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This study examined the effects—on mood and subsequent prosocial behavior—of a prosocial behavioral manipulation in individuals who varied in levels of borderline personality disorder traits. Female undergraduate participants (final  $N = 230$ ) were randomly assigned to either write an encouraging letter to a person experiencing hardship (“prosocial” condition) or to write a letter describing their typical day (control condition). Baseline measurements of mood (using the Positive and Negative Affect Scale [PANAS]) were taken and compared with those obtained postmanipulation. Subsequent prosocial behavior was measured in two laboratory tasks that were sequential and in a constant order. As expected, participants in the prosocial condition experienced more positive mood and more prosocial behavior after the manipulation, compared to the control manipulation, but there were no differential effects related to level of borderline traits.

A PROSOCIAL MANIPULATION PRODUCES INCREASES IN POSITIVE  
AFFECT AND PROSOCIAL BEHAVIOR, BUT NOT  
RELATED TO BORDERLINE TRAITS

by

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## CHAPTER I

### INTRODUCTION

Every man must decide whether he will walk in the light of creative altruism or in the darkness of destructive selfishness.

—Martin Luther King Jr.

Borderline Personality Disorder (BPD) is typically characterized by *inter alia*, fear of abandonment, intense periods of dysphoria, and unstable interpersonal relationships (American Psychiatric Association, 2013). The dysphoria experienced by those suffering from BPD is unique in that it involves intense feelings of sorrow, along with rage, pain, depression, anxiety, and emptiness (Reed, Fitzmaurice, & Zanarini, 2012). The low tolerance for distress and intense dysphoria that typify BPD often lead to unhealthy coping mechanisms, such as substance abuse, bulimia, and non-suicidal self-injurious (NSSI) behavior (e.g., “cutting”). Because of the research described above, it was predicted that BPD traits would have a significant direct correlation with premanipulation negative affect and significant inverse correlation with premanipulation positive affect. A key component of Dialectical Behavior Therapy, the only empirically validated treatment for BPD, is the teaching of distress tolerance skills (Linehan, 2015; McKay, Wood, & Brantley, 2007). One of the many distress tolerance strategies suggested for individuals with BPD is contribution, or prosocial behavior. The mood-enhancing effects of prosocial behavior on typical individuals are well-established (e.g.,

Dunn, Aknin, & Norton, 2008; Glomb, Bhave, Miner, & Wall, 2011; Lyubomirsky, Sheldon, & Schkade, 2005), suggesting that it could be an especially effective strategy for individuals with BPD hoping to improve mood and lessen distress. Most people feel positive affect after engaging in prosocial behavior. This has been referred to as the “warm glow” (Dunn, Aknin, & Morton, 2008; Moll et al., 2006; Young, Chakroff, & Tom, 2012). Therefore, prosocial behavior is very reinforcing. This can lead to further prosocial behavior and can, therefore, create a positive feedback loop of continued prosocial behavior (Layous, Nelson, Kurtz, & Lyubomirsky, 2017). Thus, the clinical application of using prosocial behavior to help individuals with BPD is mood improvement, which has a beneficial effect on distress tolerance.

#### *Prosocial Behavior Is a Powerful Mood Enhancer*

Prosocial behavior is defined very broadly as a “category of acts that are defined by some significant segment of society and/or one’s social group as generally beneficial to other people” (Penner, Dovidio, Piliavin, & Schroeder, 2005). Therefore, prosocial behavior could include actions to benefit an individual, a group, or the world in general, as well as cooperative behavior (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007).

There is much support in the scientific literature for the idea that prosocial behavior facilitates happiness in healthy individuals (Dunn, Aknin, & Norton, 2008). Helping behavior can increase positive mood and well-being (Glomb, Bhave, Miner, & Wall, 2011; Lyubomirsky, Sheldon, & Schkade, 2005). Likewise, prosocial behavior is

associated with better mood and better overall mental health (Raposa, Laws, & Answell, 2016). Research suggests that prosocial behavior can alleviate symptoms of depression (Schacter & Margolin, 2018; Van Willigen, 2000). These mood enhancement benefits of prosocial behavior lead to the question of whether such behavior could be beneficial in the treatment of other mental illnesses, such as Borderline Personality Disorder. Because BPD is characterized by intense dysphoria and unstable mood (APA, 2013), the use of prosocial behavior to improve mood is intriguing. Research suggests that prosocial behavior produces activation in the reward center of the brain, causing people to feel what has been described as a “warm glow” after engaging in prosocial behavior (Moll et al., 2006). My study predicted that a prosocial manipulation would cause mood improvement, as defined by greater positive affect and/or less negative affect as compared to the control condition.

*Prosocial Behavior Is Suggested as a Distress Tolerance Strategy in Dialectical Behavioral Therapy*

While we know that prosocial behavior is beneficial to both healthy individuals and those who are depressed, the BPD treatment literature suggests that prosocial behavior could be beneficial to the borderline population as well. Dialectical Behavioral Therapy (DBT), the standard and empirically validated treatment for Borderline Personality Disorder, focuses on providing skills and strategies to manage difficult emotions (Linehan, 2015; McKay et al., 2007). “Contributing” is suggested as one of the strategies in the Distress Tolerance module of the DBT skills training (Linehan, 2015; McKay et al., 2007). The module describes two examples of “contributing” as volunteer

work or simply doing something nice for someone else (Linehan, 2015; McKay et al., 2007). Thus, DBT suggests that doing something kind for others can make a difference to the world—and to one’s own ability to tolerate distress. Given that encouraging prosocial behavior is already part of the standard treatment for BPD, it would be helpful to know, for purposes of further research and for development of treatment protocols, whether prosocial behavior is one of the “active ingredients” of DBT. There is very little dismantling research with regard to DBT, presumably because of its complexity (Dewe & Krawitz, 2007; Rizvi, Steffel, & Carson-Wong, 2013; Widiger, 2000). The inclusion of contribution as one of the methods of distress tolerance within DBT suggests that the use of prosocial behavior should be especially beneficial for individuals higher in BPD traits. Moreover, the negative affect and dysphoria that characterize BPD suggested that those higher in BPD traits would especially benefit from the use of prosocial behavior as a method of mood-enhancement.

The present study examined the receptivity of individuals higher in BPD traits to mood change following a prosocial manipulation; it was posited that the affective instability (APA, 2013) of individuals higher in BPD traits would make these individuals more receptive to the mood-enhancing effects of prosocial behavior compared to the presumably healthy individuals in the sample. Moreover, pilot work revealed that individuals higher in BPD traits had greater decreases in negative mood, as measured by the Profile of Mood States-Short Form (POMS-SF; Curran, Andrykowski, & Sudts, 1995), when compared to other individuals in the sample. Thus, it was predicted that

mood improvement (defined as greater positive affect and/or less negative affect measured by the Positive and Negative Affect Scales) would vary across the continuum of borderline traits and in response to the randomly assigned study manipulation (control or prosocial), creating a significant interaction.

*Individuals with BPD May Be Less Likely to Engage in Prosocial Behavior*

Research suggests that individuals with BPD may be less likely to engage in prosocial behavior despite its mood-enhancing benefits. Indeed, a meta-analysis examining facets of the Five Factor model of personality, using self-report measures, (Samuel & Widiger, 2008) reveals that BPD is negatively correlated with altruism ( $r = -.19$ ). Likewise, pilot work for the current study revealed that hypothetical charitable donations were negatively correlated with borderline traits in that sample,  $r(93) = -.24$ . The literature also reveals that individuals with BPD are more likely to engage in *antisocial* behavior, such as violence and aggression. Indeed, one study found that 73% of individuals diagnosed with BPD had engaged in violent behaviors over the course of the past year (Newhill, Eack, & Mulvey, 2009).

Based upon previous research and pilot work, persons with BPD would likely exhibit less prosocial behavior than other individuals. The reasons postulated are complex and not fully understood. Prosociality is correlated with the Five Factor Model trait of Agreeableness (Ashton, Paunonen, Helmes, & Jackson, 1998). BPD is characterized by low Agreeableness (Samuel & Widiger, 2008), which provides support to the idea that individuals with BPD are less likely to engage in prosocial behavior. Individuals with

BPD are usually high in Neuroticism and experience intense dysphoria. Research indicates that distress reduces the likelihood of prosocial behavior (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). Moreover, high levels of neuroticism are correlated with less prosociality towards people outside of one's own family (Ashton, Paunonen, Helmes, & Jackson, 1998). Because individuals with BPD experience distress and dysphoria much more than the general population, it is logical that they would be less likely to engage in prosocial behavior.

