The Effects of Religion and Career Priming on Self-Control During Difficult Tasks in College Students

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ABSTRACT. The purpose of this study was to investigate ways that religion and career could be used to increase self-control. Participants (N= 60) were primed by taking the religion or career implicit association test (IAT). These tests were given before participants attempted to solve 3 creative analytical problems. The amount of time spent trying to solve the problems was used to measure self-control under the assumption that participants had to resist the temptation to give up and view the solutions. The riddles given to participants were chosen because they each require extensive thinking and many trials and errors before reaching the solution. Participants were told a cover story that the experiment was about the effects of technology on problem-solving ability, so they were not aware of any connection between the IAT and the problems. After being primed with either religion or career, participants worked longer on the problems than participants who were not primed, F(2, 53) = 5.46, p = .007, η² = .17. Locus of control was also measured but did not influence the time that participants spent on the problems. Results indicated that briefly priming participants with either religion or career can lead to greater persistence in the face of difficult tasks.

Out of the many ingenious young minds recruited by institutions of higher education each year, only 59% will graduate in six years and nearly a third will drop out (U.S. Department of Education, 2014). Although earning a college degree is not meant to be easy, these figures raise an important question: What factors lead some students to persevere in the face of difficulty, and why are others so quick to give up? One contributing reason, and the focus of this article, is a lack of self-control in the face of adversity. Accumulating evidence suggests that priming may be an effective manipulation to bolster self-control (Rounding, Lee, Jacobson, & Li-Jun, 2012; Sasaki, Mojaverian, & Kim, 2015; Walsh, 2014) and reduce depletion effects on self-control (Boucher & Kofos, 2012; Sasaki et al., 2013; Walsh, 2014).

Self-control has long been associated with positive life outcomes and has been studied since the 1900s (Mischel, Ebbesen, & Raskoff Zeiss, 1972). It is most commonly defined as the ability to continue to pursue an overarching goal despite more alluring temptations (Duckworth & Gross, 2014; Fishbach & Shah, 2006; Koestner, Powers, Milyavskaya, Carbonneau, & Hope, 2015). Researchers now know that short-term self-control is predictive of long-term academic achievement (Véronneau, Hiatt-Racer, Fosco, & Dishion, 2014). Yet, little is known about the underlying motivations and mechanisms of self-control. In the present study, we examined how career and religious priming increased self-control on difficult subsequent tasks.

Self-Control as a Limited Resource

Evidence has shown that self-control operates as a limited resource that can be depleted when resources such as mental energy are used for other demands (Vohs et al., 2014). Research has also demonstrated that counter-attitudinal behaviors and
decision-making, which both use mental energy, can decrease subsequent self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Vohs et al., 2014). For example, participants who were asked to make a series of choices between products drank less of an unsavory drink for monetary reward than participants who merely rated products (Vohs et al., 2014).

Fortunately, there are simple ways such as priming that can attenuate the depletion of self-control. For instance, priming cues related to one’s self-control goals, such as saving or healthy eating, leads to greater self-control and goal commitment after depletion (Walsh, 2014). Additionally, because religion is associated with behavior that requires self-control such as virtue and altruism (Baumeister & Exline, 1999), priming of religious words may increase self-control (Rounding et al., 2012). Brain research has also shown that mouth rinsing with glucose can increase self-control by activating receptors which then activate regions in the brain associated with reward and motivation (Gant, Stinear, & Byblow, 2010; Molden et al., 2012; Sanders, Shirk, Burgin, & Martin, 2012).

