

THE EMOTION OF GUILT AS A MOTIVATOR: CAN TRANSGRESSORS  
OVERCOME EGO-DEPLETION TO HELP THEIR VICTIMS?

Brandon Boring

A thesis in partial fulfillment of the requirements for the degree of MASTER OF ARTS

Department of Psychology

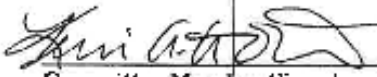
Towson University  
Towson, Maryland 21252

May, 2016

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 Justin Buckingham 5/10/16  
Chairperson, Thesis Committee Signature      Type Name      Date

 Geoffrey D. Munro 5/10/16  
Committee Member Signature      Type Name      Date

 Kerri Goodwin 5/10/16  
Committee Member Signature      Type Name      Date

\_\_\_\_\_  
Committee Member Signature      Type Name      Date

\_\_\_\_\_  
Committee Member Signature      Type Name      Date

 Janet V. DeLong 5-12-11  
Dean of Graduate Studies      Type Name      Date

### *Acknowledgments*

First and foremost, I would like to express my deepest thanks to my advisor Dr. Justin Buckingham for giving me the opportunity to study my late-found passion for psychology. He gave me insight into the Self, and helped me become a better researcher and writer. I will always be grateful for what he has done for me.

I would also like to thank my committee members Dr. Kerri Goodwin and Dr. Geoffrey Munro for their lessons both in and out of the classroom. They forced me to think critically about all topics, and encouraged me to ask questions to strengthen my understanding of new and exciting realms of the mind.

To the rest of the Towson faculty and staff, including Dr. Frederick Parente and Barbara Skinner, I thank you for creating a scholarly home and for providing me with the tools to take full advantage of my learning experience.

Many thanks go to my research assistants Kelly Ann Colby and Rebecca Marchel for putting in countless hours in the laboratory, and for helping me work out the kinks of my study.

Finally, I would like to thank my wife Charlotte for patiently supporting me throughout my graduate school journey, and my son Nathan for being a constant source of inspiration. I love you both very much.

*Abstract*

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Self-control is a limited resource; exerting it leads to a state termed ego-depletion. Research suggests that techniques can overcome this loss of resources; one such avenue may lie in the experience of guilt, an emotion arising following transgressions. Transgressors are motivated to repay their victims, and are also motivated to alleviate the feelings associated with guilt. This study examined whether guilt can motivate people to overcome ego-depletion. Participants completed a task requiring self-control, and were then made to believe that they had caused harm to the researcher. Persistence on a subsequent task helping the researcher was then measured. The results showed that depleted participants who experienced guilt persisted longer on the subsequent task than depleted participants who did not experience guilt. However, guilt without prior depletion debilitated participants' self-control as much as the ego-depletion induction. This study showed that guilt can both restore and exhaust self-control depending upon prior circumstance.

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## **Introduction**

Self-control is an integral aspect of daily life. People often encounter instances that require restraining themselves from giving into fleeting temptations in lieu of obligatory duties or behaviors. However, this restraint is mentally draining and difficult to maintain for extended periods of time (Baumeister, Vohs, & Tice, 2007). Baumeister et al. suggest that self-control is a limited resource, and exerting it leads to an exhausted state termed ego-depletion. Individuals in a depleted state have difficulty performing additional acts of self-control, such as emotional inhibition, resisting the temptation of food (Baumeister, Bratslavsky, Muraven, & Tice, 1998), and maintaining physical stamina (Muraven, Tice, & Baumeister, 1998). However, recent research suggests that implementing certain ideas and techniques can overcome this exhaustion (Hagger, Wood, Stiff, & Chatzisarantis, 2010). Monetary rewards (Boucher & Kofos, 2012), sugary drinks (Gailliot, Baumeister, DeWall, Maner, Plant, Tice, & Schmeichel, 2007), and even walks in the woods (Chow & Lau, 2015) have been found to counteract the effects of ego-depletion, allowing for further acts of self-control. However, the research on ego-depletion is still relatively young, and many methods for surmounting its deleterious effects have yet to be fully explored.

One such avenue may lie in the emotion of guilt. Guilt is an unpleasant feeling that arises in the wake of transgressions against others (Baumeister, Stillwell, & Heatherton, 1994). While it is a negative emotion, its interpersonal nature makes it a beneficial social tool. Transgressors are motivated to repair any relational bonds they may have damaged through their actions; failure to do so risks potential ostracism from the group (Woodyatt & Wenzel, 2013). People are also personally motivated to alleviate

the unpleasant feelings associated with guilt, even if it requires self-punishment (Nelissen & Zeelenberg, 2009). Guilt acts to prevent future transgressions as well (Smith, Webster, Parrot, Eyre, 2002).

It is therefore reasonable to suggest that guilt can act as a catalyst to overcome the effects of ego-depletion. Transgressors may find reserves of self-control if it means repaying their victim and relieving personal negative feelings. Only one study to date has examined the relationship between guilt and ego-depletion (Xu, Begue, & Bushman, 2012), but it did not account for multiple depleting tasks within the study, and it did not give the participants the opportunity to interact with their victim. As such, the current study attempted to show that guilt is powerful enough to counteract ego-depletion. Specifically, I proposed that depleted participants who were induced to feel guilty would persist longer on a monotonous task than those who were depleted but not made to experience guilt. The remainder of this proposal presents a background of self-control and ego-depletion, and then explores studies that have examined motivators for restoring its limited resources. It then details why the emotion of guilt may be a possible motivator for overcoming ego-depletion. The methods of the current study are outlined, followed by analysis and discussion of the results.

### **Strength Model of Self-Control and Ego-Depletion**

Baumeister et al. (2007) proposed that self-control functions similar to muscles. They suggest that people have a limited store of self-control resources. Exerting self-control exhausts these reserves until a person can no longer restrain his or her impulses, just as a weight lifter can only perform a certain amount of repetitions before his or her



muscles become too fatigued to continue. Baumeister, Bratslavsky, Muraven, and Tice (1998) termed this state ego-depletion.

Muraven, Tice, and Baumeister (1998) conducted one of the first studies examining the effects of ego-depletion. The researchers wanted to observe if forcing participants to exert self-control on an initial task would diminish their resources, resulting in poor self-control performance on a subsequent task. Participants began by squeezing a handgrip exerciser for as long as they were able. This was done to record a baseline measure for comparison against performance on the same task after experiencing ego-depletion. The researchers then had all participants watch an emotionally disturbing documentary. One group of participants received no additional instruction. Another group was told to enhance their emotional responses. The final group was told to inhibit their emotional responses. After watching the video, participants again performed the handgrip task. The researchers then calculated the change in handgrip performance by subtracting the initial length of endurance time from the second. They found that participants who exerted self-control by either increasing or decreasing their emotional response persisted for a shorter amount of time on the second handgrip task as compared the first.

Muraven et al. (1998) then conducted a second study to expand upon the findings of the first. Participants were asked to write down all the thoughts that came to them during a six minute period. However, participants were assigned to one of three conditions and received additional directions depending upon group. Participants in one condition were told to think about a white bear as much as possible. Participants in a second condition were told to suppress thoughts of a white bear. Participants in a third condition were given no additional instructions. Participants in both white bear conditions

were also told to draw a check mark at the top of the page every time they thought of the bear. The participants were then given a set of anagrams, which, unbeknownst to them, were actually unsolvable. Participants were asked to work on them as long as possible, and to ring a bell when they were finished. Participants' persistence was timed, and the testing session ended at 20 minutes if they had not yet rung the bell.

The results showed that participants in the suppress condition persisted less than those in both other conditions. There was no difference in persistence time between the control and the enhanced thought conditions. These findings, together with those of the first study, show that exerting self-control exhausts a limited set of resources, reducing the ability of people to exert self-control on subsequent tasks. Like physical fatigue, people became mentally fatigued when putting forth effort to inhibit impulses. However, just as an athlete can regain energy by eating food, various motivating actions have been found to restore self-control.

