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PRAYER AS A POTENTIAL BUFFER AGAINST EGO DEPLETION

by

DANIELLE OEHRING

(Under the Direction of Janie Wilson)

ABSTRACT

Ego depletion is theorized as the loss of self-control after it has been exerted over a period of time, leading to loss of conscious regulation of behavior. Buffering against this loss is characterized by engaging in an activity that will help extent the use of self-control, helping to further regulate behaviors such as impulse control. We were interested in learning how prayer may act as a buffer against ego depletion and compared prayer against self-encouraging talk to find is there is a difference between how the two-affect self-control. One hundred ten participants were randomly assigned to a video group: either a neutral video or a video intended to evoke disgust as they were told to suppress their emotions. With the video group, participants were given one of three passages to read beforehand: prayer, self-encouraging talk, and control. After suppressing emotion while watching the video, participants' persistence was measured during a Stroop task. It was shown that prayer was the most beneficial buffer against ego depletion as participants persisted longer with no difference between which video was viewed.

INDEX WORDS: Ego Depletion, Prayer, Buffer, Self-Control, Prevention

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DANIELLE OEHRING

B.S., Georgia Southern University, 2017

A Thesis Submitted to the Graduate Faculty of Georgia Southern University in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

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CHAPTER ONE

INTRODUCTION

The self contains a limited amount of self-control that regulates all actions, such as decision making, originating and continuing behaviors, processing information, and resisting temptations or automatic responses, impulses, and emotions. Baumeister, Bratslavsky, Muraven, and Tice (1998) argued that depletion of self-control with continued use characterizes a state of ego depletion. Ego depletion can be explained by a limited-resource model, also referred to as the strength model of self-control, which defines the loss of self-control over time. A person's self-control strength is limited, resulting in a fixed capacity for self-control. A fixed capacity means that repeated use of self-control will leave little control for subsequent tasks or challenges.

Ego Depletion

Baumeister, Bratslasky, Muraven, and Tice (1998) developed the original study to test the limited-resource model. Executive functioning was examined after participants had to exert self-control. In this experiment, participants were placed in a room with a plate of freshly baked chocolate chip cookies and a bowl of radishes or in a control group with no food. Participants were told to either eat the cookies or the radishes, and they could only eat the food they were assigned. They were required to resist the temptation to eat the food not assigned to them. For example, those in the radish condition resisted the temptation to eat cookies. Both groups later had to attempt a problem-solving task with puzzles they did not know were unsolvable; the primary outcome was persistent on the task as a measure of self-control. The participants who forced themselves to eat the radishes and resist the cookie temptation quit significantly sooner than the group who ate the cookies (and resisted any potential urge to eat radishes). The act of resisting temptation by not eating the cookies while also eating an undesirable food in their place

revealed that depletion of self-control did occur. That is, after exerting self-control, participants showed less subsequent self-control.

Resisting temptation provides one way to create ego depletion, but depletion occurs when any self-control is required before a second self-control task. Ego-depleting tasks can be found in several domains, including physical, emotional, and cognitive. Interestingly, the ego is a finite resource of self-control such that depletion across any domain pulls from the same resource. It is notable that the ego-depletion paradigm includes two self-control requirements, the first task requiring self-control is considered the depleting task, and the second task requiring self-control is the assessment task. Because every domain of self-control pulls from the same resource, ego-depletion studies may employ tasks across different domains within the same study. For example, depletion might be *created* using a cognitive self-control task, and depletion might subsequently be *assessed* using a physical self-control task. For the sake of clarity, the following discussion focuses on the self-control domain used to create ego depletion (the independent variable) rather than the task used to assess self-control (the dependent variable).

The physical domain has been explored as a source of self-control in many ways. For example, Alberts, Martijn, Nievelstein, Jansen, and De Vries (2008) examined the effects of physical exertion on self-control. Participants were asked to hold up a weight for as long as they were able (self-control). Following this task, participants were given a 3-minute lecture on the muscular sensations of the arm and hand with the intention of creating a hyper-focus on discomfort in the arm. Subsequently, participants proceeded to again hold the weight up for as long as they were willing. In a control group with only a 3-minute break and no lecture, participants also held up the weight for as long as they were willing to do so. The results showed that persistence on the second task of physical exertion was significantly less than persistence in

the first task. Lecturing the participants on muscle exertion did not produce a significant difference between groups, suggesting that the depletion was caused by the act of physical exertion rather than on the cognitive resources used to focus. Not surprisingly, this outcome shows that resources of physical self-control can be exhausted through physical efforts.

The same resource of volition is used when controlling or suppressing emotion. Many researchers utilize an emotion video for examining the emotional domain. An emotion video is a task that requires participants to watch an emotion-evoking video while simultaneously requiring the participants to reveal no emotional expression. Invoking disgust has been used multiple times in research when asking patients to suppress emotion, such as watching a ten-minute video of animals being butchered for their meat or skin (Schmeichel et al., 2005). Wagstaff (2014) measured performance on a persistence task by participants who were told to suppress their emotions when watching a two-minute clip of a woman forcing herself to vomit. In each of these emotion-suppression tasks, participants' performance and persistence on subsequent tasks was significantly worse than control groups who did not suppress emotions. In Baumeister et al.'s study (1998), participants suppressed their emotional response to a ten-minute video, one invoking humor and the other sadness. After the video, each participant completed an anagram task, which involved attempting to unscramble as many words as possible for six minutes. Performance on the anagram task was significantly poorer by the participants who suppressed their emotions than those who were permitted to show emotion during the videos. This study confirms that depletion of self-control can occur with efforts to attenuate emotional responses.