Autonomous and Controlled Motivation
A person’s motivation to pursue a particular goal directly affects the amount of control a person has to resist other temptations (Milyavskaya, Inzlicht, Hope, & Koestner, 2015). People tend to pursue goals either because of autonomous motivation or controlled motivation (Brunet, Gunnell, Gaudreau, & Sabiston, 2015; Milyavskaya et al., 2015). Autonomous motivation is driven by an individual’s own internal wants such as interest, whereas controlled motivation is driven by external rewards such as salary or social approval. Previous research has demonstrated that the probability for success is higher when goals are pursued with autonomous motivation (Brunet et al., 2015; Milyavskaya et al., 2015). However, there are instances when a person may pursue a goal with both autonomous and controlled motivation. For instance, correlation between autonomous and controlled motivation can predict success in areas such as health and academics (Brunet et al., 2015). One example given by Brunet et al. (2015) is physical activity. They found that greater agreement between an individual’s autonomous motivation and controlled motivation in regard to motivation for physical activity, led to a greater likelihood that the individual would exercise. In the current study, the degree to which participants relied on both autonomous and controlled motivation could have similarly influenced the likelihood of them solving versus giving up on the riddles.

Finding Purpose in Career and Religion
Both career and religion, which may fall under autonomous or controlled motivation, can have great influence over people’s daily decisions. For instance, many socially beneficial behaviors are associated with religion such as altruism and forgiveness, which also require increased self-control (Baumeister & Exline, 2000). On the other hand, people strive for a fulfilling and lucrative career so that they can meet both intrinsic (e.g., realize one’s dreams of becoming an architect) and extrinsic goals (e.g., earn a high salary; Agbor-Baiyee, 1997).

Because career and religion are often integral parts of a person’s life, it is important to consider how they are related to self-control. Research has shown higher job satisfaction to be associated with both childhood self-control (Converse et al., 2016) and selective control strategies during decision-making (Schindler & Tomsak, 2010). In addition, self-control has been related to greater career success based on both extrinsic outcomes and intrinsic outcomes (Converse, Pathak, DePaul-Haddock, Gotlib, & Merbedone, 2012). Religion has also been associated with greater self-control (Rounding et al., 2012). The current study extended these findings by considering if the salience of religion or career could be used to enhance self-control on an unrelated task.

Locus of Control and Religion
It is important to note that success has also been largely correlated with a person’s locus of control, the way in which a person attributes outcomes, either internally or externally. People who have an internal locus of control tend to attribute life’s outcomes to their own decisions and behaviors, whereas people with an external locus of control tend to attribute life’s outcomes to forces outside of their control (Ahlin & Lobo Antunes, 2015; Rotter, 1966; Wong-McDonald & Gorsuch, 2004).

Locus of control is unconscious, and people are often unaware of their attributions. In addition, many factors such as family, peers, community, and childhood experiences can influence a person’s locus of control (Ahlin & Lobo Antunes, 2015). Like autonomous motivation, an internal locus of control is associated with greater life success and health. An external locus of control is predictive of more negative outcomes, such as aggression...
and low self-control (Ahlin & Lobo Antunes, 2015; Rotter, 1966). Overall, research has supported the idea that people with an internal locus of control are more likely to be successful than people with an external locus of control, yet there is little research on how people can overcome the disadvantages of developing an external locus of control.

One proposed way that people with an external locus of control may overcome what seems to be a major disadvantage is through religion, although previous research on religion and locus of control has been inconsistent. Religion allows people to place attribution for their life events onto God, fate, or some other powerful force (Wong-McDonald & Gorsuch, 2004), undermining the need for personal control. For instance, research has shown that disadvantaged groups report higher levels of religiosity (Schieman, Pudrovskas, Pearlin & Ellison, 2006). Religion provides people with a sense of security and meaning, so that even when things go wrong, they can believe it is part of a divine plan (Baumeister, 2002; Schieman et al., 2006).

However, religion is a multidimensional concept. Particular aspects of religion, such as frequency of attendance at services and belief in an afterlife, actually enhance an internal sense of control (Ellison & Burdette, 2012). This is in part because people internalize religion differently (Coursey, Kenworthya, & Jones, 2013; Wong-McDonald & Gorsuch, 2004). The current study broadly defined religion as any belief in an external divine intervention. In a previous study, participants who were primed with religious words such as God, spirit, and divine, drank more of an unsavory drink for monetary compensation than participants primed with neutral words (Rounding et al., 2012). Therefore, we predicted that exposure to religious words would increase self-control and lead people to work longer on difficult tasks.

