

Research Report

Liberating Effects of Losing Executive Control

When Regulatory Strategies Turn Maladaptive

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ABSTRACT—Across numerous domains, research has consistently linked decreased capacity for executive control to negative outcomes. Under some conditions, however, this deficit may translate into gains: When individuals' regulatory strategies are maladaptive, depletion of the resource fueling such strategies may facilitate positive outcomes, both intra- and interpersonally. We tested this prediction in the context of contentious intergroup interaction, a domain characterized by regulatory practices of questionable utility. White participants discussed approaches to campus diversity with a White or Black partner immediately after performing a depleting or control computer task. In intergroup encounters, depleted participants enjoyed the interaction more, exhibited less inhibited behavior, and seemed less prejudiced to Black observers than did control participants—converging evidence of beneficial effects. Although executive capacity typically sustains optimal functioning, these results indicate that, in some cases, it also can obstruct positive outcomes, not to mention the potential for open dialogue regarding divisive social issues.

The human capacity to regulate responses for goal-directed action has been studied in domains from language and spatial ability to addiction and consumer behavior (e.g., Bialystok, 2001; Miyake, Friedman, Rettinger, Shah, & Hegarty, 2001; Muraven & Baumeister, 2000; Vohs & Faber, 2007). Despite the breadth of this literature, a unifying conclusion has emerged: the consequences of decreased capacity to exert executive control are negative. Here we consider a context in which a depleted state may actually offer intrapersonal and interpersonal benefits. Specifically, we propose that individuals who have been stripped

of their usual capacity for executive control and placed in contentious social interaction can have more enjoyable experiences, exhibit less inhibited behavior, and make a more positive impression on interaction partners than those who have not.

EXECUTIVE FUNCTION AND REGULATORY STRATEGIES

Executive control is typically presumed to facilitate optimal functioning by fueling those actions necessary to override or otherwise change maladaptive tendencies (Baumeister, Heatherton, & Tice, 1994). Consider, for instance, an individual seeking to lose weight by curbing fast-food consumption. An individual may enlist various strategies: packing healthy lunches, avoiding tempting routes of travel, skipping meals, suppressing thoughts of junk food altogether. The ability to adhere to these strategies is often contingent on available executive capacity—a limited resource, exhaustible by previous actions (Baumeister, Vohs, & Tice, 2007; Muraven & Baumeister, 2000). But what if one's intuitions about how to achieve a goal are flawed from the outset? Notably, research indicates that skipping meals often predicts weight gain, not loss (Stroebe, 2008), and efforts to avoid thinking about certain foods likely result in more, not fewer, unwanted thoughts (Wegner, 1994). In such cases, when individuals are mistaken regarding the utility of their regulatory strategies, reduced capacity to employ such efforts may actually facilitate positive outcomes.

The implications of such misjudgment are doubly important for interpersonal domains, as maladaptive regulatory practices may not only detract from one's subjective experiences, but also create negative impressions among interaction partners. Historically, executive function has been studied as an intrapersonal phenomenon, but recent efforts have considered its role in dynamic interpersonal processes (e.g., Finkel et al., 2006; Richeson & Shelton, 2003; Richeson & Trawalter, 2005; Vohs, Baumeister, & Ciarocco, 2005; von Hippel & Gonsalkorale,

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2005). Deficits in executive functioning have been found to predict impaired self-presentation (Vohs et al., 2005) and increases in inappropriate (von Hippel & Gonsalkorale, 2005) or stereotypical (Govorun & Payne, 2006) responses. Thus, it is apparent that decreased executive capacity impedes the practice of regulatory behavior, but we propose that it does not necessarily ensure negative consequences. Indeed, when individuals tend toward maladaptive regulatory strategies, this depletion may facilitate positive intrapersonal and interpersonal outcomes.