On the opposite end of the domain, emotional exaggeration still creates the same depleting effect. Schmeichel, Demaree, and Robinson (2005) had participants watch a 2-minute clip with the intentions of invoking disgust, but rather than suppress their emotional response,

participants were told to exaggerate their responses of disgust. Following the video, participants completed two cognitive fluency tests examining verbal fluency, providing as many words as possible from a given category in a certain amount of time, and figural fluency, having participants create images out of dot configurations. Performance on the fluency tests were significantly poorer when participants were told to exaggerate their emotional response to the video compared to controls. Schmeichel et al.'s findings introduced the idea that emotional exaggeration has adverse effects on subsequent self-control, revealing that depleted resources are a consequence of emotional exertion.

Finally, loss of self-control can be found in the cognitive domain. Responsible decision making is a cognitive process that exhausts the ego (Baumeister Bratslavsky, Muraven, & Tice, 1998). In their study, participants were split into two groups, with the task of reciting pre-prepared speeches for or against raising tuition. One group was required to decide which of the two arguments (for or against) they wanted to present (the choice group). The no-choice group was simply told that they would give a speech in favor of raising tuition; they did not have to cognitively weight choices. After speeches were made, participants were given an unsolvable puzzle task. The group that was required to choose a topic rather than assigned a topic showed significantly less persistence on a problem-solving task. The mental effort required to make a choice required self-control as measured by a subsequent persistence task.

Cognitive exertion also creates ego depletion as measured by a second task in the physical domain. Muraven, Baumeister, and Tice (1999) examined the effect of cognitive ego depletion on physical exertion. To obtain a baseline measure, participants completed a hand-grip task, then they completed a thought-suppression task. After participants were told not to think about a white bear, researchers tested their capacity for hand-grip endurance a second time.

Participants who suppressed thoughts of a white bear subsequently stopped squeezing the handgrip compared with those who did not suppress their thoughts (Muraven et al.). In a similar study, athletes completed a cognitive self-control task then completed as many press-ups and sit-ups as they were willing to do (Dorris et al., 2016). The athletes completed significantly fewer press-ups and sit-ups after having to complete a difficult cognitive task, once again supporting the assumption that exertion of cognitive self-control negatively affects subsequent self-control, even when the second self-control task is from a non-cognitive domain.

Given the several avenues through which ego depletion can occur, people will often find ourselves at risk for loss of self-control. Effortful control is necessary not only to be a functional member of society, but to achieve goals, grow, learn, and manage a successful lifestyle. Baumeister, Heatherton, and Tice (1994) revealed the contribution that loss of self-control has made toward problematic drinking, overeating, drug use, unhealthy sexual practices, and criminal activity. People are more likely to participate in these problematic and unhealthy behaviors when self-control is low. In general, self-control failure can lead to poor decision making such as impulsive purchasing, conflicting goals, lack of motivation, and loss of the ability to plan ahead (Baumeister 2006; Sjastad & Baumeister, 2018). Unhealthy physical behaviors, impulses, and emotional responses have created a need to find or create ways to strengthen self-control, or better, avoid ego depletion altogether.

It should be noted that since the original barrage of ego-depletion studies, the construct has come under fire due to lack of consistent replication. Hagger and colleagues (2010) completed a meta-analysis to examine the effect of ego depletion within multiple domains. Their meta-analysis was one of the first studies to question the effect of ego depletion on task performance, revealing that the arguments supporting ego depletion could be explained by other

factors such as motivation and fatigue. This meta-analysis inspired further replication studies. Friese et al. (2018) analyzed the arguments for and against the effects of ego depletion, but they found that the evidence was inconclusive and called for additional research. Radel et al. (2019) developed 2 identical studies in optimal conditions to test for ego depletion. Participants in each study performed the same depleting task and persistence measurement. The results for study 1 revealed depletion effects, while study 2 did not show the same significance. The authors were unable to explain why this occurred, showing a need for further research into the replication crisis of ego depletion.

Buffering Ego Depletion

Ego depletion research has evolved to include ways to buffer against self-control loss. Buffering can be developed in two ways: replenishment and prevention. Of course, replenishment refers to returning self-control *after* it is lost. Prevention offers a focus on inoculating against the loss of self-control *before* it can occur. With prevention, we might immunize prior to risky situations.

Most current research regarding ego depletion has focused on discovering how to replenish self-control once it has been lost. Researchers require participants to exert self-control before engaging in other tasks such as meditation (Friese et al., 2012) and fostering positive affect (Tice et al., 2007). Mindful meditation was used in Friese et al.'s (2012) study after participants were made to suppress their emotions in response to a disgusting video. The participants were first divided into groups of emotion suppression or no emotion suppression. After the video, participants were again separated into groups in which they either completed a 5-minute mundane task as the control or the mindful meditation they had been trained in days before. After the intermediate tasks, all participants completed a test using attention and

concentration to assess self-control. The results revealed that those who did not suppress emotion (meaning no ego depletion) performed better than those who suppressed disgust reactions. Among those who suppressed emotion, participants who meditated performed equally well on the subsequent task as participants who did not exert self-control. That is, meditation enhanced persistence to levels similar to the control condition of participants who were not depleted, providing one way to replenish self-control.

Counteracting ego depletion can also occur by improving mood. Tice, Baumeister, Shmueli, and Muraven (2007) created different measures to examine the effects that mood may have on ego depletion. The first study induced depletion with a thought-suppression task before participants were given a small gift as a thank you for participating, while a separate group was only given a receipt for their cooperation. A third group did not suppress thoughts. Each participant was then asked to drink as many ounces of bad-tasting vinegar Kool-Aid as they could. Participants who were given a gift to evoke a positive mood drank as many ounces of the mixture as those who did not have to complete the thought-suppression task. Thus, positive mood eliminated the depleting effects of self-regulation. In a second study, participants were given a crossing-out 'e' task as exertion of self-control. After the 'e' task, participants watched either a comedic video or a neutral informational video. The subsequent persistence task consisted of using poorly created metal sticks to move a ball up a hill and into a goal. Ego depletion led to lower task persistence, but participants in the positive-mood group (from watching the comedic video) persisted just as long as non-depleted participants. Both studies showed that inducing positive affect can replenish lost self-control.