The purpose of the current study was to investigate how religion and career priming can enhance self-control. More specifically, we examined how priming from the religion or career implicit association test (IAT) could be used to enhance self-control after a cognitive-depleting task. We also tested to see if locus of control or importance of religion, career, and family had any effect on self-control. Self-control was measured as the amount of time participants spent working on difficult problems. Participants primed with religion, or career, were predicted to have more self-control after a depletion task than participants who were not primed.

This approach is similar to that of previous research. For instance, in Boucher and Kofos’s experiment (2012), participants who completed a cognitive depletion task demonstrated more self-control after unscrambling money-related words than did participants who unscrambled neutral words. In another study, participants from a religious institution who were exposed to a moral fable judged situations such as jaywalking more harshly. Participants primed to think about the religious institution subsequently judged honor code infractions more harshly (Moon, Wright, Broadbent, & Robinson, 2017).

**Method**

**Participants**

Participants were recruited from the psychology research pool and introductory psychology classes at a midsized university in the southeastern United States. Participants signed up to participate voluntarily and received one credit toward their class for participating. There were 60 participants in the study, and each was randomly assigned to either a control condition (n = 20), a career condition (n = 21), or a religion condition (n = 19). Forty-four participants were European Americans (74.6%), eight were African American (13.6 %), and seven others identified as another race (11.9%), not specified. There were 41 women and 19 men, and the average age was 20.31 (SD = 4.47) years old. Participants were collected from a wide range of majors including psychology, business, and majors from the arts and humanities. Twenty-five participants were first-year students (42.4%), nine were sophomores (15.3%), 15 were juniors (25.4%), and nine were seniors (15.3%). The average GPA was 3.28 (SD = 0.51). All participants were treated in accordance with the American Psychological Association’s ethical guidelines and principles (APA, 2002). Institutional review board approval was received prior to conducting the experiment.

**Materials**

The implicit association test (IAT) was used for cognitive depletion and priming (Greenwald, McGhee, & Schwartz, 1998). The IAT is a computer-based test that measures peoples’ implicit associations between different concepts. It is typically used to reveal unconscious biases. For this study, the test was used primarily as a depletion and priming mechanism, and biases were not recorded. It was chosen as the manipulation because it depletes cognition by requiring participants to make many
successive choices (Vohs et al., 2014) and has many different versions already available for use, including both a religion and career test. By using a cognitive-depleting task, we were able to ensure that participants’ self-control would weaken for subsequent tasks.

The IAT presents words pertaining to some category (e.g., religion, career) and shows two separate categories on each side of the screen. The participant is to assign the word on the screen to one of the categories by pressing either the E or the I key as quickly as possible. The second part of the test pairs two categories together that people either often associate together (e.g., women and family) or that people do not often associate together (e.g., women and career) and again, asks the participant to place the words into the corresponding category as quickly as possible. Faster response times to one category over another are indicative of an implicit preference or stereotype. The test requires a significant amount of mental ability by forcing participants to often select an answer that is against their initial associations. Thus, the test depletes the mental energy of the one taking the test.

For the current study, participants in the experimental conditions took either the Religion IAT or the Gender-Career IAT to induce priming of religion or career (Greenwald et al., 1998). Participants were not made aware of the true purpose of the test. The Religion IAT displayed words from various world religions including Christianity, Judaism, and Islam. Religions were then randomly paired with the categories good and bad, and participants had to place related words to the proper category. For example, if the categories Christianity and bad were on the left side, and the categories Islam and good were on the right side, the word happy should be placed on the right side. In a similar format, the Career-Gender IAT paired different career-related words with the categories male and female, and participants had to allocate the words to the proper category. For example, if the categories family and male were on the left side, and the categories career and female were on the right side, the word children should be placed on the left side. Both tests are free and available online for anyone to take.

