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Personal conflict impairs performance on an unrelated self-control task: Lingered costs of uncertainty and conflict[☆]

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A B S T R A C T

People have the ability to make important choices in their lives, but deliberating about these choices can have costs. The present study was designed to test the hypothesis that writing about conflicted personal goals and values (conflict condition) would impair self-control on an unrelated subsequent task as compared to writing about clear personal goals and values (clarity condition). Personal conflict activates the behavioral inhibition system (BIS; Hirsh, Mar, & Peterson, 2012), which may make it harder for participants to successfully execute self-control. In this large (N = 337), pre-registered study participants in the conflict condition performed worse on anagrams than participants in the clarity condition, and the effect of condition on anagram performance was mediated by a subjective uncertainty measure of BIS activation. This suggests that BIS activation leads to poor self-control. Moreover, given that conflict is inherent in the exercise of self-control, results point to BIS activation as a mechanism for why initial acts of self-control impair self-control on subsequent, unrelated tasks.

1. Introduction

In many societies people have unprecedented freedom to make important choices about who they will be and what they will do (Baumeister & Muraven, 1996; Schwartz, 2000). Decisions that were once made by one's family, government, and religion are at times now solely the responsibility of the individual. Although there are certainly advantages to this degree of autonomy (Ryan & Deci, 2000) there may also be costs to the uncertainty that accompanies these decisions. The present research was designed to test the hypothesis that deliberating over important decisions in life will impair performance on unrelated tasks.

Although the potential outcomes one may obtain through unlimited choices may seem very appealing (though see Iyengar & Lepper, 2000; Sagi & Friedland, 2007 on how more options can reduce enjoyment of the chosen option), the acts of deliberating and choosing can have negative outcomes. Previous research has shown that assigning people to deliberate about a personal dilemma leads participants to feel anxious and adopt more extreme opinions than participants assigned to a control condition (McGregor, Zanna, Holmes, & Spencer, 2001). Making

choices even about relatively trivial topics has also been shown to impair performance on unrelated tasks, such as decreasing persistence on unsolvable puzzles or increasing time spent procrastinating studying for a test (Vohs et al., 2008). Being faced with choices affects opinions and performance on issues and tasks unrelated to the choice.

One of the ways making choices about a conflicted situation may reduce performance on unrelated tasks is by generalized activation of the Behavioral Inhibition System (BIS; Nash, McGregor, & Prentice, 2011), which is a motivational system that mediates systematic vigilance and disengagement from all goals when faced with conflict or uncertainty (Corr, DeYoung, & McNaughton, 2013; Gray & McNaughton, 2000; Hirsh & Kang, 2016; Hirsh, Mar, & Peterson, 2012). This disengagement allows the conflicted organism to step back and contemplate the options available in the situation, but its generalized activation may also decrease the likelihood of persistence and success at other unrelated tasks. According to Gray and McNaughton (2000), when conflicts are detected by the BIS there is a goal-system-wide muting of enthusiasm for all goals.

We chose to measure performance on a task that has been used to measure self-control in previous studies, solvable anagrams under time pressure (Muraven, Tice, & Baumeister, 1998). Self-control occurs when

one overrides a prepotent or immediately-rewarding response that conflicts with a long-term goal or a situational constraint (Baumeister, Vohs, & Tice, 2007; Fujita, 2011). Working through a daunting task under the pressure of a deadline demands that people use self-control to focus their attention on the task. Although BIS activation may undermine performance on a variety of tasks via muted enthusiasm, we thought it might be particularly likely to reduce performance on tasks involving conflict, because the adaptive purpose of disengagement and vigilance of BIS activation is to identify and switch to less conflicted goals. Other tasks that involve conflict should accordingly be particularly likely to be eschewed after BIS activation. We accordingly predicted that considering a personal dilemma would impair persistence and performance on an unrelated task requiring self-control, and that this decrement would be mediated by BIS-specific affect.

In a large-N, pre-registered study (<https://osf.io/num4y/>) we tested whether randomly assigning participants to think about conflicted (vs. clear) priorities would heighten BIS-activation and thereby impair performance on an unrelated task. In past research the high conflict manipulation heightened BIS-related affect and the clarity manipulation reduced it to baseline levels, but not below (McGregor et al., 2001). Following McGregor et al., 2001, and Hayes, Ward, & McGregor, 2016, we used a subjective measure of anxious uncertainty that has been found to specifically follow after motivational conflict (see also Nash et al., 2011; McGregor, Prentice, & Nash, 2013 for additional evidence). We predicted that participants in the conflict condition would solve fewer anagrams than participants in the clarity condition and that anxious uncertainty would mediate the relationship between condition and anagrams solved.