Although restoring self-control after it has been depleted is good progress toward changing negative behaviors, poor decisions and impulses may still have time to occur in the

interim between depletion and restoration. Ego-depletion research has begun to include ways to avoid depletion before it has a chance to occur. Rather than focusing on replenishing behaviors after self-control is lost and destructive behaviors could have occurred, researchers can focus on behaviors that might prevent the loss of self-control. Buffering against ego depletion via prevention has a better likelihood of lessoning impulsive and problematic behaviors.

Prevention research designs, like all other ego-depletion designs, present participants with two consecutive self-control tasks, but in research aimed at preventing ego depletion, a buffer is experienced prior to either self-control task. Relative to replenishing self-control, less research has been conducted to examine prevention of ego depletion. Examples of acute prevention of ego depletion include buffering by motivation and preventing depletion by mental distraction. In the realm of motivation, Muraven and Slessareva (2003) developed research having participants believe that the task in which they engaged was helping others. Participants in the experimental condition were told that their efforts would help with the development of an Alzheimer's treatment. The control group was not given any indication that their efforts would be helpful to others. Subsequent self-control tasks included thought suppression followed by a puzzle task that the participants did not know was unsolvable. Participants who were told that their efforts would help others persisted longer on the puzzle tasks than those who were not, suggesting that motivation activated prior to a self-control task prevents depletion.

The same prevention effect occurs when people are mentally distracted from a depleting task. Recall in Alberts et al. (2008) study, participants held weights for a given amount of time, before taking a 3-minte break for either a lecture on muscle exertion to increase focus or no lecture in the control group. The researchers designed an extension to the original study to test if mental distraction could prevent depletion when participants were given a physical self-control

task of holding weights under different conditions. Participants who focused on their muscles during the weight task performed significantly worse than those who were distracted by a math task. That is, when distracted participants were given a cognitive calculation task during the muscle exertion task, there was no decline in performance. Thus, Alberts et al.'s results revealed that distraction during a task that requires self-control can prevent depletion from occurring. Note that prevention in this example is defined by the buffering and self-control task occurring simultaneously rather than sequentially. We label this methodology as prevention because self-control was not compromised prior to buffering.

Prayer and Religiosity

Buffering of ego depletion can also occur through religious priming and prayer. Rounding, Lee, and Jacobson (2012) developed two studies to test the theory that a religious prime could prevent the effects of ego depletion. In their first study, participants had to unscramble ten sentences by first removing an irrelevant word. One group had a religious prime, using religious words such as "God" and "spirit" in the sentences, but the other group read neutral words. After the word priming, all participants were asked to drink as much as they wanted of an unsavory mixture. Participants who read the religious prime consumed significantly more of the mixture than those in the neutral condition, indicating their resource of self-control was less depleted. The outcome of religious priming reveals that exposure to religiosity can prevent the effects of depletion before it has a chance to occur. In a second study, Rounding et al. used the same unscramble task with the religious versus non-religious primes, but instead they offered an incentive of money either the next day or one week later. Participants exposed to the religious prime were more willing to wait a week to receive a higher monetary incentive than

those in the neutral word task. The initial religiosity prime in the first ego-depleting task led to a prevention of ego-depleted behaviors.

Religiosity, and the benefits of religious reminders, can also take the form of prayer. Friese and Wanke (2014) examined how a brief period of personal prayer could buffer against loss of self-control. In their study, participants either were given five minutes to think freely about anything they wished or five minutes to pray. After the five minutes, participants were asked to suppress their emotions while watching a video (leading to depletion) before performing a self-control task. Participants who were given time to pray showed superior performance (better subsequent self-control) compared to individuals who did not pray. These results imply that praying before exerting self-control can mitigate ego-depletion effects. Given the success of prayer and priming with religious words when preventing ego depletion, we turn to the role of religiosity as a general self-control strategy. The specific religious activity of prayer has been positively correlated with overall life satisfaction (Peacock & Poloma, 1999). One mechanism through which these positive outcomes might emerge is enhanced self-control.

Recent literature has supported that active prayer leads to fewer impulsive behaviors and more self-regulation. As an example of a behavior requiring self-control, remaining faithful and dedicated in relationships may be influenced by prayer. Fincham, Lambert, and Beach (2010) measured the influence of prayer in romantic relationships through two studies. In the first study, participants were assigned to either pray for their partner each day for six weeks or serve in the control conditions to merely focus on positive thoughts or engage in neutral activities. At the end of the study, participants who prayed reported higher levels of relationship satisfaction and predicted lower levels of infidelity. Their second study consisted of the same two conditions and measures, but they shortened the duration of prayer to four weeks. Again, the researchers

concluded that participants who prayed engaged in lower levels of infidelity and reported an increase in feeling more committed to their partner as compared with participants in the control groups. This research reveals how prayer can enhance self-control by reducing impulsive behaviors, such as cheating, and improve long-term relationships.

The frequency of prayer is also related to lower levels of alcohol consumption and reduced problematic behavior associated with drinking. Lambert, Fincham, Marks, and Stillman (2010) used two studies to examine the effect of prayer on alcohol consumption. In the first study, a cross-sectional design revealed that higher frequency of prayer was positively correlated with lower alcohol consumption and fewer problematic drinking behaviors. Their second study, an experimental design, had participants pray each day for four weeks. After a month of prayer, participants reported drinking about half as much alcohol as the control participants who were not assigned to pray. Thus, the act of prayer is associated with self-control across diverse challenges.