One social domain with clear potential for such effects is intergroup interaction (Apfelbaum, Sommers, & Norton, 2008). Negotiating intergroup interaction is often a threatening experience (Dovidio, Gaertner, Kawakami, & Hodson, 2002) that can turn contentious when involving discussion of race-related issues (Sommers, 2006). These interactions are frequently characterized by efforts to stifle responses that risk social reprimand (Crandall & Eshleman, 2003; Dovidio & Gaertner, 2004)—a regulatory strategy that can persist even when ineffective. For instance, Whites' efforts to avoid mentioning race during intergroup interaction sometimes emerge at the expense of objective task performance and, ironically, the impression made on Black interaction partners (Apfelbaum et al., 2008; Norton, Sommers, Apfelbaum, Pura, & Ariely, 2006). Navigating such interactions with depleted executive capacity may therefore liberate individuals from a misguided regulatory tendency, resulting in more enjoyable experiences for them and more positive assessments from interaction partners.

In short, whereas previous work has focused on the pitfalls of diminished executive capacity, we suggest that, when individuals misintuit how best to self-regulate, reduced cognitive control may facilitate favorable consequences. Our test of this hypothesis focused on two outcomes. First, we investigated intrapersonal effects of depleted executive capacity, namely whether inducing this state in Whites facilitates greater enjoyment of intergroup interaction. Second, we explored a potential interpersonal benefit of depleted executive capacity by considering the possibility that in interracial settings, Whites are perceived as less racially prejudiced when depleted.

METHOD

Participants

Eighty-two White undergraduates (53 females, 29 males; age range = 18–23 years; mean age = 18.73 years, $SD = 1.13$ years) participated for course credit or payment. After completing the experimental task, participants were randomly assigned to interact with a White or Black confederate blind to condition and hypothesis.

Executive-Control Task

The Attention Network Test (ANT; Fan, McCandliss, Sommer, Raz, & Posner, 2002) is a computer-based measure of attention.

We modified the ANT component typically used to gauge executive control into a manipulation of executive capacity. Across multiple trials, participants were presented with a string of five arrows and instructed to quickly and accurately indicate the direction of the center arrow (i.e., whether the arrow was pointing left or right). The center arrow was either congruent (i.e., $\leftarrow \leftarrow \leftarrow \leftarrow \leftarrow$, $\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$) or incongruent (i.e., $\rightarrow \rightarrow \leftarrow \rightarrow \rightarrow$, $\leftarrow \leftarrow \rightarrow \leftarrow \leftarrow$) with its flankers; correct responses to incongruent trials thus required executive control to override the natural tendency to follow the flankers. Participants in the depletion condition were presented with congruent and incongruent stimuli, whereas participants in the control condition viewed congruent stimuli only. Trials began with presentation of a fixation cross for 1,000 ms, followed by presentation of the stimulus for a maximum of 2,000 ms before advancing to the next trial. All participants completed 10 blocks of 16 trials (~10 min).

Procedure

A White female experimenter led participants to a computer, where they completed the version of the ANT to which they were assigned. A White or Black male then entered the laboratory to conduct an ostensibly unrelated 5-min interview regarding campus “hot topics.” A rigged drawing ensured that each participant was given the same topic: how universities should ensure a diverse student body. Interviewers asked participants to “share any comments regarding this issue,” and responses were audiorecorded.¹ The interviewer then left the room, and participants rated their interaction enjoyment before being probed for suspicion.

RESULTS

Manipulation Check

Pilot testing with 19 participants confirmed that executive function (assessed by Stroop color-naming efficiency) was hampered after completing the depletion ANT ($M = 114.00$ ms, $SD = 72.33$ ms) versus control ANT ($M = 46.60$ ms, $SD = 59.36$ ms), $t(17) = 2.21$, $p_{\text{rep}} = .92$, $r = .47$. No differences emerged for mood or fatigue between task versions, $t_s < 1.2$.