2. Method

2.1. Participants

Three hundred thirty-seven participants (88 men, 157 women, 92 not reported; $M_{\text{age}} = 35$) were recruited through Amazon's Mechanical Turk. Based on a separate pilot study ($N = 42$), we expected a medium to large effect size. A power analysis indicated that we needed 292 participants to achieve 99% power with an effect size of $d = .50$. Additional participants were recruited to have a sample robust to attrition, and data were not analyzed until all data were collected.

2.2. Procedure

The only manipulation and dependent variable measured are reported below. Potential moderators were measured that are not in the manuscript (e.g. neuroticism; all available at <https://osf.io/num4y/>), but none were significant.

2.2.1. Conflict and clarity manipulation

Participants randomly assigned to the conflict condition wrote about an unresolved personal dilemma and the conflicting personal values that the horns of the dilemma implied (McGregor et al., 2001). In the clarity condition, participants wrote about a highly important personal value (McGregor et al., 2001). In both conditions, participants were asked to think about their important values, but in the conflict condition they were considering how those values apply to a personal conflict. In past research these manipulation have respectively increased and decreased anxious uncertainty (McGregor et al., 2001, Study 1), and related constructs (Creswell et al., 2005; Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999; Taylor & Gollwitzer, 1995).

2.2.2. Performance

Participants were given a set of fifty five-letter anagrams and were asked to solve as many as possible in 7 min (Muraven et al., 1998).

2.2.3. BIS-related affect

Following the anagram task, participants completed McGregor et al.'s (2001) anxious uncertainty scale, which has been used in previous research to measure BIS-related affect (Hayes et al., 2016, Study 5; McGregor, 2006; see Hirsh et al., 2012 for centrality of uncertainty to BIS-activation). They rated the degree to which they currently felt nineteen uncertainty-related emotions, such as "uneasy" and "torn" on a scale from 1 (very slightly or not at all) to 5 (extremely).

3. Results

3.1. Anagram performance

Participants in the conflict condition solved significantly fewer anagrams ($M = 12.91$, $SD = 14.19$) than participants in the clarity condition ($M = 16.86$, $SD = 13.40$), $F(1, 335) = 6.83$, $p = .009$, $\eta^2 = .02$, 90% CI[.004, .06].

In addition to predicting performance on anagrams, condition also predicted whether participants dropped out of the study entirely at some point after the manipulation, $\chi^2(336) = 22.82$, $p < .001$. Participants in the conflict condition were 3.28 times more likely to drop out of the study after the manipulation than participants in the clarity condition. Although this effect was not predicted, it seems plausible that a participant with poor self-control following the conflict manipulation may be especially likely to disengage from an online study and pursue a more immediately rewarding activity.

3.2. BIS-related affect

Participants in the conflict condition ($M = 2.49$, $SD = .90$) reported feeling more anxious uncertainty than participants in the clarity condition ($M = 2.18$, $SD = .86$), $F(1, 254) = 7.33$, $p = .007$, $\eta^2 = .03$, 90% CI[.004, .07]. The difference in the dfs between these and previous analyses is because anxious uncertainty was measured after the anagram measure, and participants who quit the study entirely did not complete the anxious uncertainty measure.

3.3. Mediation

Anxious uncertainty was negatively correlated with the number of anagrams solved, $r(255) = -.16$, $p = .01$. The indirect effect (Preacher & Hayes, 2004) of condition through anxious uncertainty on anagrams solved was $-.74$, 95% CI $[-1.80, -.15]$. Because the confidence interval does not include zero, the indirect effect was significant.

4. Discussion

This pre-registered, large-N study provides evidence that considering a personal conflict leads to poor performance on solvable anagrams as compared to writing about a clear value. Participants who were assigned to write about a personal conflict reported greater anxious uncertainty than participants in the clarity condition, and anxious uncertainty mediated the effect of conflict condition on anagram performance.