Next, three different riddles were chosen as dependent measures. The first riddle involved a scenario with three houses and three suppliers that participants were asked to draw lines connecting without intersecting lines (see Appendix A). The second riddle asked participants to think of three words containing all five vowels that are also related to the world of mathematics or geometry (e.g., education), which was also chosen due to the combination of its simple form yet thought-provoking solution (see Appendix B). Third, the nine-dot riddle was used, which asked participants to connect nine dots using only four continuous straight lines (see Appendix C). These riddles were all borrowed from Archimedes Laboratory Project (Sarcone & Waeb, 1997). These particular riddles were chosen to measure participants’ self-control and persistence to continue because they require abstract thinking and multiple attempts before one reaches a solution.

Other measures included were locus of control items taken from Rotter’s scale (1966), and four measures each about the influence of religion, career, and family in one’s life. Fifteen items were used to measure locus of control; \( \alpha = .67 \). The items used to measure importance of religion were created from the religion scale by Brown, Nesse, House, and Utz (2004). For instance, one item states, “I try hard to carry my religious beliefs over into all my other dealings in life.” Questions measuring importance of career and family were generated by the experimenter. For example, participants were asked to rate how much they agreed with the statements “My love for my family encourages me to always do the best I can” and “My career goals encourage me to always do the best I can.” Questions were answered on a 4-point Likert-type scale from 1 (strongly disagree) to 4 (strongly agree). Participants were also asked questions concerning basic demographics including age, race, sex, major, class rank, and GPA.

Procedure

Before conducting the study, approval was given by the institutional review board. To begin, participants were randomly assigned to the control, religion, or career condition, and were asked to read and sign an informed consent form explaining that their participation was voluntary and anonymous. Participants were told a cover story that the experiment was about the effects of using technology before taking a written test to ensure that they were not aware that they were being primed. Next, due to a copying error during the printing of materials, only the first 24 items of Rotter’s Locus of Control scale were included. Five of those items were fillers. Cronbach’s alpha of the remaining 19 items was .59. Because this internal consistency value was poor, we conducted an item-analysis and removed four additional items that were negatively correlated or correlated near zero with the overall measure. This reduced item LOC measure produced an improved Cronbach’s alpha of .67, which is still low but closer to the .70 value reported by Rotter (1966).
participants in the religion and career conditions took either the Religion or the Gender-Career IAT (Greenwald et al., 1998). Participants were told to stop the IAT on the last blank screen so that the remainder of the study was not influenced by viewing their test results. A researcher in the room ensured that participants did not see the IAT results, and participants were given the opportunity to view them during the debriefing. Participants were not informed about the true nature of the IAT to detect stereotypes. In the control condition, participants completed a simple computer-based task for the same amount of time. The control task consisted of categorizing shapes and colors into the correct geometric and color categories by pressing keys on the keyboard. Similar to the instructions of the IAT, participants in the control condition were told to complete the task as quickly as possible. Although participants believed that they were being tested, the control task did not require participants to correct for mistakes, nor did it record responses like the IAT. All tasks were conducted on a computer. After the initial task, participants were instructed to solve three riddles (Sarcone & Waeber, 1997). Participants were informed that, at any point, they could give up and retrieve the solutions. The experimenter timed how long each participant spent on the riddles. Lastly, participants completed items measuring locus of control (Rotter, 1966), importance of religion, family, and career (Brown et al., 2004), and demographics. They then had the opportunity to view their results to the IAT before being debriefed. Participants were asked during debriefing if they suspected the true nature of the IAT, to determine the relationship between religiosity and self-control. A 2-tailed test was utilized with p < .05 to determine statistical significance. The results showed a negative correlation between the religion measures and time spent solving the problems, r(60) = .27, p = .04. The correlation between grade point average and time spent solving problems was also marginally significant, r(60) = .23, p = .10. However, there was no correlation between importance of career and time spent on the problems, r(60) = .15, p = .25, or importance of family and time spent on the problems, r(60) = .12, p = .38.