Subjective Enjoyment

Participants rated the degree to which their post-ANT interaction was “enjoyable,” “awkward” (reverse-scored), and “comfortable” ($\alpha = .78$) on a 7-point response scale (1 = *not at all*, 4 = *neutral*, 7 = *very much*). These ratings were submitted to a 2 (executive-control task: depletion, control) \times 2 (interaction type: same-race, interracial) between-subjects analysis of variance (ANOVA). The predicted interaction emerged, $F(1, 78) = 6.67$, $p_{\text{rep}} = .96$, $r = .28$. In the interracial condition, depleted

¹One participant's recording was lost because of equipment malfunction.

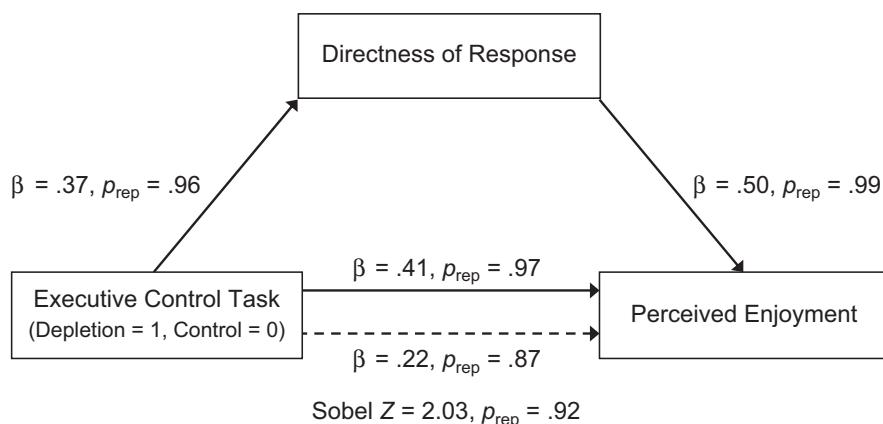


Fig. 1. Mediation model for the executive-control task (depletion = 1, control = 0) predicting Whites' perceived enjoyment of interracial interaction. The dashed line denotes the mediated effect; β and p_{rep} values indicate strength and reliability of effects, respectively; Sobel Z indicates the reduction in direct effect.

participants ($M = 4.39$, $SD = 1.14$) reported having significantly more enjoyable experiences than control participants ($M = 3.50$, $SD = 1.28$), $t(78) = 2.51$, $p_{\text{rep}} = .96$, $r = .27$. No difference emerged in same-race interactions between depleted ($M = 3.24$, $SD = .99$) and control participants ($M = 3.68$, $SD = 1.18$), $t(78) = 1.18$, $p_{\text{rep}} = .80$, $r = .13$. The effect of confederate race approached significance, $F(1, 78) = 3.61$, $p_{\text{rep}} = .91$, $r = .21$; the effect of task type did not, $F < 1$.

To bolster these self-reports, two naive White coders assessed audio recordings of participants' interview responses (intraclass correlation coefficient = .69). Coders used the same three items ($\alpha = .70$) to evaluate the extent to which participants seemed to enjoy the interaction. Again, a significant interaction emerged, $F(1, 77) = 6.86$, $p_{\text{rep}} = .96$, $r = .29$. Among interracial interactions, depleted participants ($M = 4.52$, $SD = 0.76$) were rated as having significantly more enjoyable experiences than control participants ($M = 3.85$, $SD = 0.77$), $t(77) = 2.80$, $p_{\text{rep}} = .97$, $r = .30$. No difference emerged in perceptions of same-race interactions between depleted ($M = 4.01$, $SD = 0.83$) and control participants ($M = 4.24$, $SD = 0.73$), $t < 1$, nor were there significant main effects, $F_s < 1.6$.

