FlashReport

Personal prayer buffers self-control depletion

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HIGHLIGHTS

- Several factors can counteract self-control depletion
- Less is known about factors that can prevent depletion effects
- We tested the assumption that personal prayer would buffer depletion effects
- Participants in the control group showed the regular depletion effect
- Participants who had prayed at the beginning of the study did not

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ABSTRACT

The strength model of self-control has inspired large amounts of research and contributed to a deeper understanding of the temporal dynamics underlying self-control. Several studies have identified factors that can counteract self-control depletion, but relatively little is known about factors that can prevent depletion effects. Here we tested the hypothesis that a brief period of personal prayer would buffer self-control depletion effects. Participants either briefly prayed or thought freely before engaging (or not engaging) in an emotion suppression task. All participants completed a Stroop task subsequently. Individuals who had thought freely before suppressing emotions showed impaired Stroop performance compared to those who had not suppressed emotions. This effect did not occur in individuals who had prayed at the beginning of the study. These results are consistent with and contribute to a growing body of work attesting to the beneficial effects of praying on self-control.

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Introduction

The strength model of self-control (Baumeister, Vohs, & Tice, 2007) posits that self-control relies on a limited, domain-independent resource. The exertion of self-control in any domain will temporarily reduce this resource, leading to a state dubbed self-control depletion, which increases the likelihood of subsequent self-control failure in any other domain requiring self-control. Abundant evidence indicates that activities requiring self-control such as emotion regulation, thought control, resisting temptation, or inhibiting pre-potent response tendencies can lead to decrements in self-control performance in domains such as eating and drinking (Muraven, Collins, & Nienhaus, 2002; Vohs & Heatherton, 2000), aggression (DeWall, Baumeister, Stillman, & Gailliot, 2007), or executive control (Schmeichel, 2007).

Researchers began investigating factors that can ameliorate the deleterious effects of self-control depletion. Among those factors are the consumption of glucose (Gailliot et al., 2007), an increased motivation to perform well (Muraven & Slessareva, 2003), a brief period of mindfulness meditation (Friese, Messner, & Schaffner, 2012), and a high construal level (Agrawal & Wan, 2009; Schmeichel & Vohs, 2009). Particularly relevant for present purposes, in a recent study reminders of religious concepts such as *God* or *devine* that were presented outside of participants' conscious awareness offset depletion effects (Rounding, Lee, Jacobson, & Ji, 2012).

In contrast to the quickly growing literature on factors counteracting self-control depletion, less is known about factors that make individuals less susceptible to self-control depletion to begin with. In a series of studies, Oaten and Cheng (2006a, 2006b, 2007) found a reduced vulnerability to self-control depletion after prolonged self-control trainings over several weeks. Other work sometimes found a decreased (DeWall et al., 2007) and sometimes an increased (Imhoff, Schmidt, & Gerstenberg, in press) susceptibility to self-control depletion in individuals high in trait self-control, leaving the role of trait self-control for depletion effects unsettled. In a series of studies, experimentally induced or measured lay beliefs that the ability to self-control is unlimited buffered self-control depletion effects. Only individuals who believed or were led to believe that the ability to self-control is limited showed the regularly observed pattern of impaired self-control performance

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after a first effortful task (Job, Dweck, & Walton, 2010; but not after a particularly strong depletion manipulation, see Vohs, Baumeister, & Schmeichel, 2012).

In the present study we tested the hypothesis that a brief period of personal prayer can prevent the deleterious effects of self-control depletion. Praying over prolonged periods of time strengthens self-control as indicated by reduced alcohol consumption and infidelity (Fincham, Lambert, & Beach, 2010; Lambert, Fincham, Marks, & Stillman, 2010). The (scarce) research on the short-term effects of praying suggests that it evokes feelings of inner strength and rest (Bänziger, van Uden, & Janssen, 2008; Janssen, Dehart, & Dendraak, 1990) and people turn to prayer as a coping response to high demands in life (Ellison & Taylor, 1996; McCullough & Larson, 1999), presumably because, in the words of William James, praying activates "energy, which otherwise would slumber" (James, 1902/1982, p. 477).