### **Overcoming Ego-Depletion**

Muraven and Slessareva (2003) conducted one of the first studies examining the restorative properties of motivation. They were interested in whether the incentive of reward would assist participants in overcoming ego-depletion. Previous studies have shown that incentives motivate people to persist longer on uncomfortable tasks (Johnson & Cabanac, 1983) but none had studied its effects on depleted individuals. Muraven and Slessareva (2003) also examined how ego-depletion affected performance on secondary tasks that do not require further self-control. Participants were first shown a five minute video of a comedy routine. Those in the self-control condition were told that they must suppress their expression of emotions, including smiling, throughout the duration of the

film. Those in the control condition were just instructed to watch the video. Following the video, participants were told that they could drink as much Kool-Aid as they wanted. Within that task there were two sets of conditions. Participants were either told that they would receive 25 cents per ounce (high pay) or 1 cent per ounce (low pay) of the drink consumed. The other factor either had participants drink Kool-Aid made with a cup of sugar (sweet condition) or made with a cup of vinegar (sour condition). The researchers hypothesized that those participants who had suppressed emotions and were given low monetary incentive would drink less of the bad tasting beverage than non-depleted participants, but would consume just as much good-tasting beverage as any other participant. However, they also hypothesized that those in the suppression condition who were well paid would drink as much of the bad tasting beverage as non-depleted participants.

The results supported their hypothesis (Muraven & Slessareva, 2003). Within the taste conditions, there was a significant interaction between the first-task condition and pay. Participants in the suppression condition who were paid well drank more bad-tasting drink than those in the suppression condition who were poorly paid. They also drank as much bad tasting Kool-Aid as those in both the high and low paying no-suppression conditions. There was no difference in bad tasting drink consumption between the high and low paying no-suppression conditions. This was consistent with other studies that had shown that participants who have not been depleted are less receptive to motivational rewards. For the good-tasting beverage, however, there was no significant difference between any of the groups. Depleted participants drank just as much sweet Kool-Aid as the non-depleted participants, regardless of compensation. Muraven and Slessareva

(2003) claimed that this was due to the lack of self-control required to perform the drinking task. However, it is possible that drinking the sugary Kool-Aid restored depleted resources. Many studies have shown that glucose consumption counteracts the effects of ego-depletion, allowing participants to persist longer and perform better on secondary tasks (Gailliot, et al., 2007). Still, the effects of reward, be it monetary or consumable, cannot be dismissed as motivators for further acts of self-control.

Muraven and Slessareva (2003) also explored whether informing people of the benefits of their participation would motivate them to overcome ego-depletion. More importantly, participants were told that their actions would help others; the participants themselves would not directly benefit from the study. Participants were randomly assigned to one of two conditions in the cognition task. In the high depletion condition participants listed all thoughts that came to their mind. However, they were told that they were not allowed to think of a white bear; any time they thought about a white bear they were required to write it down but immediately try to remove that thought from their head. Participants in the control condition were asked to memorize a list of words. Participants were then assigned to one of two directional prompts. In the importance condition, participants were told that the purpose of the current study was to help develop beneficial therapies for individuals with Alzheimer's disease. Participants in the control task were just told to try their best on the next task.

For the second task, participants were asked to trace geometric shapes without lifting their highlighter from the paper, and without tracing the same line twice. They were first given a solvable practice figure to trace. Then they were given 45 minutes to

trace two unsolvable shapes, but were allowed to stop at any point. After the task, participants were asked their levels of motivation to finish the puzzles.

The results indicated that those in the thought suppression condition who were not told that the experiment provided benefits persisted on the tracing task for the shortest amount of time (Muraven & Slessareva, 2003). Participants in the suppression condition who believed the task was important persisted longer than those in the suppression condition who were not told of the importance of the task. There was no difference in persistence time between those in the suppression condition and the control condition when told of the benefits of the experiment. This study showed that informing participants that their performance was helpful for someone other than themselves' motivated them to exert more self-control after ego-depletion. If reminders of helpfulness restore self-control resources, then participants should be even more inclined to exert self-control if their next actions benefit someone whom they have transgressed against.

Building upon this finding, Gao, Zhang, Wang, Xu, Hong, and Jiang (2014) explored whether finding benefits in their performance would motivate participants to exert self-control after experiencing regret. Regret is similar to guilt, but it is more intrapersonal in nature. It arises when one finds fault in one's own actions, and usually only involves the self (Berndsen, van der Pligt, Doosje, & Manstead, 2004); regardless, both guilt and regret motivate people to amend their transgressions.

Gao et al. (2014) hypothesized that acknowledging the benefits of one's actions would help participants overcome ego-depletion and perform better on a subsequent task, even if those initial actions were personally regrettable. They used a modified version of the gambling paradigm to induce either regret or disappointment. The task consisted of

two rounds with three trials per round. Within each trial participants were asked to choose between one of two gambles. If they chose the first gamble, participants had a 25% chance of winning 200 points, but had a 75% chance of losing 50 points. In the other gamble, participants had a 50% chance to win 50 points and a 50% chance to lose 50 points. At the end of the round, the scores from each trial were added together. If the total was a positive value, participants would receive 5 ¥. If the total was a negative value then they would owe the researcher 5 ¥. Participants were shown the results of both the gamble they selected as well as the gamble they did not choose. Previous research has shown that complete feedback in the gambling paradigm elicits feelings of regret whereas partial feedback leads to more feelings of disappointment (Chua, Gonzalez, Taylor, Welsh, & Liberzon, 2009). The task was rigged so that participants always won one trial and lost two within each round, resulting in an overall losing score for the round.

After the gambling task, participants rated their degree of satisfaction with the outcome as well as their desire to change their decisions (Gao et al., 2014). The purpose of this was to establish whether or not participants experienced regret. Previous research has shown that higher ratings of dissatisfaction and greater desire to change past decisions are related to regret rather than disappointment (Carmon, Wertenbroch, & Zeelenberg, 2003). Previous studies by Gao et al. (2014) had also shown that regret causes ego-depletion. Participants were then either reminded of the significance of their participation in the study (benefit condition) or were just told about the data analysis process (control condition). Finally, to test the effects of ego-depletion caused by regret, participants completed the Stroop test.

The results showed that participants reported low levels of satisfaction with the outcome of the gambling task and were more interested in changing their choices, as had been found in their previous studies (Gao et al., 2014). The results also showed that participants in the benefit group had significantly faster reaction times on the Stroop task compared to those in the control group. Reminding participants of the benefits of their personal contribution alleviated the depleting effects of regret caused by failure in the gambling task.

Overall, Gao et al. (2014) showed that experiencing regret causes ego-depletion, but that finding benefits in their actions restored participants' self-control resources, allowing them to perform better on subsequent tasks. Since regret is akin to guilt, similar patterns should be seen when the transgressions are against individuals other than the self. Helping their victim should be viewed as a benefit by the guilty because it repays debts and also alleviates personal distress. Because of this, guilt should also motivate participants to persist longer at a task after ego-depletion if they know the task benefits their victim.

### **Guilt and Prosocial Behavior**

Guilt must first be established as a sufficient motivator for reparatory action. Guilt is a burden that weighs upon a transgressor's conscience (Kouchaki, Gino, & Jami, 2014); research has shown that the guilty prefer quick alleviation of their interpersonal obligations (Baumeister, et al., 1994). However, it is unclear how long these feelings may last. To examine this, Ketelaar and Au (2003) explored if participants would repay their victims a week after the initial transgression.

Ketelaar and Au (2003) utilized a variation of the ultimatum game to induce guilt in the participants. The game is a situational bargaining paradigm occurring between two people. Participants entered the lab in pairs and were randomly assigned to either a role of proposal maker or acceptor. They were tasked with dividing a sum of money (in this case \$19). Only the proposal maker was allowed to make an offer of how to split the money. The other participant could either accept the proposal, in which case both participants receive the dictated amount; however, if the acceptor did not agree with the proposed division and declined it, neither player would receive any money and the game would end. Because the provided sum of money was not divisible by two, an even distribution of money could never occur; the proposed amount would always favor one player over another. Therefore the participant in the offering position needed to decide between generosity and selfishness. As soon as the proposal was made, the participant submitting the offer completed an assessment of their current feelings, including the emotion of guilt. The second participant then either accepted or declined the offer. The participants were then dismissed. One week later the participants returned and played the game again, with both participants assuming the same role they had performed the week before.