Behavioral Ratings

We examined whether the nature of Whites' interview responses could elucidate the basis for their positive interaction experience. Specifically, we expected a tendency among control participants to choose their words cautiously that would be less evident among depleted participants. Coders evaluated the extent to which participants "directly addressed the issue of ensuring diversity" (intraclass correlation coefficient = .80). Analysis of this measure revealed an interaction, $F(1, 77) = 4.99$, $p_{\text{rep}} = .94$, $r = .25$. During interracial interactions, depleted participants ($M = 4.85$, $SD = 1.69$) were significantly more likely to directly discuss approaches to diversity than were control participants ($M = 2.81$, $SD = 1.47$), $t(77) = 2.52$, $p_{\text{rep}} =$

.96, $r = .28$. No difference emerged in same-race interactions between depleted ($M = 3.05$, $SD = 1.65$) and control participants ($M = 3.40$, $SD = 1.57$), $t < 1$, nor were there significant main effects, $F_s < 1.6$.

These findings suggested the possibility that cognitive depletion resulted in more enjoyable interracial interactions for Whites because this deficit liberated them from the restrictive tendency to monitor their responses. We examined this mediational relationship using the procedures of Baron and Kenny (1986). As displayed in Figure 1, for the interracial conditions, the executive-control task (depletion = 1, control = 0) positively predicted directness of response, $\beta = .37$, $p_{\text{rep}} = .96$. Controlling for task type, coders' ratings of directness positively predicted their ratings of enjoyment, $\beta = .50$, $p_{\text{rep}} = .99$. Consistent with mediation, the relationship between depletion and perceived enjoyment, $\beta = .41$, $p_{\text{rep}} = .97$, was significantly reduced when directness was added to the model as a predictor, $\beta = .22$, $p_{\text{rep}} = .87$; Sobel $Z = 2.03$, $p_{\text{rep}} = .92$.²

Interpersonal Outcomes

We assessed interpersonal outcomes by examining the extent to which participants' interview responses, edited to remove confederates' voices, were judged as indicative of "racial prejudice" by new pairs of naive White (intraclass correlation coefficient =

²We did not obtain a self-reported assessment of how direct participants believed their own response to be. Nevertheless, we conducted a similar analysis using self-reported enjoyment as an outcome and coders' ratings of directness as the mediator. Regressions were consistent with the pattern for coders' ratings of enjoyment, but the reduction in the direct effect upon addition of the mediator was not significant. When the outcome measure of enjoyment was treated as a composite of participants' and coders' assessments, the overall mediation model again reached significance. It is also worth noting that an alternative model, wherein perceived enjoyment mediated the effect of ANT on directness, also reached significance. Statistically speaking, we cannot rule out this alternative model, though in deference to temporal priority, it would require depleted participants to have experienced greater enjoyment from the outset of interracial interactions before even beginning to provide their interview response.

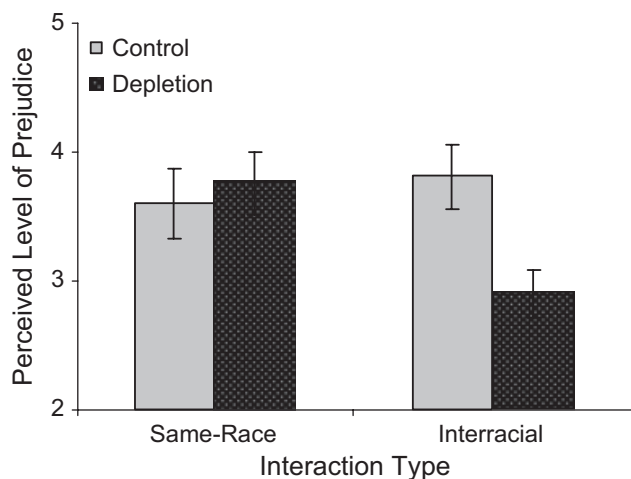


Fig. 2. Black coders' perceptions of prejudice among other participants as a function of interaction type (same-race or interracial) and executive-control task (whether or not participants' capacity for cognitive control had been depleted in an earlier task). Error bars represent 1 *SEM*.