In addition, the appendix to the DSM-5, which advocates a dimensional analysis of personality, posits that individuals with BPD lack empathy (APA, 2013). Like Agreeableness, empathy is correlated with prosocial behavior (Eisenberg & Miller, 1987; Lim & DeSteno, 2016). In contrast, low levels of empathy are correlated with antisocial behavior (Gerdes, Segal, Jackson, & Mullins, 2011). Research suggests that emotionality is correlated with empathy, but poor emotion regulation, a hallmark of BPD, is a negative predictor of empathy and/or empathic responses (Eisenberg, Wentzel, & Harris, 1998).

The assertion that individuals with BPD lack empathy is supported by some studies, but the results are quite mixed. For example, Dziobek et al. (2011) concluded that individuals with Borderline Personality Disorder lack both cognitive and affective empathy when compared to healthy controls. *Cognitive empathy* is also known as perspective taking. Cognitive empathy can be defined as the ability to understand a situation from someone else's point of view (Lazarus, Cheavens, Festa, & Rosenthal, 2014). *Affective empathy* is described as emotional concern for someone else (Lazarus et

al., 2014). For example, affective empathy is the experience of distress at seeing a homeless person shivering in the cold. Cognitive empathy is the ability to understand what the homeless person is thinking and/or feeling. Individuals with BPD tend to focus obsessively on themselves and have poor insight into the emotions experienced by others (Lazarus et al., 2014).

In contrast to the Dziobek et al. (2011) study suggesting that individuals with BPD lack both cognitive and affective empathy, other studies have shown deficits in cognitive empathy, but not affective empathy in individuals with Borderline Personality Disorder (Harari, Shamay-Tsoory, Ravid, & Levkovitz, 2010). Similarly, a study of BPD families found that *the mothers* of BPD women tend to lack affective empathy compared to other mothers, whereas *the daughters* (who had BPD) had higher levels of affective empathy and lower levels of cognitive empathy compared to other women (Guttman & Laporte, 2000). Moreover, some research suggests that poor relationship quality among persons with BPD may be due to reduced cognitive empathy, combined with higher personal distress and *higher* affective empathy (Jeung & Herpertz, 2014). Indeed, the inability to distinguish between one's own personal distress and that of others is maladaptive and could function to reduce prosocial behavior (Decety & Jackson, 2006).

Cooperation is another facet of prosocial behavior that is particularly problematic for individuals with BPD (King-Casas et al., 2008). In the King-Casas et al. (2008) study, participants reacted to various investment offers; those with borderline pathology did not perform well in negotiations. They reacted angrily and irrationally in response to standard

negotiating techniques, such as “lowballing” and refused to respond to “coaxing” (efforts to re-engage them in negotiating). Moreover, individuals with BPD are often unable to forgive perceived slights (Hepp et al., 2014). Some researchers theorize that even these difficulties with cooperation stem from a lack of empathy in individuals with BPD (Dziobek et al., 2011).

Context matters when measuring cooperation and prosocial behavior. For example, social exclusion is associated with a drop in prosocial behavior even for presumably healthy individuals (Twenge, Baumeister, DeWall, Ciarocco, & Bartlels, 2007). Likewise, healthy individuals experience a comparative deficit in prosocial behavior following a cognitive depletion task, such as thought suppression (Osgood & Muraven, 2015). The effects of distress and emotion dysregulation are important in the context of BPD because those with the disorder frequently experience emotion dysregulation compared to other individuals (Gratz, Dixon-Gordon, Breetz, & Tull, 2013). This constant distress may decrease the ability to empathize (Eisenberg & Miller, 1987), to interact effectively with others (Gratz et al., 2013; Lopes, Salovey, Côté, Beers, & Petty, 2005), and may also help explain why BPD is negatively correlated with altruism.

Thus, the reasons why research indicates that individuals with BPD are less altruistic than other individuals are nuanced. Accordingly, this present study did not examine any moderating or mediating variables that might lie between BPD and level of prosocial behavior. Because of this complexity, it is difficult to even predict how

receptive individuals with BPD will be to the mood enhancing effects associated with prosocial behavior, let alone reasons for this possible receptivity. Thus, it was predicted that individuals higher in BPD traits will demonstrate less prosocial behavior than other individuals in our sample.

*The Mood-Enhancing Effects of Prosocial Behavior Are Reinforcing and May Lead to Additional Prosocial Behavior*

Behaving in a prosocial manner toward others elicits more prosocial responses to said behavior, leading to more positive mood and, possibly, even more prosocial behavior (Thomaes, Bushman, De Castro, & Reijntjes, 2012). Such a process would be highly beneficial to individuals with BPD. Because prosocial behavior produces activation in the reward center of the brain, it can be very reinforcing (Moll et al., 2006). The phenomenon of prosocial behavior begetting further prosocial behavior has been described as “an upward spiral of compassion” (Thomaes et al., 2012). Flynn, Beron, and Underwood (2015) examined the relationship between prosocial traits and borderline pathology in a longitudinal study of children as they progressed through childhood and adolescence. As expected, being in the group of children deemed to be “more prosocial” by teachers was correlated with less borderline pathology for teen girls (Flynn et al., 2015). One explanation put forward by the study authors was the notion that girls behave in a prosocial manner to reduce stress in interpersonal relationships. The authors speculate that “being on a high prosocial trajectory is protective against both internalizing problems and borderline personality features by way of positive peer relations” (Flynn et al., 2015).

In this way, prosocial behavior may be reinforcing: prosocial behavior leads to better relationships, leading to more prosocial behavior.

There are various theories as to why prosocial behavior can lead to further prosocial behavior, thus creating a positive feedback loop. As discussed previously, helping behavior causes participants to feel a “warm glow” and, therefore, feel motivated to engage in more prosocial behavior (Dunn, Aknin, & Norton, 2008; Young, Chakroff, & Tom, 2012). This is perhaps what Linehan (2015) envisioned when she formulated the idea of using prosocial behavior (or “contribution”) as a method of distress tolerance. Thus, the act of helping others will give participants a “warm glow” and, presumably, better mood. The positive reinforcement provided by the “warm glow” should then lead to more prosocial behavior. Increasing prosocial behavior in individuals with BPD could have additional beneficial consequences in addition to mood enhancement. As prosocial behavior increases, interpersonal interactions should improve as well, providing another reinforcement mechanism.

In addition to the “warm glow” theory articulated above, prosocial behavior may lead to further prosocial behavior due to our desire to avoid cognitive dissonance. Cognitive dissonance occurs when we engage in behavior, assess that behavior in the context of our values, and note a difference between our values and behavior, resulting in mental discomfort (Stone & Cooper, 2001; Thibodeau & Aronson 1992). In other words, if we view ourselves as a prosocial person, we are more likely to behave prosocially to avoid conflict with our self-perceived identity. (Lyubomirsky, Sheldon, & Schkade,

2005; Mullen & Monin, 2016; Stone & Cooper, 2001). Thus, it can be helpful to reinforce someone's self-perception as a prosocial being if the goal is to increase prosocial behavior. For this reason, the manipulation in this study concluded by thanking participants for their kindness (prosocial condition) or for their accuracy (control condition), presumably relating the condition to their self-perception.

While some research indicates that prosocial behavior (and the recollection of the same) begets further prosocial behavior (Dunn et al., 2008; Young, Chakroff, & Tom, 2012), other research indicates that the recollection of "good deeds" will cause participants to feel "licensed" to refrain from further prosocial behavior or even engage in antisocial behavior (Conway & Peetz, 2012; Gneezy, Imas, Brown, Nelson, & Norton, 2012). This phenomenon is referred to as the licensing effect (Mullen & Monin, 2016). The literature reveals that individuals are more likely to exhibit prosocial behavior when they consider the connection between their prior prosocial behavior and their values. In contrast, individuals are more likely to exhibit licensing when they think concretely (e.g., a list of prior good deeds) about their prior prosocial behavior (Mullen & Monin, 2016). For example, someone may recount a story about having helped someone to change a tire earlier in the week and feel that she has accomplished her "good deed" for the week and, therefore reason that she does not need to stop again when she sees someone else on the side of the road. Conversely, if the person who changed the tire considers helping others to be a core value crucial to her identity, then she will be more

likely to stop again to help someone. This illustrates how the concepts of licensing and cognitive dissonance can intersect.