Within the ego-depletion literature, it is not surprising that prayer appears to buffer the loss of self-control. Friese et al. (2014) asked participants to write down their thoughts for six minutes while avoiding thinking about a white bear. Following the thought suppression task, participants were given a five-minute period to either pray to themselves or “think freely” (the control condition), meaning they could use the time to think about whatever they wished. Finally, participants were given a self-control task to complete. Participants who prayed between the first and second self-control tasks performed better than those in the free-thought condition. In other words, prayer replenished self-control.

Prayer can also prevent ego depletion. In a related study from the same laboratory, Friese and Wanke (2014) had participants pray or engage in free thought before suppressing their

emotional response to a video. The participants were then given a second self-control task. Although the researches were limited with a small sample size and a participant pool of only females, the results supported the hypothesis that participants who prayed before completing the emotion-suppression task performed better on the subsequent self-control task than those who thought freely. This outcome indicates that prayer appears to prevent ego depletion from occurring.

For our study, we will expand on the recent findings that prayer acts as a buffer against ego depletion. Addressing the limitations of Friese and Wanke's (2014) study, we will have a larger sample size and include more than one gender. Further, suppressing emotional responses will be used to create ego depletion, with a strongly disgusting video versus a neutral video. In a meta-analysis of ego depleting tasks compiled by Dang (2018), emotion suppression emerged as an effective way to create ego depletion due to a medium effect size and low heterogeneity. As a second independent variable, three passages will compare prayer, encouraging self-talk, and a control condition. For our dependent variable, we will measure participants' persistence on the Stroop task (described below) rather than quality of performance. Once again, Dang (2018) reported the Stroop task to be an excellent self-control challenge. Additionally, this study includes a validated religiosity measurement to assess if religious beliefs of the participants will covary out individual differences. After removing variability associated with religious beliefs, we expect this will manifest in a statistical interaction between prayer and persistence on the Stroop task.

CHAPTER TWO

METHOD

Participants

One-hundred and ten undergraduate students from a southeastern university participated in this study (31 males, 77 females, 1 did not report). Participants ranged between ages 18 and 43 years (M = 19.70, SD = 2.91), with 44 in their first year of school, 40 in their second year, 17 in their third year, and 6 in their fourth year. Of these participants, 36 were Black/African American, 6 Hispanic/Latin, 2 Native American, 61 White/Caucasian and 5 did not report.

Materials

Three passages were used: prayer, encouraging self-talk, and a neutral paragraph. The prayer passage was written to address God, asking for rest and peace in challenges ahead. The encouraging self-talk passage utilizes the same language, addressing only the self and the belief in the self to overcome and perform. A control passage was used to address the accomplishments and capabilities of a third party (Appendix A).

Two videos, each lasting 7 minutes with no sound, were used in this study to evoke emotion (a disgusting video) or serve as a neutral condition. The disgusting video contains clips of pimples and cysts being popped and bursting open. The neutral video consists of a table being sprayed down and cleaned off.

The Stroop task was provided by PsyToolkit. The Stroop task was originally created and named after Stroop (1934) when studying the interference or inhibition that occurs cognitively when the word of a color and color of the word are incongruent. Participants were given 600 trials of the words “red, yellow, green, blue.” The purpose of the task was to select the ink color of the word on screen while ignoring the meaning of the word. The task monitored the response

time (in milliseconds) to incongruent and congruent words. Congruent words occur when the meaning of the word and the ink color match; incongruent words occur when the ink of the color does not match the meaning of the word. The order of the trials was randomized, with an equal number of both congruent (300 trials) and incongruent (300 trials) words.

The Centrality of Religiosity Scale (CRS) measures the central importance of religious teachings, meanings, and practices (Huber & Huber, 2012). This scale has been used in more than 100 studies and in 25 countries. Items assess several aspects of religiosity (intellect, ideology, public practice, private practice, and experience), but one average composite score represents the construct of religiosity. An example item is 'How often do you think of religious issues?' Ratings across 15 items range from either "Never" to "Very Often" or "Not at all" to "Very much so" on a scale from 1 to 5. No items were reverse scored. Individuals with a higher score have a more personal central religious construct. The CRS was validated empirically, with high correlations on self-reported religious identity and importance of religion for everyday life (Huber & Krech, 2008). (Please see Appendix B.)

The Emotional Rating Scale was created as a manipulation check to be sure the participants have exerted self-control and did not enjoy the video condition. Created as a Likert-type scale, questions were asked such as 'I enjoyed the video', 1 being 'Strongly Disagree' to 5 being 'Strongly Agree'. Higher scores reveal more use of self-control, with items 1 and 4 being reversed scored. (Please see Appendix C.)

Procedure

Participants performed in individual sessions. After providing informed consent, each participant read a randomly assigned passage: prayer, encouraging self-talk, or neutral. Participants were randomly assigned to a second independent variable: suppressing emotion

responding to a disgusting or neutral video. Each participant first read the given passage once to themselves, then read the passage again aloud for an allotted two minutes. Next, they suppressed any emotional expression as they watched either video. The videos were previously set up on screen, and the participant were given an envelope requesting which video to choose. A researcher, blind to passage and video conditions, will observe participants through a two-way mirror, noting facial expressions of emotion.

Once the video was complete, participants were given the Stroop task on a computer. This task will continue for as long as participants were willing to respond, with a ceiling of 20 minutes. Participants can stop at any time by ringing a bell to alert the researcher. Lastly, the Centrality of Religiosity Scale was given, followed by the Emotional Rating Scale as a manipulation check, and finally a measure of demographics (Appendix D).

Planned Analysis

We used a 2 (videos) X 3 (passages) analysis with a covariate of religiosity (ANCOVA). The independent variables were the readings given to the participants and the videos watched by the participants. The dependent variable was time spent on the Stroop task. Power analysis revealed a need for 210 participants in this study if we assume an effect size of .25 and a *p*-value of equal to or less than .05 (G-Power). Participants were divided evenly among the 6 possible groups (35 per group) using block random assignment. Centrality of Religion served as the covariate.

