analyses suggested that for those who are high in openness to new experiences (+1 SD), people in the depletion condition are more likely to persist longer in RAT than those in the control condition ($\beta = 45.08$, $p = 0.006$). For those who are low in openness to new experiences (−1 SD), people in the depletion condition and those in the control condition did not significantly differ in persistence in RAT ($\beta = -2.95$, $p = 0.84$) (Figure 4).

Consistent with our predictions, Study 4 showed that the effect of depletion on creative engagement is attenuated for those who are high in openness to new experiences. That is, when individuals are low in openness to new experiences, they were less likely to persist on engaging in creativity activity (i.e., RAT), even when they were depleted.

9 | GENERAL DISCUSSION

The majority of research to date has focused on the detrimental outcomes of depletion, based on the assumption that a state of depletion is always harmful for subsequent performance (Baumeister et al., 1998; Beedie & Lane, 2012; Johnson et al., 2018). This assumption is problematic because it suggests that people should avoid activities that require self-regulation exertion even if those activities are beneficial for recipients. For example, although a discretionary behavior such as pointing out potential problems in companies is beneficial for companies, it

also contributes to self-regulation impairment (Lin & Johnson, 2015). Unfortunately, previous research on self-regulation has overlooked the possibility that the experience of depletion may be constructive in some instances or for certain types of behavior. Thus, our study advances the literature on resource-based theories of self-regulation by highlighting a beneficial outcome that could be produced by depletion. Specifically, our results provide evidence for a beneficial effect of depletion on creative engagement. When people are depleted, they are more likely to be attentive on the benefits of creativity, leading to more creative engagement. We also show that the beneficial effect of depletion on creative engagement will be attenuated for individuals who are not open to new experiences.

10 | THEORETICAL AND PRACTICAL CONTRIBUTIONS

This research advances the literature about depletion and creativity and offers several important contributions. The primary contribution is in showing that depletion can be beneficial by increasing individuals' creative engagement. Previous research has focused on discovering the detrimental outcomes of depletion and often assumed that the outcomes of depletion are always negative. For example, past research has shown that whenever people exert initial self-control, they are less likely to maintain their self-control and more likely to engage in impulsive or deviant behaviors, without exception (Christian & Ellis, 2011; Gino et al., 2011). However, the unexpected benefits of depletion have largely been overlooked in previous research. In response to this oversight, our findings suggest that depletion can bolster individuals' creative engagement. Specifically, we found that depletion alters consumers' attention on the benefits of creativity because individuals become more concerned about how to exploit their remaining resources efficiently to complete their current task and they realize that being creative is the best way to break their current constraints. In fact, when people are depleted, the perception of resource scarcity urges them to seek new strategies to find easier (e.g., less resource intensive) means to complete their current task, and this concentration of searching for new strategies prompts them to realize the benefits of and seek out creativity. We hope this research can shift the focus from detrimental outcomes of depletion to the possible positive outcomes of depletion. By proposing and showing the bright side of depletion, we hope this research will result in more attention to the positive impacts of depletion in future research.

Our findings also contribute to theory by introducing a new underlying process for the effects of constraints on creativity. Previous research seems to consistently point to increased creativity when individuals suffer from constraints. For example, when individuals perceive constraints such as on time or resources, they seem to be more concerned than before about how to exploit their remaining resources (e.g., time) wisely and tend to search for new and easier methods to solve the problems. Our findings suggested that when individuals are depleted, they are more likely to search for new means to achieve their goal. This is because they realize that being creative is the best way for them to use limited resources to solve current problems. Thus, no matter what leads individuals to be concerned about resource reallocation (e.g., having no access to existing strategies, lower functional fixedness), they should all lead to the same consequences (creative engagement).

In addition, our findings also contribute to the self-regulation and creativity literatures by showing the boundary conditions of the effect of depletion on creative engagement. We expected that the effect only holds when individuals are open to new experiences. In fact, if

individuals are not open to new experiences, it seems pointless to them to be creative and try new strategies, given that the core of creativity is something new.

Finally, our research also contributes to the self-regulation literature by offering a viable online depletion manipulation. Previous research has developed online depletion manipulation measures but did not work well on MTurk (Zhou & Fishbach, 2016). Our research showed that the task of watching football was not onerous and perhaps sufficiently engaging for participants in both depletion and control conditions. As such, we provided future research another way to manipulate depletion online.