On an exploratory basis, we made an initial attempt at investigating three potentially mediating factors for the assumed buffering effect of personal prayer on self-control depletion. First, previous research suggests that activating central personal values leads to a high construal level (Trope & Liberman, 2010), which in turn counteracts self-control depletion (Agrawal & Wan, 2009; Schmeichel & Vohs, 2009). We reasoned that praying might trigger a high construal level. Second, based on reports that individuals pray to gain subjective strengthening (Janssen et al., 1990), we investigated whether the extent to which individuals try to find strength during praying would mediate the hypothesized effect. Finally, previous research showed that (a) people interpret praying as a social interaction with God (Bremner, Koole, & Bushman, 2011; Schjoedt, Stødkilde-Jørgensen, Geertz, & Roepstorff, 2009), and (b) even brief social interactions can trigger cognitive resources and enhance executive control (Ybarra et al., 2008). We therefore investigated engagement in social interaction as a third potentially mediating factor. In sum, we hypothesized that a brief period of personal prayer would buffer self-control depletion effects. On an exploratory basis, we investigated construal level, subjective strengthening, and engagement in social interaction as potential mediators of this presumed effect.

Methods

Participants and design

Seventy-nine participants (62 females, $M_{age} = 24.42$ years, $SD_{age} = 6.18$), predominantly students of psychology, were randomly assigned to a 2 (initial task: prayer vs. free thought) × 2 (thought suppression: yes vs. no) between-subjects design. Forty-one participants (52%) described themselves as Christian, fourteen as atheistic, ten as agnostic, one as Muslim, and thirteen reported various other religious affiliations.

Procedure

Participants took part in individual sessions. First, they either engaged in a brief period of free thought or personal prayer. Next, they completed the manipulation of self-control resources, answered manipulation check questions, and completed a Stroop task. Finally, they completed measures of the potential mediators, religiosity, control questions, and demographic information.

Prayer manipulation

Participants were asked to either engage in personal prayer or free thought as intensively as possible for five minutes. In the prayer (free thought) condition, they were instructed to *pray* (*think*) freely for (about) a person, a group of persons, their hopes and wishes, something they were currently concerned with, or anything else they wished in whatever manner they wished to do so. They were informed that it would not be possible to hear their voice in adjacent rooms and that

no one would be able to see them. The experimenter then informed the participant that she would leave the room during the next five minutes and would not return before an hourglass on the participant's table had run out.

The free thought instruction was identical to the prayer condition except for the subjective awareness that one is praying and not merely thinking. It paralleled previous control conditions for personal prayer (Bremner et al., 2011) except that in previous research participants were asked to think about a particular person while in the present study they were allowed to think about anything they wished.

Manipulation of self-control resources

Participants watched a five-minute compilation of two film clips that were rated very funny in a pretest. Participants in the control condition were asked to watch the film clips as they would normally do. Participants in the suppression condition were asked to suppress all emotions that may arise and to control their facial appearance. Emotion suppression has been repeatedly used to manipulate self-control depletion (Hagger, Wood, Stiff, & Chatzisarantis, 2010).

Manipulation check and mood

Participants were asked how exhausting it was (1 'not exhausting at all', 7 'extremely exhausting'), and how much they had to concentrate (1 'not at all', 7 'very much', $\alpha = .97$) to follow the instructions during the film clips. Mood was assessed with two items (1 'very negative'/ 'very sad', 7 'very positive'/'very happy', $\alpha = .85$). One participant failed to provide manipulation check ratings. As part of the control questions at the end of the study, participants were asked how intensively they tried to follow the instructions they were asked to adhere to while watching the film clip (0 'not at all intensively', 6 'very intensively').

Stroop task

Participants completed a Stroop task (Stroop, 1935) on the computer. In each trial, a stimulus appeared in blue, red, or yellow ink and participants were instructed to react to the ink color and ignore the semantic meaning of the stimulus. In (in)congruent trials, the semantic meaning of the word did (not) match the ink color. There were 108 congruent, and 36 incongruent trials. The inter-stimulus interval varied randomly between 500 and 1000 milliseconds. The Stroop task requires self-control because on incongruent trials participants need to override the dominant response tendency of reacting to the semantic meaning of the presented word and indicate the ink color instead. The difference in error rates on incongruent versus congruent trials served as the dependent variable (Friese, Binder, Luechinger, Boesiger, & Rasch, 2013). Note that previous studies in the realm of the strength model of self-control have found susceptibility to depletion effects for error rates but not response latencies and vice versa (Gailliot et al., 2007).