Ketelaar and Au (2003) hypothesized that participants who made selfish offers at week one would report higher levels of guilt than those who made generous offers. They also hypothesized that selfish participants would be more generous in the game a week later; this was supported by the results. Twenty-one participants made selfish offers during the first game; twelve of these participants reported feelings of guilt after the first game. No participants who had acted generously reported feeling guilty. Eleven of the



twelve participants who had acted selfishly and reported feeling guilty acted generously in the game a week later compared to just two of nine who had acted selfishly but did not report feeling guilty.

This shows that feeling guilt motivates people to act pro-socially in an attempt to repay their victims, even a week after the event occurred. However, it is yet to be determined that participants will act in a similar pro-social manner after experiencing ego-depletion.

### **Guilt and Ego-Depletion**

To date though, only one study has attempted to find a link between ego-depletion and guilt. Xu et al. (2012) examined if depleted participants who were induced to feel guilty would be less prosocial than non-depleted individuals. Participants began the study by watching a 10 minute video of animals being butchered. Those in the depletion condition were told to suppress their emotional expressions, whereas those in the no-depletion condition were told to express any and all emotions. After a few manipulation checks, participants completed the Stroop task. All participants were then induced to feel guilty. They were shown 10 different pictures for 5 seconds each, and were asked if the picture contained 17, 19, or 21 faces. They were told that if they were incorrect the next participant in the study would receive a 100-decibel noise blast for 5 seconds. Upon completion, all participants were told that they got nine trials wrong and that the next participant would receive nine noise blasts. They were all then told that the previous participant had only gotten five trials wrong, resulting in five blasts of noise for the current participant. Xu et al. believed that this would induce guilt because participants “performed” worse than their predecessors. Participants then completed the five-item

guilt subscale of the State Guilt and Shame Scale (Marschall, Saftner, & Tangney, 1994).

Then they completed a modified version of the Implicit Association Test that included words related to guilt and innocence. Finally, prosocial behavior was assessed.

Participants were given 10 Euro and asked to leave a portion of the money to give to the following participant. The researcher then gave the participant two Euro, which was the amount purportedly left by the previous participant. Participants were then told that the lab was collecting money for a charity supporting AIDS research, and that they could donate money if they were so inclined.

The results showed that participants in the depleted condition felt significantly less guilty than those who had not been depleted (Xu et al., 2012). Participants in the no-depletion condition also recorded lower implicit measure of guilt on the IAT than depleted participants. Depleted participants also left significantly less money for the following participant, and significantly less amounts of money for the AIDS research than participants in the no-depletion condition. The authors suggested that ego-depletion reduced the ability of the participants to exert the effort needed to repay their victim.

However, participants in the study by Xu et al. (2012) performed multiple ego-depleting tasks throughout the course of the study. Regardless of the initial depleting task requiring participants to withhold their emotional response to a video, all participants then performed the Stroop test. The researchers used this as a measure of participants' level of self-control, but numerous studies have found that the Stroop test itself induces ego-depletion (Englert & Wolff, 2015; Goto & Kusumi, 2013). After the guilt induction, all participants then completed the IAT, another task that has been shown to require self-control (Storbeck, 2012). As such, all participants had performed multiple depleting tasks

before prosocial behavior was measured through the amount of money given, possibly affecting the ability to distinguish between groups.

Guilt is also an interpersonal emotion, and any feelings following a transgression are between the victim and the guilty party. Transgressors are motivated to repair the social bonds between those they have harmed, but more so when they are familiar with the person; Kubany and Watson (2003) found that participants are more likely to help people they know than those that they do not. The victims in the study by Xu et al. (2012) were intangible entities that had no true relational bond with the participant.

To truly induce guilt, it may be important that the transgressor interacts with the person whom his or her actions affect. Leaving money for those whom you have hurt is also a poor way to gauge guilt reparation. Vohs, Mead, and Goode (2008) found that participants who were primed with the idea of money actually helped less than those who had not been reminded of money. It is important to observe how individuals perform on a secondary task after guilt induction when told that the task is beneficial to the person they have transgressed against. The transgressors should be motivated to exert further acts of self-control so that they may allay their guilt.

### **The Present Study**

To assess guilt as a means for overcoming ego-depletion, the present study induced ego-depletion using a paradigm that has been successful in the past (Muraven, Shmueli, & Berkley, 2006). The study then elicited feelings of guilt, and gave the participants the opportunity to relieve that guilt by helping their victim, even though it required further acts of self-control. However, this study introduced an implementation of guilt induction not used in other ego-depletion studies. Participants were to believe that

their actions caused harm to the researcher; specifically, they were led to believe that they deleted all of the researcher's data needed for graduation, using a technique that has been successfully shown to make participants feel responsible for their actions (Kassin, & Kiechel, 1996). This induction was unique in that the participants witnessed their victim's distress. Previous studies have implied that participants' actions have hurt another, but none have given visual and vocal proof. This tangible suffering should be a strong motivator for reparatory action. The task used to measure persistence was a variation of a monotonous and potentially frustrating braiding task implemented by Bosson and Vandello (2011).

I hypothesized that there would be a main effect of guilt condition on persistence in the braiding task; those who were made to feel that their actions caused harm to the researcher would braid more loops and persist for a longer period of time on the braiding task than those who were just required to perform the task. Research has shown that transgressors are motivated to help their victims to remove the emotion of guilt, so participants made to feel responsible for harming another should work harder to make amends.

I also hypothesized that there would be a main effect of ego-depletion condition on braiding performance. Overall, non-depleted participants should braid more loops and persist for a longer period of time on the braiding task than depleted participants. Ego-depletion has been shown to affect performance on persistence tasks, so participants who exert self-control on the initial typing task should perform worse on the subsequent braiding task.

Finally, I hypothesized that there would be a significant interaction between depletion conditions and guilt conditions. Participants who were ego-depleted, and then made to feel guilty would perform better on the subsequent task than depleted participants who were not made to feel guilty, and would perform as well as participants who were not depleted. Participants should be motivated to overcome ego-depletion if their subsequent actions can repay their victim for their previous transgression.

### **Method**

#### **Pilot**

Two pilot studies were first conducted to verify the validity of both the ego-depletion and guilt inductions. The first pilot study examined if the braiding task was a valid measure of persistence following ego-depletion. Eighteen participants (9 control, 9 depletion) were recruited from a statistics class in return for class credit. Upon entering the lab, participants were escorted to a room with a computer, and asked to read and sign a consent form. Participants were then given instructions for the initial task. Using the program Medialab, participants in the control condition were told to retype an essay as quickly and accurately as possible. Participants in the experimental condition were told to retype the essay as quickly as possible, but without typing the letter “e” or using periods. They were instructed to monitor their typing and delete any instances of the use of the restricted keys. All participants were given five minutes for the typing task. After five minutes, the Medialab program instructed participants to contact the researcher; they were then escorted to a larger room where they were shown how to complete a braiding task (see the Procedure section for more detail). Participants were then escorted back to the room where they conducted the typing task, and were told to braid as much as they

were able to in 15 minutes, but that they were allowed to stop whenever they wanted. The researcher then left the room; when the participant notified the researcher they were finished braiding, or after 15 minutes had elapsed, the researcher debriefed and thanked the participant for their participation. Persistence time and loops braided were recorded. Participants in the control condition ( $M = 890.33$ ,  $SD = 29.00$ ) persisted longer than participants in the depletion condition ( $M = 774.44$ ,  $SD = 187.03$ ), cohen's  $d = 2.60$ ,  $r = .79$ . Participants in the control condition ( $M = 27.00$ ,  $SD = 11.47$ ) braided more loops than those in the depletion condition ( $M = 20.56$ ,  $SD = 13.06$ ), cohen's  $d = 1.57$ ,  $r = .62$ .