Our research has practical implications as well. Given that we showed a positive consequence of depletion, when depletion is unavoidable (e.g., due to high work overload, during times of high change or uncertainty), companies might leverage this ostensibly detrimental condition by encouraging consumers to engage in creative activities. For instance, a gym could promote different types of training courses based on consumers' level of depletion. They could promote training courses that are based on traditional design when consumers are energetic (e.g., before going to the gym) in addition to innovative courses that are based on new methodologies when gym members are depleted (e.g., after working out for a while). Thus, by utilizing the beneficial effects of depletion, companies could further increase their revenue and sales.

We also contribute to public policymakers who are trying to enhance individuals' well-being. Indeed, Dolan and Metcalfe (2012) showed that creativity contributes to individuals' well-being. Thus, public policymakers or companies could increase individuals' well-being through encouraging individuals' persistence and engagement in creativity tasks. According to our findings, public policymakers could also promote a better time management method so that consumers could spend their time on creative-related activities when they are tired or depleted. Doing so could further enhance consumers' well-being.

In addition, our results showed that the bright side of depletion only occurs for certain individuals—those who are open to new experiences. Thus, in order to derive benefits from depletion, companies could further encourage their consumers to try new experiences. For example, they could put some signs on the wall, saying, "Be open to whatever comes next." As another example, organizations could also list the benefits of taking on new initiatives. By doing so, consumers may be more open and willing to trying new experiences, leading to higher creativity.

11 | LIMITATIONS AND FUTURE RESEARCH

Despite the strengths of our research, such as the experimental designs that provide strong internal validity evidence, some limitations of our research warrant mention. First, this research provided robust evidence about the effect of depletion on creative engagement and its mediation by manipulating depletion in laboratory settings. What is less clear, however, is the external validity of this effect. We do not know if the results of this research would necessarily generalize to a different setting. To alleviate this concern, we tried to show initial evidence from Google trend data. We compared consumers' searching behaviors between "novel brand" and "brand" during the period individuals should have more regulatory resources (12–5 p.m.) and the period they should be more depleted (midnight to 5 a.m.). We expected that consumers' searching amount for "brand" should decline when they are depleted, whereas the search amount for "novel brand" should increase when they are depleted. As expected, a paired

samples t-test showed that consumers' search behaviors while the depleted increase for "novel brand" ($M = 12.69$, SD $= 31.94$) but decline for "brand" ($M = -7.53$, SD $= 8.18$; $t(35) = 3.68$, $p = 0.001$, $d = 0.613$).

Second, the current research only focuses on one aspect of creativity—creative engagement, ignoring another aspect—the level of creativity. It would be interesting for future research to examine the level of creativity or even the actual creative performance. Indeed, on the one hand, it is possible that when individuals are depleted, their level of creativity might be heightened because they are more cognitive flexible. Specifically, when individuals are depleted, they are less likely to fix their attention on details, shifting their attention to a broader level and making their cognition flexible (Trope & Liberman, 2003). With the cognitive flexibility, they are more likely to be creative (Dreu et al., 2011). On the other hand, it is also possible that if individuals are consciously feeling depleted, they are less likely to be creative because previous research has shown that depletion of conscious self leaves individuals to generate less creative responses (Baumeister et al., 2007). Thus, it would be interesting for future research to further examine the effect of depletion on the level of creativity or actual creative performance.

Finally, the current research only focuses on one possible bright side of depletion (i.e., creative engagement). There are likely many other benefits of depletion. We expect our research to help shift the concentration from dark side to the bright side of depletion. Future research could examine if the circumstances in which depletion occurs could attenuate the depletion effect or even reverse the effect. For example, working in a team setting could possibly be beneficial for people who are depleted given that individuals could perceive the opportunity to borrow more regulatory resources from others. By focusing more on the bright side of depletion, we could get a clear picture of the impact of depletion rather than just being afraid of the detrimental consequences.

12 | CONCLUSION

Research and theory on self-regulation and depletion have been extended and applied over the past two decades. However, investigations of depletion have largely been limited to exploring only its detrimental effects on subsequent behavior, while ignoring the possible benefits. To better understand the effects of depletion, we expand the criterion space of depletion, and suggest that depletion may in fact guide consumers' behavior in a good way. Across four experiments, we showed that depletion makes individuals persist on creative tasks, by increasing their attention on the benefits of creativity when in a depleted state. We hope that our work not only challenges the way we think about depletion, but also stimulates future work to take a more balanced view of depletion.

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SUPPORTING INFORMATION

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