Religiosity

Three questions served as an index of religiosity (How strongly do you believe in God (Allah, Jahwe…)?, 0 'certain that God does not exist' to 6 'certain that God exists'; How religious are you?, 0 'not at all religious' to 6 'very religious'; How often do you pray?, 0 'almost never' to 6 'daily'; $\alpha = .92$). Mean religiosity was moderately low ($M = 1.61$; $SD = 1.76$). Similar to previous research on praying and self-control, religiosity did not affect the results and will therefore not be discussed further (Bremner et al., 2011; Lambert, Fincham, Stillman, Graham, & Beach, 2010; see also Rounding et al., 2012).

Potential mediating processes

Following prior research (Schmeichel & Vohs, 2009), participants completed the Behavioral Identification Form as an indicator of construal level (BIF, Vallacher & Wegner, 1989; α = .85). Subjective strengthening was assessed with one ("During the task during which I was alone in the room, I have tried to find strength") and engagement in social interaction with two questions ("…I have tried to get in touch with someone else", "… I have talked to someone else (aloud or quietly)", α = .74). These items were embedded in a 15-item questionnaire that was based on exploratory interviews of independent participants about what they would do when asked to think freely or pray for a few minutes.

Results

Manipulation check

As expected, participants in the suppression condition reported that it required more effort to follow the instructions during the film clips than participants in the no suppression condition ($M_{suppression}$ = 5.35, $SD_{suppression}$ = 1.49, $M_{no\ suppression}$ = 1.96, $SD_{no\ suppression}$ = 1.30, $t(76)$ = 10.68, $p < .001$, d = 2.42). There were no differences in mood between the suppression conditions after viewing the film clips ($M_{suppression}$ = 5.59, $SD_{suppression}$ = 0.99, $M_{no\ suppression}$ = 5.55, $SD_{no\ suppression}$ = 0.97, $t < 1$). Furthermore, participants in the prayer and the free thought conditions who suppressed their emotions found the emotion suppression task similarly demanding (M_{prayer} = 5.18, SD_{prayer} = 1.59, $M_{free\ thought}$ = 5.50, $SD_{free\ thought}$ = 1.42, $t(38) < 1$, p = .512, d = 0.21) and were engaged in the task to a similar extent (M_{prayer} = 5.35, SD_{prayer} = 0.59, $M_{free\ thought}$ = 5.43, $SD_{free\ thought}$ = 0.75, $t(39) < 1$, p = .711, d = 0.12).

Main analyses

Stroop interference effects were analyzed with a 2 (initial task: prayer vs. free thought) × 2 (emotion suppression: yes vs. no) between-subjects ANOVA. The interaction between prayer (vs. free thought) and emotion suppression was significant ($F(1, 75)$ = 4.18, p = .044, η_p^2 = .053, Table 1 and Fig. 1). A priori defined contrast analyses showed that emotion suppression led to poorer Stroop performance in the free thought condition ($t(75)$ = 2.29, p = .025, d = 0.53), but not in the personal prayer condition ($t < 1$). While the two no suppression conditions did not differ ($t < 1$), Stroop performance was significantly better in the suppression/personal prayer condition than the suppression/free thought condition ($t(75)$ = −2.16, p = .034, d = −0.50). Neither the main effect of emotion suppression ($F(1, 75)$ = 1.60, p = .209, η_p^2 = .021) nor the main effect of prayer (vs. free thought; $F < 1$) was significant. In a similar analysis using Stroop interferences based on response latencies the interaction was not significant, $F(1, 75) < 1$, p = .445, η_p^2 = .008. When controlling for response latencies the interaction in the main analysis on error rates remained significant, $F(1, 75)$ = 4.85, p = .031, η_p^2 = .062.
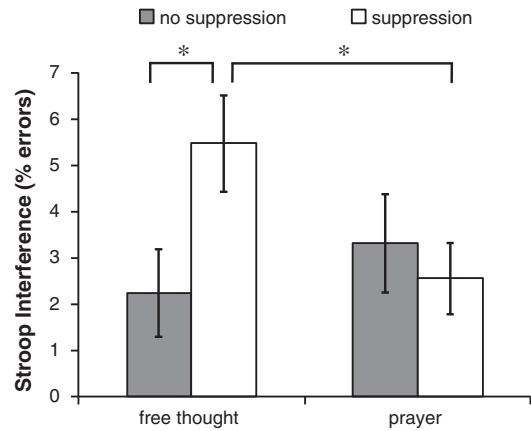

Fig. 1. Stroop interference effects as a function of condition in the initial task (free thought vs. personal prayer) and the first self-control task (emotion suppression: yes vs. no). After a brief period of free thought, participants in the suppression condition showed greater Stroop interference effects than in the no suppression condition, whereas no significant difference between the groups emerged after a brief period of personal prayer. Error bars indicate ± one standard error of the mean.