To test the hypothesis that the priming of career or religion and locus of control would interact to influence self-control, a 3 (condition: control, career, or religion) x 2 (locus of control: internal or external) factorial Analysis of Variance was conducted. This was calculated by taking the average amount of time, measured in seconds, that participants spent on each problem. The analysis revealed a significant main effect for condition, F(2, 53) = 5.46, p < .01, $\eta_p^2 = .17$, and a nonsignificant effect for locus of control, F(1,53) = 0.03, p = .87, $\eta_p^2 = .00$. The interaction between condition and locus of control was not statistically significant, F(2, 53) = 0.14, p = .87, $\eta_p^2 = .01$. However, post-hoc comparisons showed that participants in the control condition ($M = 182.55$, SD = 53.40) worked on the problems for less time than participants in the career ($M = 240.27$, SD = 63.37, p = .02) and religion groups ($M = 255.21$, SD = 75.94, p < .01). Participants in the religion group did not work on the problems longer than participants in the career group, with only a mean difference of 14.9 seconds (p = .76). These results are displayed in Figure 1.

Results

Participants spent an average of 3.64 minutes ($SD = 70.99$) on each riddle. The time spent on problems ranged from 84.67 seconds to 6 minutes, at which point participants were asked to stop working on the problem. Analysis of Variance showed a significant difference between time spent on the three problems, $F(2, 177) = 3.05, p < .01$, $\eta_p^2 = .24$. Participants spent the most time on the first problem ($M = 4.22$, $SD = 3.10$), less time on the second problem ($M = 3.42$, $SD = 2.89$), and the least time on the last problem ($M = 3.28$, $SD = 3.12$).

The average locus of control score was 8.08 ($SD = 2.77$); higher scores indicated an external locus of control, and lower scores indicated an internal locus of control. Because there was not much variation, locus of control was dichotomized using a median-split. Participants were then categorized into internal locus of control, where locus of control < 10 ($n = 37$), or external locus of control, where locus of control > 10 ($n = 22$). Importance of religion, career, and family was also measured. The average score of importance was 2.53 ($SD = 0.74$) for religion. The average scores of importance were 3.10 ($SD = 0.57$) for career and 3.22 ($SD = 0.61$) for family.

A Pearson correlation coefficient was computed to determine the relationship between religiosity and self-control. A 2-tailed test was utilized with p < .05 to determine statistical significance. The correlation between importance of career and time spent on the problems was also marginally significant, r(60) = .23, p = .10. However, there was no correlation between importance of religion and time spent on the problems, r(60) = .15, p = .25, or importance of family and time spent on the problems, r(60) = .12, p = .38.

Because we used a median-split to categorize LOC as either external or internal, we also ran the same ANOVA with the initial 19 item LOC scale. The results were nearly identical to the reported 15 item LOC scale. Most importantly, the main effect for LOC, and the interaction effect involving LOC, were also not statistically significant.
Discussion

As previously stated, participants primed with either religion or family and career were predicted to have more self-control after a depletion task than participants who were not primed. The results supported the hypothesis by demonstrating that participants in both priming conditions worked on the problems longer than participants in the control condition. These results are consistent with previous research indicating that self-control is positively associated with both religion and a higher grade point average (Duckworth & Gross, 2014). However, there was no significant difference between the religiously primed condition and the career primed condition. It appears that on average, participants’ mental energy weakened after each problem because they spent less time on each subsequent problem.

Multiple factors may help explain why locus of control had no effect. Only 24 of the original 29 items were used to measure locus of control, which might have reduced the sensitivity. In addition, people tend to internalize religion differently and attribute responsibility and control to the self as opposed to a divine other on a continuum (Coursey et al., 2013; Wong-McDonald & Gorsuch, 2004). Therefore, religion can have a more profound effect on a person with an external locus of control only if religion is internalized as having more control than the individual (e.g., God controls man’s fate). It may also be important to consider an individuals’ motivation to complete the task. Participants in the current study had relatively low incentives for participating, and low intrinsic motivation might have reduced performance on the problems (Adelman & Lee, 1982). Although motivation was not measured, it is possible that locus of control had no effect due to overall low motivation to try hard on the riddles.