The second pilot study was then conducted to determine the validity of the guilt induction. Sixteen participants (8 control, 8 guilt) were recruited through Towson University's Researchpool website in return for class credit. After reading and signing the consent form, participants were placed in front of a computer running Medialab software. There was also a video baby monitor camera focused on the keyboard and monitor of the computer. They were told that the purpose of the study was to examine the relationship between hand-eye coordination and dexterity. The researcher showed the participants the video receiver portion of the baby monitor and told the participant that the researcher would be watching the participant's hands and taking notes on their dexterity. The participants were then given instructions on completing the typing control task used in the first pilot. However, the typing task ended in a different manner than that used in the first pilot; after 5 minutes the screen was programmed to go black and then flash between the black screen and a screen shot of the Medialab task using a Powerpoint presentation embedded within the Medialab program. The researcher was watching the screen on the receiver end of the baby monitor, and their reaction to the flashing of the screen was

different depending upon condition. In the control condition, the researcher knocked on the door to the room in which the participant was sitting, entered the room, and asked, “Is everything ok?”. After the participant responded, the researcher then asked, “Did the screen just start flashing like this?”. After the participant responded, the researcher said, “That’s weird. Do you mind if I look at the computer?”. The researcher then sat in front of the computer and feigned hitting keys and clicking the mouse in an attempt to fix the computer. The researcher then said, “These computers are old and act up some time. I’m going to have to restart the computer, but that takes a while. Would you mind maybe helping us out with another study we’re conducting in the lab?”. In the guilt condition, as soon as the researcher witnessed the flash, they made a loud exclamation and rushed into the room and exclaimed, “I saw you hit the "alt" key! I need to look at the computer, can you please scoot over?”. The researcher sat down at the computer and said, “Didn’t you read the directions that said you weren’t supposed to hit the “alt” key?”. The researcher then showed the participant the written directions on the last page of the typing essay that said they needed to avoid the key, and proclaimed how the computer was frozen and their data deleted. The researcher then feigned hitting keys and clicking the mouse in an attempt to fix the computer. The researcher then said, “I’m going to have to restart the computer, but that takes a while. Would you mind maybe helping us out with another study we’re conducting in the lab?”.

All participants in each condition agreed; the researcher then escorted the participant to a different room and started the Medialab program. The researcher also moved the camera to continue the story that the researcher would watch the participant’s hands. The participants completed the typing task again, but this time after five minutes

the program progressed to a questionnaire involving the State Shame and Guilt Scale (Marschall et al., 1994). Participants were then debriefed where they were asked the purpose of the study and whether or not deception had been used; no participants claimed to believe that deception had been used, and all participants in the guilt condition believed that they had pressed the “alt” key, causing the computer to crash. Participants in the guilt condition ( $M = 9.50$ ,  $SD = 3.46$ ) reported higher levels of state guilt than participants in the no guilt condition ( $M = 6.00$ ,  $SD = 1.31$ ), cohen's  $d = -1.34$ ,  $r = -.56$ .

### **Participants**

A total of 101 participants were recruited through the psychology department's research participation pool. However, ten participants were excluded for not following the directions of the typing task. Five participants were excluded for not believing that they had hit the “alt” key and/or because they did not believe that the computer actually crashed. Two participants were excluded for excessively struggling to learn how to braid the gimp. This resulted in a final total of 84 participants (mean age = 19.44,  $SD = 1.98$ ), 64 of whom were female.

### **Measures**

**Guilt and Shame.** State guilt ( $\alpha = .905$ ) and shame ( $\alpha = .897$ ) were measured using the 15 item State Shame and Guilt Scale (SSGS; Marschall et al., 1994). It is rated on a scale of 1 (*not feeling this way at all*) to 5 (*feeling this way very strongly*). It contains items such as “I feel small,” and “I feel remorse, regret”.

### **Procedure**

Upon entering the lab, participants were escorted by the researcher to a room with a computer and a video baby monitor camera focused on the keyboard and monitor of the



computer, and asked to complete a consent form. The participant was told that the purpose of the study was to examine the relationship between hand-eye coordination and dexterity, with a focus on arthritis and joint movement; the participants were told that the researcher himself had arthritis. Participants were given a packet of papers with an instruction sheet as the cover page (Appendix A), followed by an excerpt from *Walden* by Ralph Waldo Emerson. The instruction sheet detailing the procedure contained a line of text informing participants that pressing the “alt” key froze the program settings and deleted all data, so they must take care not to press it. However, the instruction page was folded, so that the participant was presented with the first page of the essay and so that the “alt” key instruction was not visible.

Participants were verbally told by the researcher that they should essentially retype the essay - the researcher pointing to the essay lying next to the keyboard as they said this - but that more detailed instructions would be presented to the participants on the computer screen once “ok” was pressed on the MediaLab program to begin the study. The researcher then showed the participants the video receiver portion of the baby monitor and told the participant that the researcher would be watching the participant’s hands and taking notes on the dexterity of their fingers. The researcher then told the participant that the computer program would inform the participant when they had completed the first portion of the study, and that the participant should retrieve the researcher from a room which the researcher indicated by pointing towards. The researcher then pressed “ok” on MediaLab, left the room, and closed the door.

Participants were randomly assigned to either the ego-depletion condition or the control condition. The researcher was blind to these conditions. The directions presented

to the participants on the computer were the same as those found in Appendix A, except the lines regarding the “alt” key were omitted. Participants in the control condition were instructed to retype as much of the essay as possible in six minutes using the program Medialab. Participants in the ego-depletion condition were instructed to retype as much of the essay as possible in six minutes with a few caveats; they must not type any letter “e” that was two letters away from another vowel, or use periods. This paradigm is similar to one that has previously shown to produce ego-depletion (Muraven et al., 2006).

After the six minutes had passed, the screen went completely black, and then flashed back and forth between a black screen and a screenshot of the MediaLab essay input screen. This was done by embedding a Powerpoint presentation into the MediaLab script. The screenshot was taken by the researcher who had typed the essay into MediaLab; a separate screenshot for both the control and ego-depletion conditions was created prior to the onset of the study. Two Powerpoint presentations were created that contained 256 slides alternating between the black screen and the screenshot every two seconds. It was programmed to flash back and forth between the black screen and the screenshot for about eight and a half minutes; only a specific button combination would progress the screen to prevent participants from accessing the final page (CTRL + →). The researcher was watching the screen on the receiver end of the baby monitor, and their reaction to the flashing of the screen was different depending upon condition. In the control condition, the researcher knocked on the door to the room in which the participant was sitting, and asked, “Is everything ok?”. After the participant responded, the researcher then asked, “Did the screen just start flashing like this?”. After the participant responded, the researcher said, “That’s weird. Do you mind if I look at the computer?”.

The researcher then sat in front of the computer and feigned hitting keys and clicking the mouse in an attempt to fix the computer. The researcher then said, “These computers are old and act up some time. I’m going to have to restart the computer, but that takes a while. Would you mind maybe helping us out with another study we’re conducting in the lab?”. In the guilt condition, as soon as the researcher witnessed the flash, they made a loud exclamation and rushed into the room and exclaimed, “I saw you hit the "alt" key! I need to look at the computer, can you please scoot over?”. The researcher sat down at the computer and said, “Didn’t you read the directions that said you weren’t supposed to hit the “alt” key?”. The researcher then showed the participant the written directions on the last page of the typing essay that said they needed to avoid the key, and proclaimed how the computer was frozen and their data deleted. The researcher then feigned hitting keys and clicking the mouse in an attempt to fix the computer. The researcher then said, “I’m going to have to restart the computer, but that takes a while. Would you mind maybe helping us out with another study we’re conducting in the lab while I try to fix the computer?”.

If the participant agreed, the researcher led the participant through a closed door to another part of the lab, to a separate room whose door was closed nearly all the way. In the room awaited a research assistant sitting at a table. The research assistant had multiple lanyards of gimp, a flat, plastic, rectangular strand also known as scoubidou, placed on the table. These lanyards were produced from braiding two separate 48 inch strands of gimp (one yellow and one black for the university’s colors) together, using the box gimp method (Appendix B). Each lanyard had 15 pre-braided loops. There were also two demonstration lanyards of varying length which were taken from quality lanyards

braided by previous participants. The research assistant also had an electronic timer. The research assistant was blind to all conditions.

The researcher knocked on the door and walked in with the participant. The researcher greeted the research assistant and told them that the computer had crashed while conducting their study. The researcher asked the research assistant if they had time to fit another participant in for the study that the research assistant was conducting. The researcher looked at the clock on a phone or computer and agreed. The researcher then introduced the participant to the research assistant and told the participant that they would return once they had fixed the computer that had crashed.