Mediation analyses

We used the macro provided by Preacher and Hayes (2008) to test BIF scores, subjective strengthening, and engagement in social interaction for mediation. Only the extent to which participants engaged in social interaction mediated the effect of praying on self-control (bias corrected and accelerated 95% confidence interval using 20 000 bootstrap resamples: [−2.71, −0.21]). This indirect effect remained significant when all three potential mediators were tested simultaneously ([−2.88, −0.06]). Participants in the prayer condition more strongly sought and engaged in social interaction during the initial task and the more they did so, the better their Stroop performance was after the first self-control task.

Discussion

A brief period of personal prayer buffered the self-control depletion effect. Participants who had engaged in free thought for several minutes and had then engaged in an emotion suppression task showed impaired performance on a subsequent Stroop task compared to participants who had not suppressed emotions. This effect was not evident for participants who had prayed at the beginning of the study. Manipulation check findings suggest that participants in the prayer condition did not simply withhold effort from the suppression task; rather, it appears that they legitimately exercised self-control during the suppression task but did not become depleted.

The present finding fits well with recent research investigating the association of religion and self-control in general (McCullough & Willoughby, 2009; Rounding et al., 2012), and praying and self-control in particular (Bremner et al., 2011; Fincham et al., 2010; Lambert, Fincham, Marks, et al., 2010). It goes beyond extant research by

Table 1
Error rates and response latencies in milliseconds for congruent trials, incongruent trials and Stroop interferences (incongruent minus congruent trials) as a function of self-regulatory resources condition and prayer condition. Standard deviations are given in parentheses.

Experimental condition	Error rates			Response latencies		
	Congruent trials	Incongruent trials	Stroop interference	Congruent trials	Incongruent trials	Stroop interference
Free thought/no suppression	0.71 (1.45)	2.94 (3.99)	2.23 (3.92)	625 (167)	744 (205)	119 (57)
Free thought/suppression	1.68 (1.62)	7.14 (4.78)	5.46 (4.80)	584 (92)	726 (161)	141 (82)
Prayer/no suppression	1.06 (1.18)	4.37 (4.44)	3.31 (4.86)	591 (84)	712 (143)	121 (82)
Prayer/suppression	1.48 (1.71)	4.03 (3.18)	2.55 (3.44)	649 (106)	819 (152)	170 (78)

Note. N = 79.

examining the implications of praying for self-control in the context of the strength model of self-control.

Further analyses revealed preliminary evidence that one potential mediator of this effect may be the extent to which participants engage in social interaction during prayer. Social interactions often involve similar cognitive operations as executive functioning tasks. Ybarra and colleagues (2008) coined the term "resource priming" to describe the effect that even brief social interactions can activate cognitive resources, improve performance on executive functioning tasks, and thereby facilitate social interactions. Engaging in a social interaction during prayer may have similar effects of providing a cognitive boost that can benefit subsequent self-control attempts. Alternatively, praying may effectively have worked as a social orientation priming, that is, a concern to live up to the expectations of others. Social orientation has been shown to reduce self-control depletion effects (Seeley & Gardner, 2003).

Either way, we urge caution in strongly interpreting the mediational analysis. First, all potential mediators were assessed after the dependent variable so it cannot be ruled out that performing the Stroop influenced responding on the mediator measures. Second, the questions assessing subjective strengthening and social interaction retrospectively asked participants how they felt during the prayer/free thought assignment. By contrast, the BIF reflects general preferences for abstract versus concrete identifications. This difference may have dampened chances of mediation for the BIF. Third, subjective strengthening and social interaction were assessed with only one and two items, respectively. Thus, the present evidence is preliminary and no strong conclusions should be drawn until future research has replicated these findings and investigated other potential mediators. Praying is a complex mental activity that can trigger multiple psychological processes, possibly serving self-control in multiple manners.

We would like to stress that the point this study tries to make is that praying can at least temporarily prevent self-control depletion to unfold. The point is not that praying triggers a process that only praying can trigger. Quite the opposite, plausibility and the mediation analysis suggest that various other activities could lead to similar findings (e.g., talking to a human being).

Acknowledgment

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