CHAPTER THREE

RESULTS

Manipulation Check

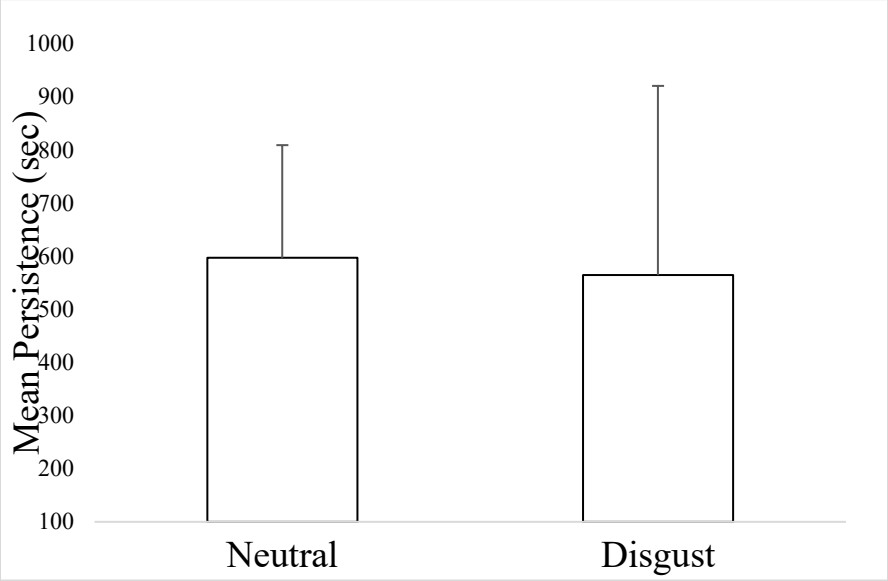
The Emotion Rating Scale was used as a manipulation check to assess what emotions were caused by watching the videos. As expected, a *t*-tests showed higher rates of reported disturbance, $t(108) = -6.23$, $p < .001$, after watching the disgusting video ($M = 3.28$ $SD = 1.46$) compared with the neutral video ($M = 1.79$, $SD = 1.02$). Not surprisingly, the disgust video elicited more disgust, $t(108) = -6.51$, $p < .001$, ($M = 3.35$, $SD = 1.60$) than the neutral video ($M = 1.71$, $SD = .99$). However, participants reported more boredom, $t(108) = 6.36$, $p = .005$, during the neutral video ($M = 4.21$, $SD = .91$) than the disgust video ($M = 2.89$, $SD = 1.25$). There was also significance in reported enjoyment, $t(108) = .59$, $p = .030$, showing participants felt less enjoyment watching the disgust video ($M = 2.30$, $SD = 1.30$) than the neutral video ($M = 2.43$, $SD = 1.06$). We failed to find significant group difference in reported relaxation, $t(108) = 2.98$, $p = .064$. Interestingly, the neutral video and the disgust video failed to differ across difficulty of emotion suppression, $t(108) = -2.01$, $p = .156$).

Primary Analysis

A 2 X 3 (depletion condition X passage read) between-groups ANCOVA was used to compare the effects that the videos and reading passages had on the persistence of the Stroop task with a covariate of religiosity. The data revealed no main effect of depletion condition (video watched) on Stroop task persistence, $F(2, 109) = .34$, $p = .562$. Persistence times (measured in seconds) were similar between the neutral video ($M = 596.96$, $SD = 212.07$) and the disgust video ($M = 564.41$, $SD = 356.15$). These group means are shown in Figure 1.

Figure 1

Depletion Condition

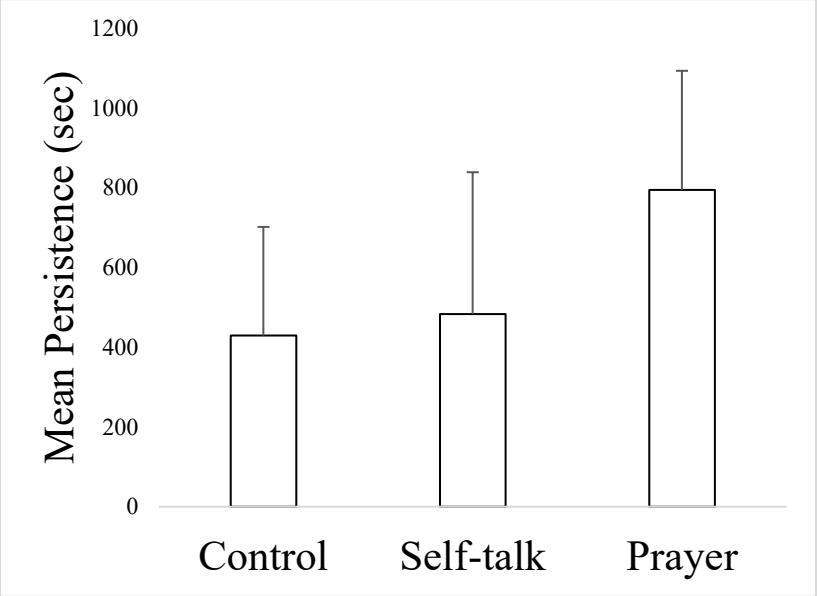


Note. The graph above shows no significant difference between video type on Stroop task persistence.

The results did show a significant main effect of passages read on Stroop task persistence $F(3, 109) = 15.72$, $p < .001$. Specifically, those who read the prayer passage persisted longer ($M = 795.35$, $SD = 298.56$) than both the self-encouraging talk passage ($M = 483.66$, $SD = 355.78$) and the control passage ($M = 429.78$, $SD = 272.31$). Figure 2 illustrates these findings.