Furthermore, it is unclear why there was a negative correlation between scores on the religion measures and time spent on the problems. As mentioned earlier, religion is a complicated multidimensional concept and may mean different things to different people. Perhaps our four items did not quite capture the entirety of religion. It is also possible that participants rated religion as more important than was accurate due to the tendency to self-report higher levels of perceived desirable behaviors (Haeffel & Howard, 2010). This might have also been true for self-reports of the importance of family and career because both were also negatively correlated with time spent on problems.

Overall, our findings are consistent with other research that has used priming as an effective way to enhance self-control and other prosocial behaviors (Boucher & Kofos 2012; Mehta & Zhu, 2009). Our study added to the evidence that priming can be a useful approach for short-term enhancement of self-control by demonstrating that students work longer after a priming manipulation. Students who were not primed with career or religion were quicker to give up on attempting to solve difficult riddles. More research is needed to determine if these results generalize into other settings and scenarios, such as a classroom. Lastly, it appears that career and religion both have beneficial implications on self-control.

Future studies may consider other priming manipulations for career and religion. The current study used the religion and gender-career IATs (Greenwald et al., 1998) for priming, which might have also prompted extraneous concepts such as gender stereotypes or family. Other priming manipulations that could be used include word searches containing priming words (Rounding et al., 2012) and computer-based tasks where participants are asked to evaluate words as negative or positive rather than categorizing them (Degner, 2009).

There are several limitations to the current study that we would like to acknowledge. First, our sample consisted of 60 college students, with the majority being European American women. Additional research should be conducted with larger and more diverse samples. Another limitation is the limit of 6 minutes given to participants to work on each riddle. Allowing an extended amount of time may provide for more clear results on who expressed the most determination to solve the riddles. Participants also completed all measures after the priming manipulation, which might have influenced responses on locus of control.

Overall, our findings are consistent with other research that has used priming as an effective way to enhance self-control and other prosocial behaviors (Boucher & Kofos 2012; Mehta & Zhu, 2009). Our study added to the evidence that priming can be a useful approach for short-term enhancement of self-control by demonstrating that students work longer after a priming manipulation. Students who were not primed with career or religion were quicker to give up on attempting to solve difficult riddles. More research is needed to determine if these results generalize into other settings and scenarios, such as a classroom. Lastly, it appears that career and religion both have beneficial implications on self-control.

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**FIGURE 1**

Average times spent working on problems in three conditions in relation to internal and external control.
control and importance of religion, career, and family measures. Due to the nature of priming, participants’ responses might be more reflective of the situational circumstances than trait attributions. In addition, this study did not consider individual differences of how religion is internalized.

Overall, the study provided important insights to teaching and enhancing students’ self-control in the classroom. These findings suggest that getting good grades may not be the only motivation for students to work hard when solving problems, and that reminding students about long-term career goals or overall purpose may help them perform better on unrelated tasks. In the future, researchers should consider applying these findings and testing them in the classroom. Because priming students with religion and career increases self-control during task-completion, it may be applied to other scenarios, such as attempting to enhance self-control when faced with the temptation to cheat or commit other forms of academic dishonesty. This study provided insight on how to increase student productivity and determination during difficult tasks. When considering the quote by Thomas Edison, “genius is only one percent inspiration and ninety-nine percent perspiration” (Simonton, 2015), it seems that helping students connect class work with a greater purpose may help them persevere during difficult tasks.

References


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APPENDIX A

Three Houses Riddle

Participants received the following instructions. The three buildings below represent gas, water, and electricity suppliers. Each of the houses beneath them needs to receive gas, water, and electricity. However, the lines for these cannot intersect. Please find a way for the houses to receive all utilities by drawing lines to get each utility into every house, without crossing over any line. You may erase lines and continue on the back for more space if needed.

APPENDIX B

Vowels Riddle

1. ______________________________
2. ______________________________
3. ______________________________

Participants received the following instructions. Think of 3 words having all the five vowels A, E, I, O, U once, related to the world of mathematics and geometry.

APPENDIX C

Nine Dots Riddle

Participants received the following instructions. Join all the dots up with no more than 4 continuous straight lines.
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