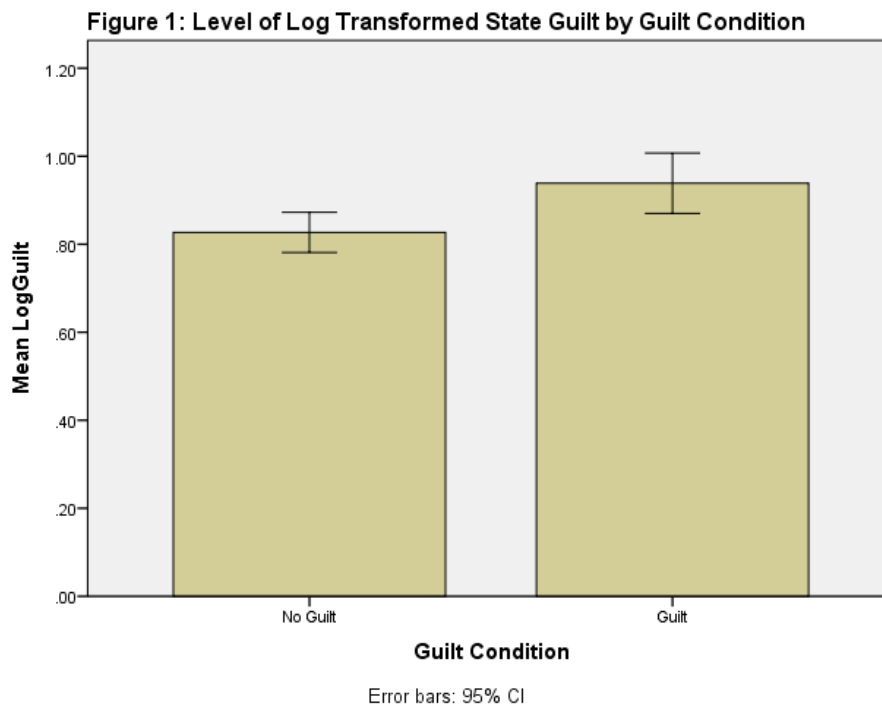
The research assistant had the participant sit down and read and sign a new consent form. This was done to maintain the appearance that this was a separate study from the typing task. All participants were then told, “The purpose of this study is to help find ways to ease the pain of those suffering from arthritis. People with arthritis have difficulty using their hands for extended periods of time, and we are interested in looking for exercises to help this. Brandon, the PI of this study, has reactive arthritis, and this will help not just his research, but him personally as well. This particular study examines if dexterous tasks are associated with hand muscle endurance. Braiding tasks have been shown to be a good gauge of dexterity, and we would like to examine this in the lab. We want you to braid this rope for as long as you are able.” Participants were then shown how to braid box gimp patterns by the research assistant with an instruction sheet for reference (Appendix B). The research assistant guided the participant through braiding one loop together at the same time. The research assistant then had the participant braid the pattern for one loop by themselves. If the participant struggled and was unable to

braid a loop by themselves, the training pattern was repeated until the participant appeared to be capable of performing the task alone. The research assistant then gave the participant two pre-started 15 loop lanyards and escorted them another room, telling them, "Please braid this for as long as you are able. The longer that you braid, the more your data helps Brandon's study, but you can stop at any time. When you can't go any longer, return to this room and notify me." The researcher closed the door to the room in which the participant was sitting, returned to the initial room they had been waiting in, and immediately started the timer. When the participant indicated that they no longer wanted to continue, the research assistant recorded the amount of time elapsed. If the research assistant had not been contacted after 30 minutes, they stopped the participant from braiding anymore loops, and brought them back into the room. The participant was then given a brief survey asking how much they enjoyed the braiding task, how difficult they found the braiding task, and if they had prior experience braiding gimp (Appendix C). The research assistant then retrieved the researcher. The researcher informed the participant that they were unable to fix the computer, but that they could continue the remainder of the study on a different computer. The participant was escorted to a third room where they completed the State Shame and Guilt Scale (Marschall et al., 1994), as well as demographics. The participant was then debriefed. Participants were asked what they had thought the purpose of the study was, as well if they thought any deception had been used. The researcher noted any participants who guessed the real purpose of the study, or who suggested that the computer had not really crashed. Participants were then thanked for their participation and excused.

## Results

### Manipulation Check and Tests of Assumptions

A manipulation check was first run to determine if the guilt condition actually induced state feelings of guilt. State guilt scores were log transformed, and a 2 (Ego-depletion) x 2 (Guilt) ANOVA on log transformed state guilt with loops braided as a covariate found a significant main effect of guilt condition on state guilt,  $F(1, 83) = 6.99$ ,  $p = .010$ ,  $\text{partial } \eta^2 = .081$ ,  $\text{power} = .743$  (see Figure 1). Loops braided was included as a covariate because state guilt scores were recorded following the braiding task; including loops braided as a covariate helped account for any variance in state guilt due to performance, or lack thereof. The main effect of ego-depletion condition, and the interaction were not significant.



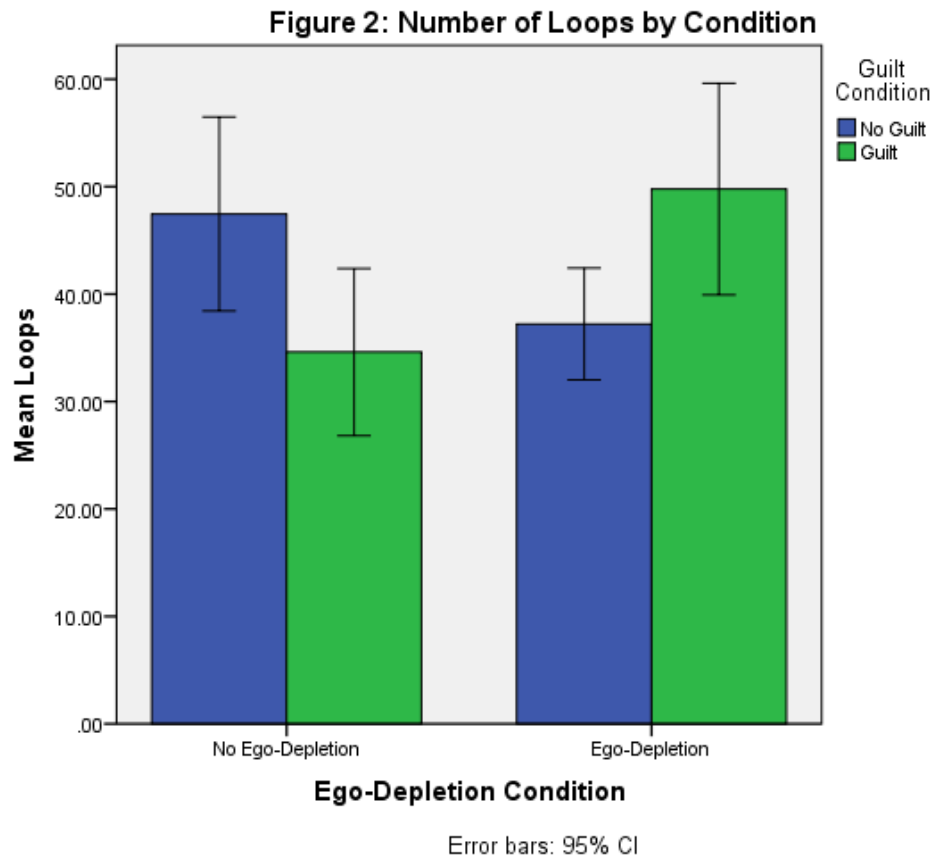
A Levene's test of equality of error variances was significant for total log transformed state guilt,  $p < .05$ , suggesting that assumptions of normality were violated;

as such, the results presented above should be interpreted with caution. However, an independent  $t$ -test with equal variance not assumed using guilt condition as the independent variable and log transformed state guilt as the dependent variable conducted found that participants in the guilt conditions ( $M = 0.94$ ,  $SD = 0.22$ ) reported significantly higher levels of state guilt than participants in the no guilt conditions ( $M = 0.83$ ,  $SD = 0.14$ ),  $t(72.54) = -2.74$ ,  $p = .008$ . Taken together with the significant results of the pilot study, it is likely that the guilt manipulation was successful at inducing guilt.