The likelihood of licensing occurring varies by context. Per the literature, licensing is less likely to occur if the individual has engaged in “costly” prosocial behavior, such as giving up a financial reward (Greezy, Imas, Brown, Nelson, & Norton, 2012). The Conway and Peetz (2012) study indicates that licensing is also more likely to occur when participants are primed to recall very recent good deeds, rather than focusing on the more “abstract” concept of being an “honorable” or “righteous” person. For these reasons, the prosocial manipulation in the present study did not include listing recent good deeds. Instead, the prosocial manipulation consisted of an actual prosocial task in the laboratory: writing a kind and encouraging letter to a person experiencing distress for a period of ten minutes, using at least 300 characters. Although ten minutes of time does not necessarily equate to the contribution of money, as in Gneezy et al. (2012), using a ten-minute writing manipulation could cause participants to feel that they have more effort invested in the process than a shorter writing manipulation; therefore, a period of ten minutes was required for each letter. Following this prosocial letter-writing task, participants in the prosocial manipulation were informed, via Qualtrics, that their kindness and encouragement to others was appreciated (Appendix B). This wording, hopefully, reinforced participants’ perceptions of themselves as prosocial beings after engaging in this prosocial laboratory task. Finally, participants in the prosocial condition were given a letter-writing prosocial task so that they could experience the “warm glow”

of prosocial behavior in between mood measurements and prior to the study's prosocial measures.

### *BPD Diagnosis Versus High BPD Traits*

Individuals without an actual diagnosis of Borderline Personality Disorder, as defined by the *DSM-5*, may nonetheless experience emotion dysregulation, distress, and impairment if they are higher in borderline traits than the general population (Zielinski & Veilleux, 2014). The present study oversampled for individuals higher in BPD traits (Higher Borderline Traits = HBTs) and data were analyzed using multiple regression, in order to provide a full dimensional analysis of BPD traits. Assessing BPD traits in a continuous, rather than dichotomous, manner is preferred because the research literature suggests that personality is dimensional—not categorical (APA, 2013; Widiger, 2011). This is preferred because BPD traits can cause distress even if an individual does not meet the arbitrary cut-off of five out nine traits as listed in the *DSM-5* (APA, 2013; Bhatia, Davila, Eubanks-Carter, & Burckell, 2013; Zielinski & Veilleux, 2014). A dimensional approach to BPD allows for the assessment of mood and prosocial behavior across varying levels of BPD traits. Indeed, the number of criteria (five of nine) needed to give a diagnosis of BPD has not been empirically validated; BPD is a heterogeneous disorder (Rebok et al., 2015). Because the diagnostic criteria are polythetic (five of nine criteria required), there are 126 different combinations of how a person could receive a BPD diagnosis (Skodol et al., 2002). For logistical reasons, no study has examined which combination of BPD diagnostic criteria in each of the study's participants are linked to

specific study results. For all these reasons, borderline traits were examined across a continuum, with over-sampling for those high in borderline traits.

The present study examined the receptivity of individuals higher in BPD traits to a prosocial manipulation; it was posited that the intense dysphoria and negative affect characterizing BPD would make these individuals less likely to engage in prosocial behavior, as compared to the presumably healthy individuals in the sample. Moreover, it was predicted that the theoretical empathy deficits described in the literature and the DSM-5 (APA, 2013) would also make individuals higher in BPD traits less likely to engage in prosocial behavior even after a prosocial manipulation. Thus, it was predicted that prosocial behavior would vary across the continuum of borderline traits and in response to the randomly assigned study manipulation (control or prosocial), creating a significant interaction.

### *Goals and Hypotheses*

This study sought to address novel issues: whether a one-time prosocial behavior manipulation would be associated with more prosocial behavior and more positive affect (compared to the control condition) in participants, as well as whether this manipulation would have a differential impact on individuals according to their level of borderline traits. The study used a prosocial manipulation designed to elicit *both* positive mood *and* additional prosocial behavior.

It was predicted that this prosocial manipulation would cause participants to experience more positive affect and would cause an increase in prosocial behavior

compared to the control condition. My hypotheses for the study were: (1) Those receiving the prosocial manipulation will have greater positive affect and less negative affect (simple or main effect) between the premanipulation (Time 1) and postmanipulation (Time 2) administrations of the PANAS compared to the participants in the control condition; (2) Those receiving the prosocial manipulation will exhibit increased prosocial behavior on two subsequent tasks when compared to those receiving the control task; (3) Borderline traits will be negatively correlated with prosocial behavior, as measured by the fishing game and charitable donations; (4) Borderline traits will be positively correlated with negative affect and negatively correlated with positive affect in premanipulation PANAS measures; (5) There will be a significant interaction between condition and borderline personality traits in improving mood. Those higher in borderline traits will derive greater benefit from the manipulation because of their greater propensity for dysphoria and their greater affective reactivity; (6) There will be a significant interaction between condition and borderline personality traits on the two tasks assessing prosocial behavior. Prosocial behavior will be greater for participants lower in BPD traits and less for participants higher in BPD traits, but the effect of the prosocial condition will moderate this relationship, creating a significant interaction. As described previously, research indicates that individuals higher in BPD traits are less altruistic (Samuel & Widiger, 2008) and less empathetic (APA, 2013).

## CHAPTER II

### METHOD

#### *Participants*

The study sample was comprised of 239 female undergraduates who received partial course credit in exchange for participation. The data of four participants were excluded because a fire drill sounded in the middle of the study. In addition, the data of another four participants were excluded due to computer difficulties. Finally, the data of one participant were excluded because she did not understand English well enough to follow the study's instructions. Thus, the final sample included 230 female participants ( $M_{\text{age}} = 19.12$ ,  $SD = 2.10$ ) with diverse ethnicity (see Table 1 for details).

Participants were required to be at least 18 years of age, as personality does not crystallize until this time (APA, 2013). Some participants signed up for the study on their own, using SONA. Other participants were recruited, via email, based upon their scores from the Wisconsin Personality Inventory–Borderline (WISPI-BOR).<sup>1</sup> To oversample for those who are higher in borderline traits, mass screening participants who scored at least .5 standard deviations above the mean were invited to participate in the study. If the participant responded positively to this E-mail invitation, she signed up for the study on

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<sup>1</sup> The reasons that participants enrolled in the study (i.e., due to seeing the study on SONA or due to receiving a recruitment email) were not tracked so data regarding the percentage of participants who were recruited and the percentage of participants who signed up on their own are not available.

SONA. Hence, it was not possible to track how many participants signed up as a result of the invitation. Approximately 75% of people with a diagnosis of Borderline Personality

Additional demographic information regarding the study participants is provided in Table 1 (Table 1 and all subsequent tables are located in Appendix A). Per random assignment, 117 participants were in the prosocial condition (see below) and 113 participants were in the control condition. Attempts to oversample HBTs were successful, as the sample's Personality Assessment Inventory-Borderline (PAI-BOR) mean score was 29.02, which is higher than the college sample norm ( $n = 1051$ ) ( $M=22.93$ ,  $SD=10.33$ ) (Morey, 1991). Trull (1995) suggests using a score of 38 as a cut-off on the PAI-BOR to indicate a high level of borderline features. The sample included a sizable number of HBTs, as 24.02% of the sample scored at 38 or above on the PAI-BOR, which was taken during the study.

*Power analysis.* In order to provide for an adequate number of participants, the power analysis requiring the largest number of participants was used. Pilot testing revealed an effect size of .09 with regard to condition. Other effect sizes were smaller. Accordingly, a modest effect size of .06 was used in calculating the number of participants necessary for the study. Using a two-tail test, a power of .80, and an effect size of .06, it was projected that 204 participants were needed, according to a power analysis using GPower software (Faul, Erdfelder, Lang, & Buchner, 2007). A total number of 235 participants was targeted based upon the assumption that approximately 15% of observations would need to be excluded due to computer and internet outage

issues, along with participant noncompliance. Specifically, participants' data were to be excluded for failing to answer more than 10% of the questions in a measure, such as the PANAS or the PAI-BOR, inattentive answering (as indicated by three incorrect answers from a scale designed to detect inattentive answering [Chapman & Chapman, unpublished measure, Appendix B]), completing the study in less than 20 minutes, or for writing that did not match the appropriate task [see below; independent raters were used]. Likewise, data were to be excluded if the participant correctly guessed the purpose of the study, that is, to determine whether the manipulation improves mood and/or increases prosocial behavior, coded by independent raters.