Figure 2

Passage Read

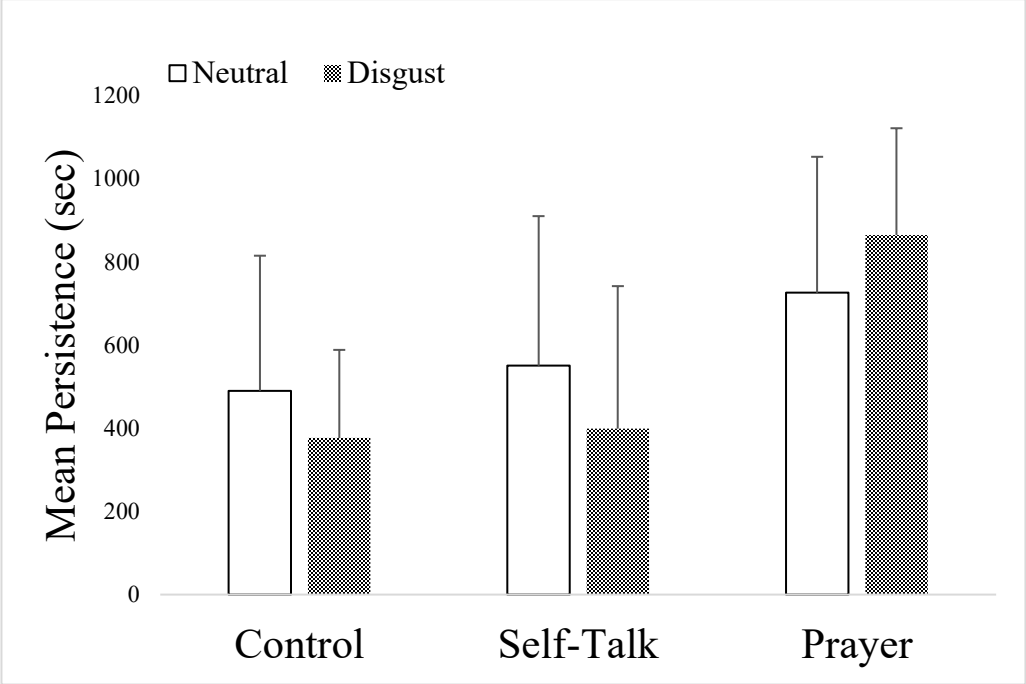


Note. Students persisted longer on the Stroop task in the prayer condition compared with positive self-talk and control conditions.

Overall, there was no significant interaction between depletion condition and passages read, $F(3, 109) = 2.34$, $p = .102$. . Figure 3 depicts the group means and standard deviations. Introducing Centrality of Religion as a covariate did not adjust the effects within our primary analysis, $F(3, 109) = .78$, $p = .383$.

Figure 3

Depletion Condition with Passage Read



Note. The graph above shows a marginal interaction between which passage was read for each video.

CHAPTER FOUR

DISCUSSION

One effect we were looking for was the influence of the three passages on the participants' persistence during the subsequent Stroop task. We hypothesized that participants in the prayer group would persist longer on the Stroop task than those in the encouraging self-talk group and those who read the control passage. Further, we expected those who read the encouraging self-talk passage to persist longer than those in the control condition. Indeed, participants in the prayer group persisted significantly longer on the Stroop task than both other reading passages, indicating that prayer buffered against depletion by preventing a loss of self-control. One potential explanation for the effectiveness of prayer is positive affect that may be triggered by prayer. In support of this idea, Yarollahi and colleagues (2019) found that those who prayed reported higher positive mood, calmness, happiness, and more vigor. Thus, prayer may buffer against depletion by boosting positive affect, which has been shown to attenuate ego depletion (e.g., Tice et al. 2007).

As a second potential explanation for the effectiveness of the prayer condition, perhaps prayer creates the feeling of social support by asking God for help and guidance. This idea originated from Craig and Deichart (2002), who measured levels of stress in participants who completed tasks while being supported by close friends during the study. Their results revealed lower blood pressure, indicated by the authors as lower levels of stress, than participants who did not have the same support. Lee et al. (2019) created a study how social support affected perceived stress and well-being in college students, finding significant correlations. Friend support and romantic partner support were both negatively correlated with perceived stress, loneliness, and depression. Family support was positively associated with reported physical

health, as well. These results warrant the idea that prayer may have the same results if perceived as social support.

A third explanation for efficacious prayer involves using prayer as a type of meditation. Prayer and meditation are similar in that they take place usually in silence and solitude. They both offer time for reflection and to connect with either a higher being, nature, or one's self. Both practices can offer a haven from stress or outside distractions. Recall that Friese and colleagues (2012) used mindful meditation as a tool to replenish self-control after it had been depleted due to suppressing emotion. Participants who meditated after suppressing emotion matched the same persistence levels as the control group.

Meditation, or mindfulness, within prayer likely worked well as a buffer in our particular sample due to the religious culture of the southeast (in the "Bible belt"). As shown with the religiosity scale, our participants had an overall moderate religious score (M = 3.34, SD = .50) on a scale from 1 to 5, perhaps enhancing the effectiveness of prayer in our sample. These results align with current literature that prayer, religiosity, and religious priming leads to higher impulse control, better social behaviors, and greater cognitive and emotional control (Rounding et al., 2012, Fincham, 2010, & Lambert et al., 2010).