The number of loops and time of persistence were first analyzed for skewness in each condition using the Kolmogorov-Smirnov test. The results were not significant for loops, suggesting that the data were not skewed. However, time of persistence was significantly skewed; 75% of all participants went the full 30 minutes, and 86.4% persisted at least 25 minutes. Time of persistence was then reverse scored and transformed by computing the log of the reverse score. Log transformed persistence had skewness = 1.15, and the Kolmogorov-Smirnov test was significant,  $p < .05$ , suggesting that the distribution was not normal. As a result, time of persistence was excluded from the following analyses.

### **Hypothesis Tests**

A 2 (Ego-depletion) x 2 (Guilt) ANOVA on loops braided conducted on these data found no significant main effects. However, a significant interaction between ego-depletion and guilt condition was found,  $F(1, 83) = 10.28$ ,  $p = .002$ , partial  $\eta^2 = .114$ , power = .886.



Post-hoc LSD analysis found significant differences,  $p < .05$ , between the ego-depletion / guilt condition and both the ego-depletion / no guilt condition and the no ego-depletion / guilt condition. Partially supporting the hypothesis, participants who were depleted and made to feel guilty braided more loops than participants who were depleted and not made to feel guilty (see Figure 2); however, they also braided more loops than participants made to feel guilty but not initially depleted. Unexpectedly, participants who were not depleted but made to feel guilty braided significantly fewer loops than those in the control condition (no ego-depletion, no guilt); they also braided a similar amount of loops to those who were depleted but not made to feel guilty.



**Additional Analyses**

An ANOVA testing the effect of gender on loops was conducted to determine if there was a difference in braiding between men and women. The results were significant,  $F(1, 83) = 6.92, p = .010$ , partial  $\eta^2 = .078$ , power = .739, such that women ( $M = 44.73$ ,  $SD = 2.28$ ) braided more loops than men ( $M = 32.45$ ,  $SD = 4.08$ ).

To determine if this difference affected the overall analysis, females were selected for, and then a 2 (Ego-depletion) x 2 (Guilt) ANOVA on loops braided was conducted. The results were similar to the original analysis, such that there were no main effects, but there was a significant interaction,  $F(1, 63) = 4.59, p = .036$ , partial  $\eta^2 = .071$ , power = .559, which had the same pattern as displayed in Figure 2.

An ANOVA of experience on loops was conducted to determine if those with prior experience braided more than those without experience. One participant did not indicate if they had prior experience, so only 83 participants were analyzed. A significant model was found,  $F(1, 82) = 18.36, p < .001$ , partial  $\eta^2 = .185$ , power = .989, such that participants with prior experience braided more loops ( $M = 46.95$ ,  $SD = 2.22$ ) than those without experience ( $M = 28.87$ ,  $SD = 3.59$ ). However, a 2 (Ego-depletion) x 2 (Guilt) ANOVA with experience as a covariate on loops braided found results similar to the overall analysis, such that there were no main effects, but there was a significant interaction,  $p < .05$ , which had the same pattern displayed in Figure 2.

A linear regression of enjoyment of the task predicting loops demonstrated a significant overall model fit,  $R^2 = .051$ ,  $F(1, 83) = 5.43, p = .022$ , such that the more participants enjoyed the task, the more they braided. However, a 2 (Ego-depletion) x 2 (Guilt) ANOVA with enjoyment as a covariate on loops braided found results similar to

the overall analysis, such that there were no main effects, but there was a significant interaction,  $p < .05$ , which had the same pattern displayed in Figure 2.

A linear regression of perceived difficulty of the task predicting loops found a significant overall model fit,  $R^2 = .034$ ,  $F(1,83) = 3.94$ ,  $p = .050$ , such that the more difficult the participants found the task, the less they braided. However, a 2 (Ego-depletion) x 2 (Guilt) ANOVA with difficulty as a covariate on loops braided found results similar to the overall analysis, such that there were no main effects, but there was a significant interaction,  $p < .05$ , which had the same pattern displayed in Figure 2.

Separate linear regression analyses were conducted each for levels of state guilt, state shame, and state pride to determine if they predicted loops braided. None of the overall models were significant.

### **Discussion**

Exerting self-control taps a limited store of resources, but certain rewards (e.g., money) and actions (e.g., walks in the woods) have shown to restore these resources, allowing people to overcome ego-depletion (Boucher & Kofos, 2012; Chow & Lau, 2015). It was hypothesized that experiencing guilt, an emotion which prompts prosocial behavior following transgressions, could also rejuvenate ego-depleted participants, motivating them to exert further self-control to repay their victim. The results of this study supported that hypothesis; there was a significant interaction such that guilt motivated depleted participants to braid significantly more loops than depleted participants who did not experience guilt. It was also hypothesized that participants who exerted self-control on the first task would subsequently braid fewer loops overall than those who were not forced to exert self-control on the first task; however, there was no

main effect of ego-depletion condition on loops, which did not support that hypothesis.

There was also no main effect of guilt condition on loops, which did not support the final hypothesis; it was expected that experiencing guilt would motivate participants to exhibit helping behavior in the form of persistence on the researcher's other study, regardless of previous levels of exertion of self-control.

While the results did not express exactly in the manner proposed by the hypotheses, they are supported by recent additions to the guilt literature. Over a series of studies, Graton, Ric, and Gonzalez (2016) induced guilt through an initial task, and then gauged subsequent helping behavior. The researchers found that guilty participants helped less than control participants when overtly and directly reminded of their ability to make reparations. This occurred despite guilty participants consistently reporting more state guilt than non-guilty participants in all experiments. Graton et al. suggested that this possibly occurred due to the threat of the loss of their control over a situation (Graton et al., 2016). The researchers also referenced studies on reactance. Persuasive cues which are limiting or confining cause participants to be more conservative in their responses, specifically when they have adequate cognitive resources; only when resources are limited do participants respond to persuasive, but confining, messages (Laurin, Kay, Proudfoot, & Fitzsimons, 2013). In the current study, not only were participants immediately asked to help participate in the second study following the transgression, but the directions for the braiding task emphasized that the more the participant braided, the more their actions would benefit the researcher. Overtly being asked to repay their guilt did not motivate non-depleted participants to help their victim by braiding many loops. Indeed, the results showed that participants who were not ego-depleted and made to feel

guilty braided a number of loops on par with the low amount braided by participants who were depleted and not made to feel guilty.

Additionally, helping behavior in previous guilt studies has predominantly been measured by the dichotomous observed response of whether participants helped or not (Cunningham, Steinberg, & Grev, 1980), or by whether participants promised to help in the future (Graton et al., 2016, Study 1; Millar, 2002). Persistence of helping behavior has seldom been measured. What must be understood, then, are the mechanisms that allow guilt to both replenish and debilitate self-control.

Socially and emotionally, the guilt induction was successful. Participants in the guilt conditions reported higher levels of state guilt than participants in the no guilt conditions. But while both guilty groups acknowledged their remorse for the transgression, their active responses varied; participants in the no depletion / guilt condition braided significantly fewer loops than those in the ego-depletion / guilt condition. From a cognitive standpoint, the difference may depend upon the salience of the guilt induction in working memory. Participants in the ego-depletion condition were required to refrain from typing any letter “e” two letters away from another vowel, and to delete and retype any instances where they failed to do so; as such, the automaticity of their typing was impaired. The task not only utilized self-control resources, but may have also reduced the confidence the participants had in their typing accuracy when told that they had hit the “alt” key, causing the computer to freeze. Ego-depletion has been shown to reduce peoples’ ability to correctly distinguish deceptive statements from truthful statements (Reinhard, Scharmach, & Stahlberg, 2013), as well as increase the occurrence of false memories (Otgaar, Alberts, & Cuppens, 2012). Participants in the current study

who were depleted before the guilt event may thus have been less likely to question their culpability in the transgression than participants who were not depleted and then made to feel guilty. When the participants performed the subsequent braiding task, their need to make amends for the transgression and braid for the helping task was salient, causing them to focus on performing diligently and thoroughly the task at hand.