### *Materials*

#### *Wisconsin Personality Disorders Inventory–Borderline Features (WISPI-BOR).*

The WISPI-BOR (Klein, Benjamin, Rosenfeld, Treece, Husted, & Greist, 1993; Appendix B) contains 18 self-report items measuring borderline traits, using a 10-point Likert scale ranging from never/not at all to always/extremely. The WISPI-BOR is part of a larger measure, the Wisconsin Personality Inventory IV (WISPI-IV), which contains 214 self-report items concerning symptoms of DSM-IV personality disorders. The WISPI-IV has demonstrated excellent internal reliability and two-week test-retest reliability, as well as good discriminant and concurrent validity (Barber & Morse, 1994; Hyler et al., 1988; Klein et al., 1993; Millon, 1982). Although it is used less often than the PAI-BOR, it is, nonetheless, a reliable and valid measure, which is appropriate as a screening tool. Its use is also free of charge with the author's permission, which was

obtained. The WISPI-BOR was used to identify individuals in mass screening who scored .5 standard deviations above the mean on the Borderline subscale. These individuals were invited to participate in the study in an attempt to oversample HBTs from the student population.

*Positive and Negative Affect Schedule (PANAS).* The PANAS (Watson, Clark, & Tellegen, 1988) is a 20-item self-report measure of positive and negative affect (Appendix B). There are 10 items measuring positive affect and 10 items measuring negative affect. Participants were asked how they are currently feeling in regards to each of the 20 words, using a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). The PANAS has been shown to have good internal consistency with alpha coefficients ranging from .85 to .91 (Watson et al., 1988). The two scales measuring positive and negative affect have been shown to be largely uncorrelated (Watson et al., 1988). The PANAS was administered as a pre and post-measure of mood. The Basic Positive Emotion Scale score and Basic Negative Emotion Scale Score results were summed and averaged to create a mean positive and negative score for each participant. These scores were compared, pre and postmanipulation, using multiple regression with premanipulation affect as a control variable and postmanipulation affect as the dependent variable. The PANAS has been used in other studies to measure mood before and after a manipulation (Jacob, Ower, & Buchholz, 2013; Palmiero, Nori, Rogolino, D'Amico, & Piccardi, 2015).

Personality Assessment Inventory–Borderline Features (PAI-BOR). The PAI-BOR (Morey, 1991) is a 24-item self-report measure of borderline traits (Appendix B). Participants were asked to rate how accurately each item describes them on a 4-point scale—false, slightly true, mainly true, and very true. The PAI-BOR has been shown to have test-retest reliability of .73 and internal consistency of .84 (Trull, 1995). The Personality Assessment Inventory Professional Manual provides normative data for the PAI-BOR in a college sample ( $n = 1051$ ,  $M = 22.93$ ,  $SD = 10.33$ ; Morey, 1991). The PAI-BOR was administered at the time of the study and produced the BPD trait scores used in data analyses. In order to ensure that participants were purposefully answering all questions in the study, three questions designed to detect inattentive answering (Infrequency Scale, Chapman & Chapman, unpublished) were embedded into the PAI-BOR. The data of participants who responded inattentively to these three items were to be excluded from analysis; fortunately, no participants responded inattentively to all three questions, suggesting that the participants provided thoughtful responses.

*Prosocial manipulation versus control task.* Participants in the prosocial condition wrote a prosocial letter, spending ten minutes (and at least 300 characters) on the letter. Participants composed a letter of encouragement to a person facing a difficult situation. There were three choices of individuals to whom the letter could be addressed (58 participants in the prosocial condition wrote to Marissa; 43 wrote to Carlee, and 16 wrote to Mama Olga). These stories were excerpted from a website soliciting letters of encouragement for people in need of hope (<http://www.moreloveletters.com/the-letter->

requests/). In order to encourage focus upon the prosocial nature of this task, participants were instructed to write a helpful and encouraging letter (Appendix B). Participants were told that their letters would be sent to the recipient immediately following their participation in the study, and indeed the letters were sent in a bundle to the respective addresses of the individuals described in the website. Thus, this was a standardized laboratory manipulation using prosocial behavior in the form of an encouragement letter to elicit positive affect and further prosocial behavior. A recent study used the prosocial act of writing a letter of encouragement as a measure of prosociality (Nook, Ong, Morelli, Mitchell, & Zaki, 2016).

Participants in the control condition also completed a letter; their letter was addressed to the UNCG Dean of Students describing in great detail their typical day and was, purportedly, to be used by that office for informational purposes. These “control condition” letters were not actually sent, and this deception was disclosed in debriefing. Each participant, in both the experimental and control groups, was instructed to spend ten minutes (and at least 300 characters) on her letter.

*Budgeting task.* Based upon Lindsay and Creswell (2014) and Piff (2010),<sup>2</sup> this measure used a spending survey allocating 100% of a participant’s imaginary income to

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<sup>2</sup> The Osgood and Muraven (2015) study used the language: “How should a person spend his or her income...” and also used family income as a covariate. In this study, the measure was reworded so that it was clear that the participant is making the income allocation decisions—not someone else—and with her own income. In addition, an imaginary income of \$100,000 was stated in order to allow all participants to engage in charitable giving if they so choose, which should obviate the need for using the covariate of family income. Using this covariate could be problematic, as college students are unlikely to know their parents’ exact income.

nine spending categories: bills, food, clothing, luxury items, recreation, charity, travel, gifts, housing (Appendix B). The category of charitable giving was a covert measure of prosocial behavior. Participants were given an imaginary income (\$100,000) that was sufficiently high in order to allow for charitable giving. The budgeting question follows:

How would you spend your annual salary, given an annual salary of \$100,000? Please indicate the **percentage** of income you would spend annually on the expenses listed below. Please be sure that the sum of the percentages<sup>3</sup> totals 100%.

Recreation 0

Gifts (for friends & family) 0

Luxury Items 0

Housing 0

Food 0

Charitable Donations 0

Bills 0

Clothing 0

Travel 0

Education 0

Other 0

Total 0

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<sup>3</sup> Qualtrics was programmed to require that percentages sum to 100% before advancing to the next screen.

*Fishing game.* A modified<sup>4</sup> version of the Inquisit 4 measure used by Osgood and Muraven (2015), the “fishing game” is a computerized game in which participants were told that they are fishing with other participants (in different rooms) from a communal pond. The game measures prosocial behavior in that participants can choose to keep fish so that they can finish the study early (30 seconds earlier per fish) or they can choose to release fish to allow other players to leave early. In actuality, this had no effect on the amount of time spent completing the study. Participants received a debriefing regarding this deception at the conclusion of the experiment (Appendix B). As in the Osgood and Muraven (2015) study, participants were presented with a total of one to seven fish during each round. Participants were given the opportunity to either keep or release the fish during each round. They were instructed that releasing fish would allow the fish to reproduce and replenish the pond, as well as benefit another participant by allowing that person to leave the study 30 seconds earlier for each fish released. By contrast, retaining fish for oneself would purportedly allow the participant to leave 30 seconds earlier for each fish retained. Each participant was presented with a total of 150 fish during the

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<sup>4</sup> The fishing game was modified from its original version in the Osgood and Muraven (2015) study in that this study did not inform participants that they would be required to complete an unpleasant task at the close of the experiment: a 20-minute essay describing the floor, ceiling and walls of the experimental room. The Osgood and Muraven (2015) study informed participants that they could reduce their time spent on this unpleasant task by catching fish. Rather than telling participants that an unpleasant task follows, participants were simply told that catching fish allowed them to “officially” finish the study 30 seconds earlier. Participants were informed in their consent forms that they could leave the study at any time. The Osgood and Muraven (2015) study sought to measure a decrease in prosocial behavior following a cognitive depletion task whereas our study sought to elicit prosocial behavior; for this reason, the “threat” of an unpleasant task seemed inappropriate.

course of the fishing game. Participants could release some or all of the fish during each round; likewise, participants could retain some or all of the fish during each round.

This measure tapped into a slightly different construct than the budgeting task because it measured prosocial behavior in the form of participants' willingness to work cooperatively with others. Cooperative skills are particularly problematic for individuals with BPD (Hepp et al., 2014; King-Casas et al., 2008).