The present research points to activation of the Behavioral Inhibition System as a potential mechanism for the effect of one act requiring self-control impairing a second act requiring self-control (ego-depletion). A large body of research has found that people perform less well on a second task requiring self-control after a first task requiring self-control (ego depletion; Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven et al., 1998; see Hagger, Wood, Stiff, & Chatzisarantis, 2010 for a meta-analysis). However, it is currently unclear why this occurs, and recent replication failures have caused some to question the validity of the effect (Hagger et al., 2016). It is likely that tasks requiring self-control activate the behavioral inhibition system. The

behavioral inhibition system is activated in response to conflict (Corr et al., 2013; Gray & McNaughton, 2000), and conflict is inherent to self-control. Self-control is only required when a person has a desire that conflicts with a goal or situational constraint (Fujita, 2011; Hofmann, Baumeister, Forster, & Vohs, 2012; Metcalfe & Mischel, 1999). Common ego-depletion manipulations such as asking participants to suppress or exaggerate their emotions, inhibit a learned or automatic response (e.g. e's task, stroop task, As and Ns task), direct their attention toward boring stimulus, or resist a desirable item put participants in a state of conflict between what they would prefer to do or do automatically and what they've been instructed to do (e.g. Baumeister et al., 1998; DeWall, Baumeister, Gailliot, & Maner, 2008; Muraven et al., 1998; Schmeichel, 2007; Schmeichel, Demaree, Robinson, & Pu, 2006; Schmeichel, Vohs, & Baumeister, 2003; Vohs & Heatherton, 2000; Webb & Sheeran, 2003). Conflict may lead to impaired self-control on a subsequent task requiring self-control, as shown in the present study, because the BIS activation aroused by conflict causes disengagement and orientation away from other tasks involving conflict. By demonstrating that contemplating a personal conflict can impair self-control on unrelated tasks, the present research points to activation of the Behavioral Inhibition System as a potential mechanism for self-control failure in ego-depletion studies.

Behavioral inhibition as a mechanism for ego-depletion may seem incompatible with previous research showing people demonstrate a greater approach response after being assigned to engage in self-control than after being assigned to a control condition (Inzlicht, Schmeichel, & Macrae, 2014; Schmeichel, Harmon-Jones, & Harmon-Jones, 2010). Previous research has shown, however, that people spontaneously try to alleviate BIS activation by turning to thoughts or actions that can activate the Behavioral Approach System (BAS) and thereby downregulate the BIS (McGregor, Nash, Mann, & Phillips, 2010). It may be that an initial BIS activation after self-control can lead people to respond with reactive BAS activation. In the current study, participants were not given the opportunity to approach something positive and enjoyable (unless they left the study, which participants disproportionately did after the conflict manipulation), so they likely just remained in a state of high BIS activation, leading to poor performance. If participants were given the option to approach something enjoyable or engaging, we would expect similar results to those obtained in previous studies that show an increase in approach motivation following one act requiring self-control.

To maximize power and make the conditions similar, our 2-cell design compared conflict with a clarity condition rather than a pure neutral control condition. Some readers might wonder whether the clarity condition constituted a self-affirmation treatment that bolstered performance. Previous work has found that self-affirmation can improve executive function (Harris, Harris, & Miles, 2017, though not above baseline in some studies, Schmeichel & Vohs, 2009). In this view, our findings could be seen as reflecting improved performance in the clarity condition, with the conflict condition constituting the control. This view is however difficult to reconcile with the anxious uncertainty findings, including their mediation of the performance outcomes. Using the same clarity manipulation we did, McGregor et al. (2001) found no difference in anxious uncertainty between the clarity and neutral control conditions. If anything, their neutral control conditions yielded a mean level of anxious uncertainty slightly lower than our clarity condition (2.18 vs. 1.8, 2.2). That speaks against any view that the difference we observed was due to the clarity condition reducing anxious uncertainty via self-affirmation.

The present research found smaller effect sizes than has been typical among published studies of ego depletion (Hagger et al., 2010). This might mean that our manipulation of uncertainty produces less severe ego depletion than manipulations directly intended to manipulate that state. Although we propose that BIS activation is one potential mechanism for ego-depletion, it may be that the standard ego-depletion effect is contributed to by multiple causes (Inzlicht et al., 2014; Vohs,

Baumeister, & Schmeichel, 2012). Due to increased error likely involved in online studies (due to not having control over the environment of participants, including distractions), it is also possible that online studies will generally obtain smaller effect sizes than in-person lab studies. We note that experiences of uncertainty in daily life can vary widely in degree and subjective impact, and the brief exercise in our study presumably falls far short of the uncertainty felt by someone awaiting the results of a pregnancy or cancer test, medical school application, marriage proposal, or speculative investment.