.61) and Black observers (coefficient = .63). We anticipated that White coders, like White participants, would perceive avoidance as an adaptive regulatory strategy during interracial interaction. Indeed, an interaction for White coders, $F(1, 77) = 5.04, p_{\text{rep}} = .94, r = .25$, indicated that in interracial conditions more prejudice was perceived among depleted ($M = 2.17, SD = 1.21$) than control participants ($M = 1.64, SD = 0.59$), $t(77) = 2.06, p_{\text{rep}} = .92, r = .23$. No difference emerged in same-race conditions among depleted ($M = 1.50, SD = 0.47$) or control participants ($M = 1.80, SD = 0.80$), $t < 1.2$.

On the contrary, we expected assessments made by Black coders to reveal positive outcomes of depletion, consistent with previous findings that White and Black individuals often diverge when evaluating behavior in interracial settings (Appelbaum et al., 2008). As displayed in Figure 2, a two-way interaction emerged for Black coders, $F(1, 77) = 4.93, p_{\text{rep}} = .94, r = .25$, stemming from the interracial conditions wherein depleted participants were viewed as significantly less prejudiced than control participants, $t(77) = 2.71, p_{\text{rep}} = .97, r = .30$. No difference emerged for same-race interactions of depleted versus control participants, $t < 1$. These results link diminished executive capacity to a positive interpersonal outcome, as depleted Whites were viewed as less prejudiced by Black individuals—their prospective partners in interracial interaction.

DISCUSSION

In the extant literature, diminished capacity for executive control is consistently associated with negative outcomes. The present study demonstrates the potential for such depletion to facilitate positive outcomes, both intra- and interpersonally. Specifically, Whites who navigated contentious intergroup en-

counters after performing a depleting computer task had more enjoyable experiences, displayed less inhibited behavior, and seemed less prejudiced to Black observers than did control participants. These findings suggest that researchers would be well advised to consider not only whether individuals regulate in a particular context, but also the extent to which these regulatory strategies are adaptive. We do not suggest that a depleted state is always (or even usually) advantageous, but rather that the nature of its effects depends on the utility of the regulatory strategy to be employed.

Notably, other work has found deficits in executive control to be associated with increases (not decreases) in prejudice (Govorun & Payne, 2006; Muraven, 2008; von Hippel, Silver, & Lynch, 2000). Of course, in these studies, such deficits limited participants' capacity to regulate the expression of prejudice toward out-groups, often an adaptive strategy for reducing bias in social judgment (Monteith, 1993). In contrast, inducing similar deficits in the present sample thwarted a misguided strategy for preventing others' attributions of prejudice during interracial interaction, thus leading depleted participants to appear less prejudiced than control participants to Black observers.

The present findings therefore underscore the notion that how individuals engage in self-regulation during intergroup interaction is just as important as whether or not they do so. This conclusion may help explain why some research has found that low-bias Whites are perceived more negatively than high-bias Whites by minorities (Shelton, Richeson, Salvatore, & Trawalter, 2005; Vorauer & Turpie, 2004). Of course, the present findings also raise new questions regarding race-related individual differences. The quality of the present intergroup interactions improved after depleting Whites' capacity for executive control. But might a similar absence of regulation among non-student samples less responsive to prevailing societal norms actually fuel intergroup conflict?

In closing, impaired executive control does not always beget negative outcomes. When individuals' regulatory strategies are maladaptive, liberating them from the ability to engage in such tendencies may even improve some intra- and interpersonal processes. Notably, not only did losing executive control lead Whites in the present study to have more enjoyable intergroup encounters and to appear less prejudiced to Black observers, but it also initiated open dialogue regarding a racially polarizing issue, perhaps constituting one step toward reconciliation of a source of intergroup conflict that is unlikely to resolve itself.

Acknowledgments—We thank Stephen Aladenoye, Mary Appelbaum, David Gottesman, Courtland Hemphill, Rebecca Mohr, Lizzie Siegle, and Sharon Taylor for research assistance, and Nalini Ambady, Michael Norton, Ayanna Thomas, Heather Urry, and Max Weisbuch for their feedback.

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(RECEIVED 6/12/08; REVISION ACCEPTED 7/22/08)