In our study, as in the Osgood and Muraven (2015) study, participants were told that they could help other participants leave early by releasing fish back into the pond. We had up to four separate small lab rooms (if all computers were available and working properly). We attempted to schedule three or four participants per time slot so it was likely that a participant would actually see other participants prior to the onset of the study. For solo participants (that is, no one else signed up for the time slot), research assistants were trained to say: "You're the first one here." Regardless of the number of participants per time slot (1, 2, 3, or 4), each participant was ushered into a room where she completed the study alone. The study results with regard to both measures of prosocial behavior—charitable giving and the fishing game—were analyzed separately.

*Filler task.* In order to prevent participants from guessing the true purpose of the study, one filler task from Inquisit 4.0 was used: the Tower of London. The Tower of London is a measure of executive functioning in children (Viterbori, Usai, Traverso, & De Franchis, 2015). This computerized set of tasks involves placing objects in a stated order; it is quite easy and should not have caused cognitive depletion.

### *Procedure*

Participants completed the experiment in a laboratory setting. A trained undergraduate research assistant ushered each participant separately into a small room (1, 2, 3, or 4 participants per time slot for practical reasons, that is, four small lab rooms) where she completed the study alone, using a Dell personal computer. Informed consent was obtained from each participant. The study was described in the written consent form and in the script, which was read to participants, as examining “writing, personality, and cognition” to disguise its true purpose. Each participant had the opportunity to take a copy of the consent form with her. Research assistants also clearly stated that the study data were anonymous and not linked to the participant’s name in any way. The study included one “filler” task to disguise its purpose. These precautions, hopefully, avoided, or at least reduced, the potential influence of social desirability bias. The study included a question at the conclusion: “What do you think this study was about?” to assess for suspicion. The data of any participant who correctly named the purposes of the study— (1) to examine whether the prosocial manipulation(s) elicit(s) further prosocial behavior; and (2) to examine whether the prosocial manipulation(s) improve(s) participants’ mood—were excluded from analysis. These determinations were made by two independent undergraduate raters. The raters used a written coding protocol indicating extent of accurate guessing as to the purposes of the study (Appendix B). The raters had excellent agreement with regard to the manipulation check (kappa statistic was .98), which consisted of determining whether participants responded to the manipulation by writing

about the appropriate topic (prosocial letter or typical day). The raters also had excellent agreement with regard to determining whether a participant guessed the true purpose of the study (kappa statistic was .90). No data were excluded on this basis, as no participant fully guessed the purposes of the study—to measure changes in mood and/or prosocial behavior caused by writing a prosocial letter.

During the study, the participants completed a series of computerized questionnaires using Qualtrics and Inquisit 4 software. The questionnaires contained the following: (1) a baseline measure of the PANAS; (2) demographic information questions (ethnicity, age,); (3) a filler task designed to measure executive functioning in children (“the Tower of London” from Inquisit 4.0); (4) the PAI-BOR; (5) a prosocial letter of encouragement to a person in need; *or* a “control task” letter describing participants’ typical day to UNCG Dean of Students—all per random assignment by Qualtrics; (6) a postmanipulation measure of mood, using the PANAS; (7) a budgeting task designed to covertly measure prosocial behavior in the form of charitable giving; (8) a computerized “fishing game” which measured cooperative prosocial behavior; (9) a question to assess for suspicion: “What do you think this study was about?”; and (10) debriefing. Each participant received two SONA credits, and the study lasted about 60 minutes or less. A flow chart showing the measures and order of the study is contained in Figure 1 (Appendix A).

## CHAPTER III

### RESULTS

#### *Preliminary Analyses*

As a check of the “prosocial” and typical day conditions, written participant responses were independently coded by two undergraduate research assistants as being either a “prosocial” or “typical day” writing task in order to insure compliance with instructions. The research assistants were blind to the study condition. The coded data were then compared to the assigned condition to verify that participants were writing about an appropriate situation during the writing task. Participant data that did not match up to the appropriate task were excluded from analysis. Accordingly, the data of one participant were excluded, as it did not respond to the prompt (the participant explained that she did not speak or write English well, but she was allowed to continue in the study to earn course credit). The kappa statistic for the undergraduate raters was excellent (.98).

Appropriate descriptive statistics are reported, including means, standard deviations, and ranges, for each measure (Tables 1–7). Pearson correlations between relevant study variables are reported in Tables 8–10. These correlations concerning mood and prosocial behavior are for the entire sample, followed by correlations separated by condition.

The researcher programmed Qualtrics to assign an equal number of HBTs (defined as those females scoring above 28 on the PAI-BOR) to each condition: “prosocial” and control. A score of 28 is approximately .5 of a standard deviation above the mean for college students. A score of 18 is approximately .5 of a standard deviation below the mean for college students; Qualtrics was programmed to assign an equal number of participants with lower PAI-BOR scores (defined as below 18) to each condition. Accordingly, the two conditions had no significant differences with regard to PAI-BOR scores (or premanipulation negative/positive affect) as revealed in Table 7 (Appendix A).

The degree to which predictors were correlated was examined. Variance Inflation Factor and Tolerance indices were used to examine multicollinearity. Variance Inflation Factors were less than 10 for variables in the mood regression models, initially suggesting that multicollinearity was not a problem, as a rule of thumb exists wherein a VIF of less than 10 indicates the absence of problematic multicollinearity (Hair, Anderson, Tatham, & Black, 1995). Nonetheless, all predictor variables other than condition (e.g., affect, borderline traits, charitable donations, fish released) were centered due to problematic correlation between several variables (e.g., pre and postmanipulation Negative Affect, borderline traits), in an effort to ease interpretation of coefficients and to reduce multicollinearity (Shieh, 2011).

*Hierarchical multiple regression.* For all multiple regression analyses, the “prosocial” manipulation was coded with one (1) representing the “prosocial” condition and zero (0) representing the control/”typical day” condition.

The dependent variable of mood change was measured by the postmanipulation PANAS measure (PANAS:T2, either positive or negative affect). Variables were added in the order stated below, using multiple regression to analyze mood change. This order was used to determine the effect of condition, borderline traits, and interaction, if any, while controlling for the initial mood measure (PANAS: T1).

$$\widehat{PANAS:T2} = \alpha + \beta_1(PANAS:T1) + \beta_2(COND) + \beta_3(BPD\ traits) + \beta_4(COND \times BPD\ traits)$$

A similar model, using multiple regression was used to analyze results for prosocial behavior:

$$\widehat{FISH} = \alpha + \beta_1(COND.) + \beta_2(BPD) + \beta_3(COND \times BPD)$$

$$\widehat{Donations} = \alpha + \beta_1(COND) + \beta_2(BPD\ traits) + \beta_3(COND \times BPD)$$

Unstandardized betas and confidence intervals for the same were calculated for each step in each model.

*Mood.* The following hypotheses pertain:

Hypothesis 1: Those receiving the prosocial manipulation will have an increase in positive affect and decrease in negative affect (simple or main effect) between the premanipulation (Time 1) and postmanipulation (Time 2) administrations of the PANAS, compared to participants in the control condition;

Hypothesis 5: There will be a significant interaction between condition and borderline personality traits. Those higher in borderline traits will derive greater benefit from the manipulation.

*Positive affect.* Paired sample t-tests were conducted separately for each condition and for the whole sample in order to compare positive affect before and after the manipulations. Thus, a paired samples t-test was run to compare the pre and postmanipulation positive affect for the prosocial condition. For the prosocial condition, there was a significant average difference between premanipulation and postmanipulation positive affect ( $t(116) = 5.00, p < 0.001$ ). On average, postmanipulation positive affect was 3.05 *higher* than premanipulation positive affect in the prosocial condition (95% CI [1.84 and 4.26]). A paired samples t-test was conducted in order to compare the pre and postmanipulation positive affect for the control condition. There was a significant average difference between premanipulation and postmanipulation positive affect ( $t(112) = -2.14, p = .04$ ). On average, postmanipulation positive affect was .96 *lower* than premanipulation positive affect in the control condition (95% CI [-1.84 and -.07]). Finally, a paired samples t-test was run in order to compare the pre and postmanipulation positive affect for the sample. There was a significant average difference between premanipulation positive affect and postmanipulation positive affect ( $t(229) = 2.69, p = .01$ ). On average, postmanipulation positive affect was 1.08 higher than premanipulation positive affect (95% CI [.29 and 1.87]).