This research also has relevance for research on deliberative mindset (Gollwitzer, 1990), from which the conflict manipulation we used was originally adapted (i.e., from Taylor & Gollwitzer, 1995; by McGregor et al., 2001). Previous research has shown that a deliberative mindset (as compared to an implementation mindset) can impair performance on the task one has been deliberating about (Armor & Taylor, 2003) and lead to less persistence (Brandstätter & Frank, 2002) and longer completion times for tasks unrelated to the deliberation (Brandstätter, Giesinger, Job, & Frank, 2015). The present research suggests that one of the mechanisms whereby deliberative mindset may affect performance and well-being is through BIS activation.

The present research provides evidence that participants assigned to contemplate their conflicting goals and values demonstrated poorer self-control on an unrelated task than participants assigned to contemplate their clear personal goals and values. Although the ability to “chart one's own destiny” has its advantages, deliberating about one's most important decisions may undermine one's ability to successfully execute self-control.

Open practices

This study was pre-registered and all materials are available at <https://osf.io/num4y/>.

References

- Armor, D. A., & Taylor, S. E. (2003). The effect of mindset on behavior: Self-regulation in deliberative and implementation frames of mind. *Personality and Social Psychology Bulletin, 29*, 86–95.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*, 1252–1265.
- Baumeister, R. F., & Muraven, M. (1996). Identity as adaptation to social, cultural, and historical context. *Journal of Adolescence, 19*, 405–416.
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science, 16*, 351–355.
- Brandstätter, V., & Frank, E. (2002). Effects of deliberative and implemental mindsets on persistence in goal-directed behavior. *Personality and Social Psychology Bulletin, 28*, 1366–1378.
- Brandstätter, V., Giesinger, L., Job, V., & Frank, E. (2015). The role of deliberative versus implementation mindsets in time prediction and task accomplishment. *Social Psychology, 46*, 104–115.
- Corr, P. J., DeYoung, C. G., & McNaughton, N. (2013). Motivation and personality: A neuropsychological perspective. *Social and Personality Psychology Compass, 7*, 158–175.
- Creswell, J. D., Welch, W. T., Taylor, S. E., Sherman, D. K., Gruenewald, T. L., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science, 11*, 846–851.
- DeWall, C. N., Baumeister, R. F., Gailliot, M. T., & Maner, J. K. (2008). Depletion makes the heart grow less helpful: Helping as a function of self-regulatory energy and genetic relatedness. *Personality and Social Psychology Bulletin, 34*, 1653–1662.
- Fujita, K. (2011). On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality and Social Psychology Review, 15*, 352–366.
- Gollwitzer, P. (1990). In E. T. Higgins, & R. M. Sorrentino (Vol. Eds.), *The handbook of motivation and cognition: Foundations of social behavior: . vol. 2. Action phases and mindsets* (pp. 53–92). New York: Guilford Press.
- Gray, J. A., & McNaughton, N. (2000). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford: Oxford University Press.
- Hagger, M. S., Chatzisarantis, N. L. D., Alberts, H., Anggono, C. O., Batailler, C., & Birt, A.R...Zwienenberg, M. (2016). A multilab preregistered replication of the ego-depletion effect. *Perspectives on Psychological Science, 11*, 546–573.
- Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. D. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin, 136*, 495–525.
- Harris, P. S., Harris, P. R., & Miles, E. (2017). Self-affirmation improves performance on tasks related to executive functioning. *Journal of Experimental Social Psychology, 70*, 281–285.