However, for those who were not ego-depleted and then made to feel guilty, the transgression itself may have been focused upon and kept in working memory as they performed the braiding task. Typing is a prevalent skill necessary to function in much of society (Keith & Ericsson, 2007), and the “alt” key is not frequently needed when typing; participants may have wondered if they actually hit the key. Previous studies have also shown that people who have been made to feel guilty are less likely to persist on deceptive tasks (Konoske, Staple, & Graf, 1979). Guilt has also been shown to cause participants to be less helpful when overtly coerced into action, specifically when they have substantial cognitive resources available (Graton et al., 2016). As such, the supposed transgression itself may have occupied the majority of working-memory resources during the braiding task; participants may have ruminated upon being directly asked to help repay their transgression, and their subsequent loss of control over the situation, rather than focusing on the task at hand. Indeed, guilt predominantly activates the prefrontal cortex, the area of the brain involved in executive functions, regulating the focus of working memory (Jankowski & Takahashi, 2014).

This is further supported by the significant main effect of guilt condition on level of state guilt. For all participants, state guilt was measured following the braiding task. As answering the questions occupied the majority of cognitive resources at that stage,

participants who had experienced guilt could then focus on their transgression and express their remorse. The lack of helping behavior by those in the no depletion / guilt condition may have amplified their reported levels of state guilt. Though not significant, participants in the no depletion / guilt condition reported higher state guilt than those in the depleted / guilt condition. Indeed, only state guilt scores for participants in the former condition were significantly higher than those in the no guilt conditions. Furthermore, the significant persistence on the braiding task exhibited by those in the depletion / guilt condition may have allayed some of their guilt, resulting in slightly lower state guilt scores.

As to why time of persistence was so heavily skewed regardless of condition, it is possible that it was not made clear enough that participants could stop at any time. Participants may have also believed that since they were now participating in a “different” study, stopping early may have been rude or inappropriate. Participants may have also been affected by power distance; research has shown that ego-depletion causes participants to value hierarchy and authority (Van Berkel, Crandall, Eidelman, & Blanchard, 2015). In regards to why participants who were not depleted but made to feel guilty braided few loops, but did not stop early, it may have been that not braiding allowed for passive reactance. The participants may not have wanted to perform a partially forced task to repay their victim, but they still felt guilty as evidenced by state guilt scores. However, stopping the task early required an active response that may have added to the negative feelings associated with their guilt. As such, participants may not have wanted to stop before the researcher dictated that the study was over.

This study was limited in that the second task required the use of a research assistant to prevent bias in teaching the participant how to braid. This might have kept the participants from feeling as though their performance on the braiding task was directly helping their victim, the initial researcher. The task also didn't help to fix the actual transgression. Future research should focus on having the guilty participants help repair the damage that they created so that their efforts are more relevant to their transgression.

Overall, guilt can help motivate people overcome the loss of self-control resources to compensate others for transgressions. Feeling bad about causing someone else's loss gave the depleted participants a boost of self-control so that they could more thoroughly perform a task to help repay their debts. However, experiencing guilt can also cause people to exhibit reactance when overtly asked for assistance (Graton et al., 2016); participants who were not depleted but made to feel guilty performed on par with participants who were depleted but not made to feel guilty. In a broader sense, these results can help us understand and predict peoples' actions following transgressions. Reparations that require self-control may not be fulfilled as thoroughly if the transgressor has not recently exerted self-control in some other way. This may also explain why projects that require self-control, such as diets, fail. When people experience guilt for a separate action (e.g. not returning a friend's phone call, causing a problem at work) without recent expenditure of self-control, they may be more likely question the restrictions placed upon them by something such as a diet and give in to impulses (e.g. eat sweets or drink alcohol). However, if people have exerted self-control recently by exercising or accomplishing chores around the house, they may be more likely to call upon further self-control resources by feeling guilty about the thought of cheating on

their diet and stop themselves from eating more. This study shows the intricate nature of the emotion of guilt; it can deplete or redeem, depending upon the mental fatigue a person has already experienced.



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*IRB Approval Letter*



**EXEMPTION NUMBER: 16-X031**

To: Brandon Boring  
 From: Institutional Review Board for the Protection of Human  
 Subjects, Debi Gartland, Chair  
 Date: Monday, October 19, 2015 *ALT*  
 RE: Application for Approval of Research Involving the Use of  
 Human Participants

Office of Sponsored Programs  
 & Research

Towson University  
 8000 York Road  
 Towson, MD 21252-0001

t. 410 704-2236  
 f. 410 704-4494  
[www.towson.edu/ospr](http://www.towson.edu/ospr)

Thank you for submitting an application for approval of the research titled,  
*The Emotion of Guilt as a Motivator: Can Transgressors Overcome Ego-  
 Depletion to Help Their Victims*

to the Institutional Review Board for the Protection of Human Participants  
 (IRB) at Towson University.

Your research is exempt from general Human Participants requirements  
 according to 45 CFR 46.101(b)(2). No further review of this project is  
 required from year to year provided it does not deviate from the submitted  
 research design.

If you substantially change your research project or your survey  
 instrument, please notify the Board immediately.

We wish you every success in your research project.

CC: Justin Buckingham  
 File

*Informed Consent*

## Informed Consent Form

I \_\_\_\_\_, agree to participate in the study “Hand-Eye Coordination and Dexterity 2” conducted by Masters student Brandon Boring and Professor Dr. Justin Buckingham of the Psychology Department at Towson University.

We are conducting a study investigating the relationship between hand-eye coordination and dexterity. In this study your typing ability will be assessed as you copy a provided essay.

Participation in this study is voluntary, and is associated with no known health risks. You must be at least 18 years old to participate. The study will take about 60 minutes to finish. If you feel uncomfortable at any time during this study you may stop the session. Your information will be kept anonymous. Your name will be matched to a random number, and this will be deleted at the end of the semester. Only researchers associated with this study will view the information given.

If you have any questions regarding this study, please call me at (410) 704-5473, my advisor Dr. Justin Buckingham at (410) 704-3214, or the Chairperson of Towson University’s Institutional Review Board for the Protection of Human Participants, Dr. Debi Gartland, at (410) 704-2236.

---

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Signature of Participant)

Thank you, your participation is greatly appreciated.

Sincerely,

Brandon Boring  
Department of Psychology  
Towson University  
Towson, Maryland 21252

Note: “THIS PROJECT HAS BEEN REVIEWED BY THE INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN PARTICIPANTS AT TOWSON UNIVERSITY. “

*False Study Informed Consent*

## Informed Consent Form

I \_\_\_\_\_, agree to participate in the study “Arthritis and Hand Endurance” conducted by Masters student Brandon Boring and Professor Dr. Justin Buckingham of the Psychology Department at Towson University.

We are conducting a study investigating the relationship between hand muscle endurance and dexterity to help determine ways to ease arthritis pain. In this study your typing ability will be assessed as you copy a provided essay.

Participation in this study is voluntary, and is associated with no known health risks. You must be at least 18 years old to participate. The study will take about 30 minutes to finish. If you feel uncomfortable at any time during this study you may stop the session. Your information will be kept anonymous. Your name will be matched to a random number, and this will be deleted at the end of the semester. Only researchers associated with this study will view the information given.

If you have any questions regarding this study, please call me at (410) 704-5473, my advisor Dr. Justin Buckingham at (410) 704-3214, or the Chairperson of Towson University’s Institutional Review Board for the Protection of Human Participants, Dr. Debi Gartland, at (410) 704-2236.

---

(Date)

(Signature of Participant)

Thank you, your participation is greatly appreciated.

Sincerely,

Brandon Boring  
Department of Psychology  
Towson University  
Towson, Maryland 21252

Note: “THIS PROJECT HAS BEEN REVIEWED BY THE INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN PARTICIPANTS AT TOWSON UNIVERSITY. “



*Appendix A*

## Control Directions:

For the first part of this study, we will assess your hand-eye coordination and finger dexterity. The ability to read while typing has been shown to be a thorough gauge of one's hand-eye coordination in multiple studies, but none have measured typing speed. We hypothesize that those with high levels of hand-eye coordination will be able to type faster than those with low levels. To test this you will copy as much of the provided text as you are able in 6 minutes.