As predicted, the manipulation had a significant effect on positive mood, as measured by multiple regression using premanipulation positive affect as a control variable. Participants in the experimental prosocial condition experienced a significantly greater postmanipulation positive mood compared to participants in the control condition, while controlling for premanipulation positive affect.

The results of the first regression analysis with postmanipulation positive affect as the dependent variable can be seen in Table 11. The first step in the regression (controlling for premanipulation positive affect) accounted for approximately 49.70% of the variance in postmanipulation positive affect ( $R^2 = .50$ ,  $p < .001$ ). The second step in the regression, condition, accounted for approximately 5.20% of the variance in postmanipulation positive affect scores ( $\Delta R^2 = .05$ ,  $p < .001$ ). Thus, the prosocial/experimental condition had a main effect in that it was associated with significantly greater positive mood compared to the control condition. Entering BPD traits into the model did not significantly improve model fit ( $\Delta R^2 = .00$ ,  $p = .57$ ; Table 11). When the interaction term was entered in the last step, the interaction between BPD traits and condition did not account for any additional significant variance in postmanipulation positive affect ( $\Delta R^2 = .00$ ,  $p = .68$ ). The total model accounted for approximately 55.1% of the total variance in postmanipulation positive affect ( $F(4, 225) = 68.92$ ,  $p < .001$ ).

Thus, participants in the prosocial condition experienced significantly greater improvement in mood compared to participants in the control condition. This was

demonstrated by the multiple regression and paired t-tests described above, which revealed significantly greater postmanipulation positive affect for participants in the prosocial condition, but not in the control condition.

*Negative affect.* Paired sample t-tests were run separately for each condition and for the whole sample in order to compare negative affect before and after the manipulations. Thus, a paired samples t-test was run to compare the pre and postmanipulation negative affect for the prosocial condition. For the prosocial condition, there was a significant average difference between premanipulation and postmanipulation negative affect ( $t(116) = 5.52, p < 0.001$ ). On average, postmanipulation negative affect was 1.78 lower than premanipulation negative affect in the prosocial condition (95% CI [-2.43 and -1.15]). A paired samples t-test was run in order to compare the pre and postmanipulation negative affect for the control condition. There was a significant average difference between premanipulation and postmanipulation negative affect ( $t(112) = -5.45, p < .001$ ). On average, postmanipulation negative affect was 1.17 lower than premanipulation negative affect in the control condition (95% CI [-1.59 and -.74]). Finally, a paired samples t-test was run in order to compare the pre and postmanipulation negative affect for the sample. There was a significant average difference between premanipulation negative affect and postmanipulation negative affect ( $t(229) = -7.56, p < .001$ ). On average, postmanipulation negative affect was 1.48 lower than premanipulation negative affect (95% CI [-1.87 and -1.10]).

As expected, the prosocial manipulation had a significant effect on reducing negative mood, as measured by postmanipulation negative affect. In order to control for premanipulation negative affect, this variable was entered as a first step in the regression and accounted for approximately 68.5% of the variance in postmanipulation negative affect ( $R^2 = .6850, p < .001$ ). The next step in the regression – condition – accounted for approximately .8% of the variance in postmanipulation negative affect ( $\Delta R^2 = .01, p = .02$ ). Entering BPD traits into the model did not significantly improve model fit ( $\Delta R^2 = .00, p = .13$ ), but there was a significant beta coefficient associated with BPD traits ( $\beta = .05, p = .04$ ), indicating that while BPD traits are predictive of postmanipulation negative affect, variability in the data obscures this result (Table 12). When the interaction term was entered in the next step, the interaction between BPD traits and condition did not account for any additional significant variance in postmanipulation negative affect ( $\Delta R^2 = .00, p = .13$ ). The total model accounted for approximately 69.90% of the total variance in postmanipulation negative affect scores ( $F(4, 225) = 130.38, p < .001$ ).

It should be noted that participants in *both* conditions, prosocial and control, demonstrated significant decreases in negative affect. This is contrary to the result observed with regard to positive affect: participants in the prosocial condition demonstrated a significant mean *increase* in positive affect according to paired t-tests; by contrast, participants in the control condition demonstrated a significant mean *decrease* in positive affect using paired t-tests. This difference in results suggests that the

manipulation was more effective at increasing positive affect as compared to reducing negative affect.

Hypothesis 4: Borderline traits will be positively correlated with negative affect and negatively correlated with positive affect in pre and postmanipulation PANAS measures.

As expected, borderline traits were positively correlated with both premanipulation ( $r(228) = .37, p < .001$ ) and postmanipulation negative affect ( $r(228) = .35, p < .001$ ) across conditions. However, contrary to predictions, borderline traits and positive affect were not negatively correlated either pre ( $r(228) = .01, p = .88$ ) or postmanipulation across conditions ( $r(228) = -.02, p = .75$ ).

*Prosocial behavior.* The following hypotheses pertain:

Hypothesis 2: Those receiving the prosocial manipulation will exhibit increased prosocial behavior on two subsequent tasks when compared to those receiving the control task.

Hypothesis 6: There will be a significant interaction between condition and borderline personality traits on the two tasks assessing prosocial behavior.

As predicted, the prosocial manipulation did have a significant effect in eliciting prosocial behavior with regard to both charitable donations and fish released (Figures 2-3). Participants in the prosocial condition gave significantly more to charity in their hypothetical budget based upon a \$100,000 income, and also released more fish.

For charitable donations, the main effect of condition was entered in the first step of the regression. In the second step of the regression, BPD traits were entered. In the third step of the regression, the interaction between condition and BPD traits was entered. Two separate regression analyses were conducted with regard to the prosocial outcome measures of charitable donations and fish released.

The results of the multiple regression analysis with charitable donations as the dependent variable can be seen in Table 13. The first step in the regression accounted for approximately 2% of the total variance in scores on the charitable donation ( $R^2 = .02$ ,  $p = .03$ ). Thus, condition did have a significant main effect on charitable donation; adding BPD traits to the regression did not improve model fit ( $\Delta R^2 = .00$ ,  $p = .45$ ). When the interaction term was entered in the third step, the interaction between BPD traits and condition was not significant. The third step accounted for an additional 1.20% of the total variance in charitable donations ( $\Delta R^2 = .01$ ,  $p = .40$ ). The full model accounted for approximately 2.50% of the variance in charitable donations.<sup>5</sup>

The prosocial manipulation was also successful in encouraging participants to release more fish. The results of the multiple regression analysis with fish released as the dependent variable can be seen in Table 15. The first step in the regression accounted for approximately 1.8% of the total variance in fish released ( $R^2 = .02$ ,  $p = .04$ ). Thus, with

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<sup>5</sup> The charitable donation data contained four outliers, or “Extreme Values,” defined as data located further out than 1.5 times the interquartile range (IQR) above the third quartile (there were no outlier data points falling more than 1.5 times the IQR below the first quartile). The regression analysis with charitable contributions as the outcome measure was re-run without these four extreme values and the results were largely the same. These results are contained in Table 14.

regard to the main effects, condition did have a significant effect on fish released; adding BPD traits to the regression did not improve model fit ( $\Delta R^2 = .00, p = .48$ ). When the interaction term was entered in the third step, the interaction between BPD traits and condition was not significant. The third step accounted for an additional .01% of the total variance in charitable donations ( $\Delta R^2 = .00, p = .54$ ). The full model accounted for approximately 2.1% of the variance in fish released.

Hypothesis 3: Borderline traits will be negatively correlated with prosocial behavior, as measured by the fishing game and charitable donations.

Contrary to expectations, borderline traits and prosocial behavior did not show a significant negative correlation with regard to charitable donations ( $r(228) = -.05, p = .47$ ) or fish released ( $r(228) = -.05, p = .50$ ). This result is contrary to the literature and pilot work for this study.

*Exploratory analyses.* Giving gifts to friends and family could be construed as a form of prosocial behavior. Accordingly, the relationship between the budget amount allocated to “gifts (for friends and family)” and condition was analyzed to determine whether the manipulation had an effect on this variable. Indeed, participants in the prosocial condition allocated significantly more money to gifts than those in the control condition ( $R^2 = .02, p = .048$ ). As was the case with the other variables, adding borderline traits to the model did not improve fit ( $R^2 = .00, p = .85$ ). Likewise, there was no significant interaction ( $R^2 = .00, p = .33$ ). This exploratory analysis strengthens the theory that the prosocial manipulation caused participants to engage in more prosocial behavior,

as participants in the prosocial condition allocated significantly more money to charity and to gifts than those in the control condition.