- Hayes, J., Ward, C. L. P., & McGregor, I. (2016). Why bother? Death, failure, and fatalistic withdrawal from life. *Journal of Personality and Social Psychology, 110*, 96–115.
- Hirsh, J. B., & Kang, S. K. (2016). Mechanisms of identity conflict: Uncertainty, anxiety, and the behavioral inhibition system. *Personality and Social Psychology Review, 20*, 223–244.
- Hirsh, J. B., Mar, R. A., & Peterson, J. B. (2012). Psychological entropy: A framework for understanding uncertainty-related anxiety. *Psychological Review, 119*, 304–320.
- Hofmann, W., Baumeister, R. F., Forster, G., & Vohs, K. D. (2012). Everyday temptations: An experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology, 102*, 1318–1335.
- Inzlicht, M., Schmeichel, B. J., & Macrae, C. N. (2014). Why self-control seems (but may not be) limited. *Trends in Cognitive Sciences, 18*, 127–133.
- Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing. *Journal of Personality and Social Psychology, 79*, 995–1006.
- Koole, S. L., Smeets, K., van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology, 77*, 111–125.
- McGregor, I. (2006). Offensive defensiveness: Toward an integrative neuroscience of compensatory zeal after mortality salience, personal uncertainty, and other poignant self-threats. *Psychological Inquiry, 17*, 299–308.
- McGregor, I., Nash, K., Mann, N., & Phillips, C. E. (2010). Anxious uncertainty and reactive approach motivation (RAM). *Journal of Personality and Social Psychology, 99*, 133–147.
- McGregor, I., Prentice, M., & Nash, K. (2013). Anxious uncertainty and reactive approach motivation (RAM) for religious idealistic, and lifestyle extremes. *Journal of Social Issues, 69*, 537–563.
- McGregor, I., Zanna, M. P., Holmes, J. G., & Spencer, S. J. (2001). Compensatory conviction in the face of personal uncertainty: Going to extremes and being oneself. *Journal of Personality and Social Psychology, 80*, 472–788.
- Metcalfe, J., & Mischel, W. (1999). A hot/cool system analysis of delay of gratification: Dynamics of willpower. *Psychological Review, 106*, 3–19.
- Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-control as limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology, 74*, 774–789.
- Nash, K., McGregor, I., & Prentice, M. (2011). Threat and defense as goal regulation: From implicit goal conflict to anxious uncertainty, reactive approach motivation, and ideological extremism. *Journal of Personality and Social Psychology, 101*, 1291–1301.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*, 717–731.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78.
- Sagi, A., & Friedland, N. (2007). The cost of richness: The effect of the size and diversity of decision sets on post-decision regret. *Journal of Personality and Social Psychology, 93*, 515–524.
- Schmeichel, B. J. (2007). Attention control, memory updating, and emotion regulation temporarily reduce the capacity for executive control. *Journal of Experimental Psychology: General, 136*, 241–255.
- Schmeichel, B. J., Demaree, H. A., Robinson, J. L., & Pu, J. (2006). Ego depletion by response exaggeration. *Journal of Experimental Social Psychology, 42*, 95–102.
- Schmeichel, B. J., Harmon-Jones, C., & Harmon-Jones, E. (2010). Exercising self-control increases approach motivation. *Journal of Personality and Social Psychology, 99*, 162–173.
- Schmeichel, B. J., & Vohs, K. D. (2009). Self-affirmation and self-control: Affirming core values counteracts ego depletion. *Journal of Personality and Social Psychology, 96*, 770–782.
- Schmeichel, B. J., Vohs, K. D., & Baumeister, R. F. (2003). Intellectual performance and ego depletion: Role of the self in logical reasoning and other information processing. *Journal of Personality and Social Psychology, 85*, 33–46.
- Schwartz, B. (2000). Self-determination: The tyranny of freedom. *American Psychologist, 55*, 79–88.
- Taylor, S. E., & Gollwitzer, P. M. (1995). Effects of mindset on positive illusions. *Journal of Personality and Social Psychology, 69*, 213–226.
- Vohs, K. D., Baumeister, R. F., & Schmeichel, B. J. (2012). Motivation, personal beliefs, and limited resources all contribute to self-control. *Journal of Experimental Social Psychology, 48*, 943–947.
- Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2008). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Journal of Personality and Social Psychology, 94*, 883–898.
- Vohs, K. D., & Heatherton, T. F. (2000). Self-regulatory failure: A resource-depletion approach. *Psychological Science, 11*, 249–254.
- Webb, T. L., & Sheeran, P. (2003). Can implementation intentions help to overcome ego-depletion? *Journal of Experimental Social Psychology, 39*, 279–286.