It is imperative that you follow the directions precisely. Failure to do so will jeopardize the results and could affect your participation in the study. The researchers assume that you have a basic ability to type using a computer keyboard. If you are not capable of this task, please inform the researcher immediately. The reason for this is that there is a glitch in the Medialab program being used for this study. Pressing the "alt" key freezes the computer and deletes all stored data, so please be careful not to hit that key. The following text is taken from *Walden* by Henry David Thoreau. Published in 1854, the author spent two years living in the woods in as basic means as possible. The book focuses on themes of nature, simplicity, and self-reliance. Its verbose language is ideal for typing exercises such as this.

When you have read and understood these directions, click "Continue" and your time will begin.

## Ego-Depletion Directions:

For the first part of this study, we will assess your hand-eye coordination and finger dexterity. The ability to read while typing has been shown to be a thorough gauge of one's hand-eye coordination in multiple studies, but none have measured typing speed. We hypothesize that those with high levels of hand-eye coordination will be able to type faster than those with low levels. To test this you will copy as much of the provided text as you are able in 6 minutes. Try to make sure that you are as accurate as possible. To make this a more reliable measure of your hand-eye coordination, DO NOT type "periods" or any "e" that is two letters before or after another vowel. For example, you would type the "e" in the word "they", but not in the word "student". If you do accidentally type one of these, please delete it immediately.

It is imperative that you follow the directions precisely. Failure to do so will jeopardize the results and could affect your participation in the study. The researchers assume that you have a basic ability to type using a computer keyboard. If you are not capable of this task, please inform the researcher immediately. The following text is taken from *Walden* by Henry David Thoreau. Published in 1854, the author spent two years living in the woods in as basic means as possible. The book focuses on themes of nature, simplicity, and self-reliance. Its verbose language is ideal for typing exercises such as this.

When you have read and understood these directions, click "Continue" and your time will begin.

*Appendix B*

## STEP 1

Hold the base vertically with one of the yellow sides facing you.

## STEP 2

Take the yellow strand of gimp farthest away from you and make a loop by pulling it over the top of the base towards you, securing the loop to the base with your finger. The loop should be approximately ½ inch in diameter.

## STEP 3

Caution: Make sure that the loops do not intersect each other when performing this step.

Pull the other yellow strand over the top of the base to the opposite side to make a second loop, again being sure to secure the loop with your finger. Now there should be 2 parallel loops of the same color and same size.

## STEP 4

Take the end of the black strand of gimp on your left and thread it over the near yellow loop and under the far yellow loop.

## STEP 5

Caution: Make sure that the gimp remains flat or a stitch will become twisted when tightened.

Take the end of the black strand of gimp on your right and thread it over the near yellow loop and under the far loop.

## STEP 6

Tighten all of the strands by pulling them away from the base simultaneously, forming a square box.

## STEP 7

Repeat Steps 1-6

*Appendix C*

Participant \_\_\_\_\_

**Endurance Task**

On a scale of 1 (*not enjoyable at all*) to 5 (*very enjoyable*), how enjoyable was this task?

1   2   3   4   5

On a scale of 1 (*not difficult at all*) to 5 (*very difficult*), how difficult was this task?

1   2   3   4   5

Have you ever used these materials to braid before today? Yes No

\_\_\_\_\_

\_\_\_\_\_

*Curriculum Vitae***Brandon Boring**

Department of Psychology  
Towson University  
Towson, MD 21252  
240-460-7938  
Email: [bborin4@students.towson.edu](mailto:bborin4@students.towson.edu)

**Education**

- |      |  |
|------|--|
| 2016 | M.A. (Expected), Towson University, Towson, MD<br>Experimental Psychology Thesis – <i>The emotion of guilt as a motivator:<br/>Can transgressors overcome ego-depletion to help their victims?</i> |
| 2006 | B.A., McDaniel College, Westminster, MD<br>Dual Major in Biochemistry  |

**Grants, Honors, and Awards**

- |      |   |
|------|---|
| 2016 | GSA Travel Grant (\$500)                      |
| 2005 | Undergraduate Research Grant (\$800)          |
| 2003 | Beta Beta Beta, Biology Honor Society         |
| 2002 | Full Academic Scholarship to McDaniel College |

**Academic and Research Experience**

- |                |   |
|----------------|---|
| 2014 - present | <b>Graduate Assistant</b> to Program Director of Experimental Psychology<br>Department of Psychology, Towson University, Towson, MD<br>Assisted in the development of new studies<br>Organized and produced materials necessary for conducting studies<br>Supervised undergraduate students in the Social lab<br>Maintained computers in the Social lab<br>Drafted and implemented IRB protocols<br>Assisted in the drafting of manuscripts for publication<br>Assisted in the admissions process for the Masters program<br>Assisted in the hiring of new faculty<br>Created posters, flyers, and spreadsheets |
|----------------|---|

- 2013 - 2014      **Research Assistant** – Buckingham Social Lab  
 Department of Psychology, Towson University, Towson, MD  
 Conducted studies as an assistant  
 Assisted in the development of new studies for the lab
- 2011 - 2013      **Assistant Manager** – Flow Cytometry Core Lab  
 Department of Rheumatology, Johns Hopkins University, Baltimore, MD  
 Coordinated the use of the cytometer for all researchers on  
 campus  
 Operated and maintained the cytometer  
 Calibrated the software used to analyze the cytometer data
- 2008 - 2013      **Laboratory Technician** – Scleroderma Center  
 Department of Rheumatology, Johns Hopkins University, Baltimore, MD  
 Developed protocol for translational research study of the  
 autoimmune disease Scleroderma  
 Acquired patient blood samples and carried out protocol using  
 appropriate laboratory techniques  
 Meticulously input and updated patient and experimental data  
 Analyzed data and interpreted results  
 Cataloged, ordered, and maintained inventory  
 Maintained a clean and organized work space
- 2005              **Laboratory Technician** – Microbiology Lab  
 Department of Biology, McDaniel College, Westminster, MD  
 Grew and maintained cell cultures  
 Examined cells using microbiological techniques  
 Maintained a clean and organized work space

### Teaching Experience

- 2015              **Teaching Assistant** – Social Psychology  
 Graded assignments  
 Graded exams  
 Proctored exams
- 2015              **Teaching Assistant** – Self-Concept & Self-Esteem  
 Assisted the professor in answering questions during lecture  
 Gave a lecture on the topics of Guilt and Shame  
 Proctored exams  
 Graded assignments  
 Graded exams  
 Evaluated student posters

**Manuscripts in Preparation**

**Boring, B.L.**, & Buckingham, J.T. *Guilt, shame, and contingencies of self-worth.*

**Boring, B.L.**, Buckingham, J.T., Weber, Andrea M. & Smith LeBeau, L. *Beyond comparison: Relationship evaluation processes and satisfaction.*

**Poster Presentations**

**Boring, B.L.** (April 2016). *The emotion of guilt as a motivator: Can transgressors overcome ego-depletion to help their victims?* Poster to be presented at the Towson University Undergraduate and Graduate Student Research Expo in Towson, Maryland.

**Boring, B.L.**, & Buckingham, J.T. (March 2016). *Guilt, shame, and contingencies of self-worth.* Poster presented at the Eastern Psychological Association Conference in New York, New York.

Buckingham, J.T., **Boring, B.L.**, Zilka, J., Colby, K.A., & Hewitt, S. (March 2016). *Comparing self-compassion and self-affirmation.* Poster presented at the Eastern Psychological Association Conference in New York, New York.

Buckingham, J.T., & **Boring, B.L.** (March 2015). *Beyond comparison: Relationship evaluation processes and satisfaction.* Poster presented at the Eastern Psychological Association Conference in Philadelphia, Pennsylvania.

**Skills**

*Software:* SPSS, MediaLab, DirectRT, Qualtrics, Microsoft Office (Powerpoint, Word, Excel), Biopac Acqknowledge, FCS Express

*Hardware:* Biopac MP100/150, FACS Aria

*Techniques:* Flow Cytometry, ELISA, RT-PCR, Gel Electrophoresis, Immunoprecipitation, Cell Culture