Another interesting result was that postmanipulation positive affect was significantly correlated with the release of a larger number of fish ( $r(228) = .22, p = .001$ ). However, postmanipulation positive affect was not significantly correlated with larger charitable donations ( $r(228) = .10, p = .15$ ). This discrepancy would be an interesting area to explore in future studies.

## CHAPTER IV

### DISCUSSION

This study is the first to examine the use of prosocial behavior as a method of mood enhancement for individuals high in BPD traits. It also added to research regarding the effects of prosocial behavior on subsequent prosocial behavior by using a novel laboratory manipulation. This study yielded several significant results in that participants in the prosocial condition experienced greater positive mood, less negative mood, and increased prosocial behavior compared to participants in the control condition. The mood improvement experienced by those in the prosocial condition could have beneficial clinical applications. Moreover, the increase in prosocial behavior observed in those participants in the prosocial condition provides support for the idea of a positive feedback loop created by an initial prosocial behavior.

#### *Mood*

As predicted, participants in the prosocial condition experienced significantly greater postmanipulation positive affect compared to participants in the control condition. This was demonstrated using multiple regression with premanipulation positive affect and premanipulation negative affect as covariates. Per this multiple regression and paired t-tests, participants in the prosocial condition experienced significantly greater postmanipulation positive affect than those in the control condition; participants in the

control condition actually experienced a significant decrease in positive affect. This result for the control condition could be explained by research suggesting that participants do not like the act of writing and typically experience a drop in positive affect after a writing task (Lyubomirsky, Sousa, & Dickerhoof, 2006). Thus, the significant result with regard to increase in positive mood for participants in the prosocial condition is particularly salient in light of research suggesting that participants dislike writing.

The results were somewhat less striking with regard to postmanipulation negative affect as an outcome measure, but were, nonetheless, still significant. Participants in the prosocial condition demonstrated lower postmanipulation negative affect when results were examined using multiple regression with premanipulation negative affect as a control variable. However, paired t-tests reveal that participants in the control condition also experienced a significant reduction in negative affect, suggesting that the prosocial manipulation was not as effective with regard to reduction of negative affect when compared to positive affect.

Pilot work, using a different mood measure -- the Profile of Mood States-Short Form (POMS-SF; Curran, Andrykowski, & Sudts, 1995), revealed a significant decrease in negative affect but no corresponding increase in positive affect. The POMS-SF includes a number of subscales to measure negative mood and only one subscale to measure positive mood. Thus, the difference in results between the pilot study and the current study may be due to the differences between these two scales. Further studies are needed in order to explore whether these differences will be replicated. Moreover, a

future study could use both measures in connection with a prosocial manipulation. This would, perhaps, allow for more precise measurements of both positive and negative mood after a prosocial manipulation. A recent study examining the effect of prosocial behavior using Experience Sampling Methodology (ESM) reported that participants engaging in prosocial behavior demonstrated an increase in positive affect, as measured by the PANAS (Schacter & Margolin, 2018). However, participants in that study did *not* demonstrate a decrease in negative affect following prosocial behavior, which suggests that the PANAS may be less sensitive in measuring these changes than the POMS-SF. Finally, it should be noted that the two scales measuring positive and negative affect are largely uncorrelated (Watson et al., 1988) so in light of that information, the difference in the type and magnitude of results with regard to positive and negative affect makes sense.

Thus, the manipulation had a significant effect on mood, as measured by postmanipulation affect within the PANAS. The use of “contribution” (prosocial behavior) in DBT is intended to aid in distress tolerance. In this study, the act of writing a kind letter to someone in need of encouragement increased positive emotions in participants who received the prosocial manipulation. This “mood-enhancing” effect of prosocial behavior could be very beneficial for individuals with BPD—and others—in a clinical setting. It is striking that a ten-minute task in a laboratory could elicit a measurable change in positive emotion. This improvement in mood following an act of prosocial behavior is consistent with prior research (e.g., Dunn, Aknin & Norton, 2008)

and these results support the use of contribution, or prosocial behavior, as a method of distress tolerance.

As predicted, BPD traits were positively correlated with premanipulation negative affect. However, BPD traits did not have the predicted inverse relationship with premanipulation positive affect. This puzzling result is, again, likely explained by research indicating that the two scales of the PANAS measuring positive and negative affect are largely uncorrelated (Watson et al., 1988). In addition, this result may suggest that BPD, which has a significant association with negative affect, does not necessarily have a predictable relationship with positive affect. The literature reveals contrary results concerning BPD and positive affect. BPD is inversely correlated with the *positive emotion* facet of Extraversion contained within the Five-Factor Model (Samuel & Widiger, 2008). Moreover, individuals with BPD demonstrate attenuated positive affect in response to acceptance behavior from romantic partners (Lazarus et al., 2018). Thus, the result in this study may suggest that BPD, which has a significant association with negative affect, does not necessarily have a predictable relationship with positive affect. Unlike the studies referenced, we did not use a clinical sample, which may explain, at least in part, differences between the results documented in the literature and what was observed in the present study. Likewise, research largely focuses on the negative affect of individuals with BPD; the relationship between BPD and positive affect may be an area for future research. Finally, the ubiquitous “file drawer” problem has the unfortunate result of causing some research to remain unknown when results are not significant, as

was the case here with regard to the relationship between BPD and premanipulation positive affect.

It is noteworthy that there were no interactions between level of borderline traits and condition with postmanipulation affect as the dependent variable. Individuals higher in BPD traits have affective instability and marked reactivity of mood (APA, 2013). Accordingly, it was hypothesized that these individuals would be more susceptible to a mood manipulation than other participants. Moreover, pilot research indicated that individuals higher in BPD traits had greater decreases in negative mood compared to other participants. Recent research using prosocial behavior to improve mood in depressed individuals indicates that depressed individuals were more likely to benefit from prosocial behavior than other participants (Schacter & Margolin, 2018). Despite these prior findings, individuals higher in BPD traits did not demonstrate greater susceptibility to the mood manipulation in the present study. The reasons for this are likely nuanced. As discussed above, individuals with BPD have greater negative affect. Indeed, the participants in this study who were higher in BPD traits demonstrated greater negative affect both pre and postmanipulation. Thus, the tendency of participants higher in BPD traits to have greater negative affect may have made it more difficult for some participants higher in BPD traits to experience improved mood. Conversely, the tendency toward mood reactivity in some participants higher in BPD traits could have resulted in greater mood changes in these individuals. These two potential effects may have worked at cross-purposes, such that no interaction was observed.

Another possible explanation for the null result for an interaction between BPD traits and condition with the dependent variable of mood change is that individuals higher in BPD traits demonstrate *context-dependent* volatility of mood. The present study did not include any manipulation designed to induce social distress, such as a rejection manipulation. Research indicates that individuals with BPD do not typically have volatile mood if they are *not* reacting to a social stressor, such as rejection (Chapman, Walters, & Dixon Gordon, 2014). Thus, a study with a rejection manipulation followed by a prosocial manipulation would perhaps be more effective in revealing whether individuals with higher BPD traits show greater mood change in response to a prosocial manipulation.

#### *Prosocial Behavior*

It was posited that the increase in positive mood associated with performing a prosocial act would lead to more prosocial acts. As predicted, the prosocial manipulation did indeed have a significant effect in eliciting prosocial behavior with regard to *both* charitable donations and fish released. This is an interesting result because some research indicates that recall of one's prosocial acts can lead to "licensing" or the feeling that one is entitled to behave in an unkind manner due to "moral credits" for the prior prosocial behavior (Conway & Peetz, 2012; Gneezy, Imas, Brown, Nelson, & Norton, 2012). The increase in prosocial behavior in participants receiving the prosocial manipulation suggests that the "warm glow" of engaging in a prosocial act led to more prosocial behavior.

It is noteworthy that *both* charitable donations and the number of fish released were greater in the prosocial condition because these two measures tap different types of prosocial behavior. Charitable donations are, presumably, motivated by altruism (and perhaps a desire to appear generous or to receive a tax deduction). Releasing fish to allow others to leave early would also, presumably, be motivated by altruism. However, the fishing game also taps into cooperative behavior. The income allocations to charity were hypothetical, which may have made participants more likely to endorse a donation higher than what their actual behavior would be. In contrast, participants were led to believe that the number of fish released would influence the amount of time they—and other participants—would spend completing the study. Despite this difference between the hypothetical nature of one outcome measure and the more immediate impact of another, participants in the prosocial condition demonstrated greater prosociality with regard to both outcome measures. Interestingly, the two measures were not significantly correlated with each other, again suggesting that they tap separate aspects of prosocial behavior.