Although prayer appeared to provide a self-control buffer in our study, there was no significant difference in subsequent persistence between the self-encouraging talk and the control passage. This finding is interesting when compared to other studies that did show self-encouraging talk to be beneficial when trying to prevent ego depletion. Schmeichel and colleagues (2009) found that self-affirmation led to improvement in self-control. Specifically, participants expressed their core values between depleting tasks to initiate feelings of self-affirmation, which promoted high levels of mental construal – defined as how individuals

perceive and comprehend the world around them. Individuals with high mental construal are capable of focusing on the bigger picture, thinking more abstractly, as compared with individuals with low mental construal who tend to think concretely, often bogged down by smaller details. High levels of mental construal and self-affirmation eliminated depletion effects. This difference may be the reason why their study found an effect of self-affirmation, whereas ours did not. We did not measure for mental construal within our participants, and all were given a simple reading of self-encouragement rather than having participants express their own core values.

When we turn our attention to a comparison of video conditions, we can explore the potential to create depletion in our experiment by suppressing disgust, an effective manipulation based on prior studies. For example, Wagstaff (2014) used a video of a woman vomiting to invoke disgust while requiring participants to suppress their emotions to deplete ego before measuring subsequent performance. Schmeichel at al. (2005) experienced these same results when requiring participants to suppress their emotion during a 10-minute clip of animals being butchered. We hypothesized that participants who suppressed disgust would fail to persist on the Stroop task as compared with those who suppressed a neutral emotion. That is, we expected that suppressing emotion during the disgusting video would require significant self-control, causing depletion. This depletion should have led to less persistence, or shorter time, on the Stroop task in comparison with the neutral video based on little effort required to suppress a lack of emotions. The results showed that this was not the case, with no main effect between the videos. This lack of an effect may have occurred because both videos adversely affected participants. Note that our manipulation check (above) showed higher rates of disturbance and disgust during the disgusting video, but the manipulation check also showed a higher response of boredom during the neutral video. Importantly, we found no significant difference between difficulty to

suppress emotion across conditions, meaning participants had an equally difficult time suppressing emotion during both videos. This response leads us to believe that depletion occurred during the neutral video due to the aversive effects of feeling bored during the 7 minutes required to watch the video and having to suppress expressions of boredom.

Any emotion suppressed as a depletion task is supported in the literature by numerous studies. Baumeister et al. (1998) found that self-control was depleted in participants who suppressed happiness or sadness. After suppressing their emotions while watching either a video evoking laughter or a video of a woman dying to evoke sadness, participants performed significantly worse on a subsequent anagram task than participants who were not asked to suppress emotion. In fact, Dang's (2018) meta-analysis of ego-depletion research explains that suppressing emotions is the most effective depletion task that can be used in the laboratory. Although the result from the neutral video suppression causing depletion was not our original hypothesis, this suggests that suppression itself has a larger effect on participants than video content. Moving forward, having a neutral video may no longer be necessary, but instead researchers might use a single content video with suppression versus no suppression. We note here that we did not choose this traditional approach because we assumed that watching the disgusting video would require high levels of self-control and would result in a ceiling effect even without emotion suppression.

Finally, we hypothesized that an interaction would exist between type of passage and suppression of disgust versus the "neutral" video. Specifically, we predicted that a buffering effect of prayer would be more evident after the challenge of suppressing disgust than following the neutral condition. Although this outcome was not found, an examination of the means in Figure 3 hints at the expected pattern and warrants further examination in future studies.

Unfortunately, the limits of our data-collection window allowed us to test 110 participants, which was sufficient to seek main effects but lacked the power to examine a potential interaction. A future study should test 211 participants for an 80% chance of finding a moderate effect, if one exists (Wilson & Joye, 2017).

Based on our results, we might assume that suppressing disgust and perhaps boredom may both have taxed available self-control. This explanation is based on the resource model of ego depletion. The resource model states that self-control is dependent upon an internal energy source that reduces or depletes with use (Muraven & Baumeister, 2000). Our participants may have lost their available reserves of self-control energy by suppressing emotion, which is consistent with the resource model. As an alternative approach, we might assume that participants who suppressed emotion and subsequently failed to persist on the Stroop task may have done so because they simply experienced reduced motivation and perhaps a shift toward more rewarding activities. This shift is defined by the process model, which proposes that loss of self-control is based on motivations, refuting the idea of self-control as a limited resource.

Inzlicht and Schmeichel (2012) first introduced this process model when arguing that the use of self-control leads to a shift in motivation and attention, undermining self-control during a subsequent task. The process model suggests that exercising self-control leads to a lack of motivation or an increased desire for rest. This approach, just as with the resource model, means that any task performed after exerting self-control will ultimately result in poorer performance. However, specifically according to the process model, self-control does not diminish from a limited inner resource; aversive, effortful action and attention cause a change in motivation away from exerting energy to seeking rest. Introducing the idea that aversive effort can cause a shift in motivation may explain the lack of main effect between the two videos in our study due to the

high reports of boredom in the neutral video. In other words, participants in both of our video conditions likely experienced depletion and a shift in motivation away from the subsequent Stroop task. Because likely all participants experienced depletion, we are left with the main effect of passage read, with prayer facilitating motivation to persist on the Stroop task. That is, according to the process model, prayer prevented a subsequent shift in motivation and allowed participants to remain on task.

Regardless of whether we explain ego depletion using the process model or the resource model, people exhibit less self-control after use. Fortunately, self-control can be enhanced through regular exercise of control. In a series of studies, various exercises were tested to see if this resource could be strengthened over time. Oaten and Cheng (2006) created a study that had participants join an intervention program that repeated practices of self-control, such as having study sessions over an 8-week period while keeping a diary. Those who participated in the intervention not only reported less stress during exam periods, but they also reported less smoking, alcohol consumption, and caffeine use while increasing healthy eating habits, monitoring spending, and enhancing emotional control. Targeted efforts of control in one area, such as saving money or exercising, leads to improvement in other areas of self-control. Practicing posture or controlling negative verbal behavior also improves laboratory performance on subsequent tasks (Baumeister et al., 2007). As a final example, Muraven et al (1999) created a longitudinal study to measure how repeated exercises of self-regulation could strengthen control over time, leading to prevention in overall ego depletion. After spending two weeks doing three different exercises (monitoring and improving posture, regulating mood, and monitoring and recording eating), the experimental group showed significant improvement in self-control than the control group who did not practice self-control. Utilizing and exercising self-control creates

the capacity to strengthen our abilities, whether that means strengthening a self-control "muscle" or building stamina to maintain motivation when working on unpleasant tasks. In the realm of religion, the plethora of demands and practices may also serve to strengthen self-control. In particular, prayer as a practice may either expand the well of available self-control or build stamina to maintain motivation.

Limitations

Due to time constraints on this study, we were unable to collect a sample size as large as we originally had hoped for in order to reveal a medium effect size for the interaction, if one existed. Therefore, our first limitation is based on needing 101 more participants to examine the potential for an interaction between reading passage and video watched. As a second limitation, suppressing emotion during the neutral video likely did deplete the ego, resulting in no true control condition. Aligning with previous research studying emotion suppression, a true control group would have watched the disgusting video without the additional burden of emotion suppression.

Conclusion

Our study was unable to create a difference across video conditions, meaning it failed to demonstrate ego-depletion without a true control group. However, we did find that prayer facilitated self-control. The majority of ego-depletion research focuses on replenishing self-control after depletion; our study revealed the use for preventing depletion before it has a chance to occur. Prevention allows people to maintain self-control and removes the need for constant replenishment from daily challenges that invariably occur. Although it may be most beneficial for religious people, prayer can serve as an effective prevention strategy, permitting continued self-control while facing challenges.

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APPENDIX A

READING PASSAGE

Prayer Condition:

God, I know that speaking your name is a prayer, so I offer this supplication. Please reside within with me the rest of this day while I achieve the tasks I have to accomplish, including those set before me here. May your peace be with me at all times, reminding me of your presence. Bless me with belief in my abilities and success, regardless of what I experience. As I humbly ask, please be with me today so that I may feel your comfort. Amen.

Word count: 85

Reading ease: 77.9

Reading level: 5.8

Self-talk Condition:

I can do whatever I set my mind to accomplish. I know that am a good person, and I can handle the demands of the rest of this day. I am strong with many abilities, no matter what I experience. If I believe in myself, good will come to me. I am an important person who deserves to be rewarded for hard work. I will continue to accomplish tasks and find comfort in my ability to do what I need to do.

Word count: 82

Reading ease: 77.4

Reading level: 5.8

Control Condition:

Pat can do whatever Pat is determined to do. Pat has confidence about being a good person and can handle the demands of the rest of the day. Pat is strong with many abilities, no matter what experiences come along. If Pat retains a strong belief in the self, only good will come. Pat is an important person who deserves to be rewarded for hard work. Pat will continue to accomplish tasks and find comfort in accomplishing what Pat needs to do.

Words: 82

Reading ease: 72.2

Grade level: 6.5

APPENDIX B

CENTRALITY OF RELIGIOSITY SCALE

Please rate the following items by circling the number that best represents your response.

	Never	**Rarely**	**Occasionally**	**Often**	**Very Often**
1: How often do you think about religious issues?	1	2	3	4	5
2: To what extent do you believe that God or something divine exists?	1	2	3	4	5
3: How often do you take part in religious services? Private practice	1	2	3	4	5
4: How often do you pray?	1	2	3	4	5
5: How often do you experience situations in which you have the feeling that God or something divine intervenes in your life?	1	2	3	4	5
	Not at all	**Not very much**	**Moderately**	**Quite a bit**	**Very much so**
6: How interested are you in learning more about religious topics?	1	2	3	4	5
7: To what extent do you believe in an afterlife – e.g. immorality of the soul, resurrection of the dead or reincarnation?	1	2	3	4	5
8: How important is it to take part in religious services?	1	2	3	4	5
9: How important is personal prayer for you?	1	2	3	4	5

	Not at all	**Not very much**	**Moderately**	**Quite a bit**	**Very much so**
10: How often do you experience situations in which you have the feeling that God or something divine wants to communicate or to reveal something to you?	1	2	3	4	5
11: How often do you keep yourself informed about religious questions through radio, television, internet, newspapers, or books?	1	2	3	4	5
12: In your opinion, how probable is it that a higher power really exists?	1	2	3	4	5
13: How important is it for you to be connected to a religious community?	1	2	3	4	5
14: How often do you pray spontaneously when inspired by daily situations?	1	2	3	4	5
15: How often do you experience situations in which you have the feeling that God or something divine is present?	1	2	3	4	5

APPENDIX C

EMOTIONAL RATING SCALE

Please rate the following items by circling the number that best represents your response

	Strongly Disagree	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
1. I enjoyed the video	1	2	3	4	5
2. I felt disturbed watching the video	1	2	3	4	5
3. I felt disgusted watching the video	1	2	3	4	5
4. I felt relaxed watching the video	1	2	3	4	5
5. I felt bored watching the video	1	2	3	4	5
6. It was difficult to suppress my emotions during the video	1	2	3	4	5

APPENDIX D

DEMOGAPHICS

Age: _____ (years)

Race/Ethnicity:

Arab American/ Middle Eastern	Asian/Pacific Islander	Black/African American	Other: _____
Hispanic/Latin	Native American	White/Caucasian	

Year in School (circle one):

1st year	2nd year	3rd year	4th year	5th year or more

Gender:

Male	Female	Non- Binary	Other: _____

Religious Affiliation:

Agnostic	Atheist	Baptist	Buddhism
Catholic	Hinduism	Islam	Jehovah's Witness
Judaism	Methodist	Mormon	Non-Denominational
Pentecostal	Presbyterian	Seventh Day Adventist	Other: _____