Contrary to predictions, the study results revealed no significant inverse relationship between BPD traits and prosocial behavior (as measured by charitable giving and fish released). This prediction was predicated upon pilot work revealing an inverse relationship between BPD traits and prosocial behavior. Moreover, research indicates that borderline traits are negatively correlated with agreeableness and positively correlated with neuroticism (Samuel & Widiger, 2008). Higher levels of neuroticism and distress (both borderline traits) are associated with lower levels of prosocial behavior (Ashton,

Paunonen, Helmes, & Jackson, 1998; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). The contrary result in this study is puzzling and is an area for further exploration with a sample more representative of the full array of adult ages.

The reasons underlying the null result for interaction between BPD traits and condition with a dependent variable of charitable contributions are difficult to ascertain. As described previously, research suggests that individuals with BPD are less altruistic than other individuals. In the present study, the researcher posited that this lack of altruism documented in the literature and demonstrated in pilot work would make participants high in BPD traits less likely than other participants to give money to charity, creating an interaction between level of BPD traits and condition, such that other participants in the prosocial condition would be more likely to give money to charity when compared to those participants in the prosocial condition who were higher in BPD traits. One possible explanation (also discussed above) for the null findings related to charitable giving and BPD traits is that the hypothetical nature of the budgeting task may have allowed participants to profess greater prosociality than they actually possessed. Thus, the hypothetical nature of this task may have masked the differences in prosocial behavior between participants high in BPD traits and other participants.

In contrast to the hypothetical budgeting task, the fishing game was a more ecological measure of prosocial behavior. Nonetheless, no interaction between BPD traits and condition was observed using the outcome measure of fish released. Research suggests that individuals with BPD have difficulty cooperating with others (Hepp et al.,

2014; King Casas et al., 2008). This difficulty in cooperation—as documented in the literature—underpinned the hypothesis that individuals high in BPD traits would be less likely to help other participants during the fishing game. However, the literature also indicates that individuals higher in BPD traits do not necessarily demonstrate a lack of cooperation unless provoked in some way (Hepp et al., 2014; King-Casas et al., 2008). For this reason, the participants high in BPD traits may have been more cooperative than expected because there was no distress manipulation in this study.

A noteworthy result discovered during exploratory analysis is that positive postmanipulation affect predicted the release of a larger number of fish. In other words, participants who felt “happier,” or more positive, after the manipulation released more fish, which purportedly helped other participants to leave earlier. This is consistent with prior research suggesting that happy people are more likely to behave prosocially (e.g., Kayser, Greitmeyer, Fischer, & Frey, 2010). Also of note is the fact that greater positive affect did not predict greater charitable donations, which again suggests that cooperation and altruism, facets of prosocial behavior, are distinct. The correlation between positive affect and fish released compared to the lack of correlation between positive affect and charitable donations could suggest that the former is a more valid measure of prosocial measure than is the latter.

### *Strengths*

This study is the first to examine whether prosocial behavior is beneficial to individuals higher in BPD traits; the study results indicate that prosocial behavior is a

powerful mood enhancer for individuals higher in BPD traits as well as for others, even when performed for a very short period of time in a laboratory. The prosocial manipulation was helpful to those higher in borderline traits, just as it was to those lower in borderline traits.

This study is unique in that it involved a one-time prosocial task in a laboratory setting. This is important because it demonstrates that a prosocial act need not involve a monetary expenditure or lengthy period of time in order to elicit positive emotions. The manipulation was limited to ten minutes, suggesting that even short, one-time prosocial acts have the ability to improve mood.

In addition, the study allowed participants to choose the recipient of their prosocial behavior, as they were given three choices of persons to whom a kind letter could be written. The manipulation was designed to give participants a choice regarding their prosocial behavior in order to make it more meaningful to them. Research suggests that voluntarism is more beneficial to the volunteer when she chooses to engage in it, as opposed to being required to do so through work or school (Van Willigen, 2000). Allowing participants to choose the recipient of their prosocial behavior presumably strengthened the manipulation.

This study's use of a laboratory setting for a manipulation eliciting prosocial behavior is particularly unique and compelling because prior studies largely involved daily diary entries and other forms of self-report (Nelson, Layous, Cole, & Lyubomirsky, 2016; Raposa, Laws, & Ansell, 2016; Schacter & Margolin, 2018), which are unreliable,

as there is no observation of the behavior being examined. In contrast, the letters prepared by participants in the laboratory provided an excellent manipulation check.

### *Limitations*

There are several limitations to the study. Despite the fact that participants were oversampled for high BPD traits, the sample was, nonetheless, comprised of college students—a group of young adults who are, in many ways, high-functioning. Thus, it is possible that individuals with BPD in a more representative community sample would react differently after the prosocial manipulation.

Although the decision to include only females was based on the rates of BPD diagnoses reported by the American Psychiatric Association (2013) and the composition of undergraduate psychology students at the university, it is possible that not including male participants excluded potential individuals higher in BPD traits who could have contributed to the study. Moreover, the inclusion of these participants could have increased the total percentage of study participants that met or exceeded the recommended cutoff for clinically significant BPD traits on the PAI-BOR.

The study shows that a short laboratory manipulation can increase positive mood across a continuum of borderline traits. However, the brevity and setting of the manipulation are, nonetheless, limitations in that a longer, more naturalistic manipulation could have even more striking results.

In addition, the two manipulations – control and prosocial – were not perfectly symmetrical. Both conditions involved letter writing for ten minutes, using at least 300

characters. However, the topics about which participants wrote were different and, therefore, will have elicited mood and behavioral changes not solely attributable to practicing (or not practicing) prosocial behavior. For example, some of the participants in the prosocial condition may have had greater negative affect and/or less positive affect after the manipulation because reading stories about people in distress can cause sadness. Conversely, some of the positive mood increases observed in the prosocial condition could be attributed to reading the “sad” stories, as reading about others who are less fortunate can cause a feeling of gratitude for one’s own life circumstances. Indeed, the use of “comparison” to those less fortunate is another suggested method of distress tolerance in DBT (Linehan, 2015). Thus, it is possible that a lack of perfect symmetry between the two conditions may have been responsible for some of the group differences observed.

#### *Future Directions*

This study’s use of a ten-minute laboratory manipulation shows the power of prosocial behavior as a method of mood enhancement; however, the short manipulation used in this study also demonstrates how much more could be done to improve mood through prosocial behavior. Future studies could include a more powerful prosocial manipulation taking place over several days in the laboratory. Alternatively, future studies could use Experience Sampling Methodology (ESM), which would allow for repeated prosocial behavior in a naturalistic setting. Either of these proposed manipulations may have an even stronger positive effect on mood. Experiments taking

place over a longer period of time than ten minutes could be associated with even greater “upward spirals,” or increases in prosocial behavior.

Another interesting extension of the current study could involve adding an “antisocial” manipulation to provide greater contrast to the result from the prosocial manipulation. For example, participants could be instructed to write a hard-hitting and angry letter to someone they dislike. It would also be interesting to add another “control” condition in which participants did no writing, as the act of writing could have had an impact on the mood results. A recent study indicated that participants who wrote about their happiest moments experienced reduced well-being and physical health relative to those who merely talked about these moments (Lyubomirsky et al., 2006). This suggests that participants may not enjoy writing, and this could cause them to feel less positive affect, thus potentially obscuring results.

Another interesting area for exploration is the correlation between postmanipulation positive affect and prosocial behavior. “Happy participants” released more fish, suggesting that positive affect predicts prosocial behavior. However, this was not true with regard to charitable donations; the correlation between positive affect and charitable donations was not significant. This discrepancy is interesting and merits further exploration.

Although there were several significant results—namely mood improvement and increased prosocial behavior following the prosocial manipulation (compared to those in the control condition)—the effect sizes were quite small with regard to prosocial behavior

as an outcome variable, suggesting the need for follow-up research to attempt to replicate these findings. It would also be beneficial to replicate this study within a clinical sample, as the current sample was comprised of female college students, who are high functioning in comparison to a clinical sample of individuals with BPD.

### *Conclusions*

In summary, the current study contributed to the literature by being the first to use a large, subclinical, undergraduate sample to examine the associations among BPD traits, prosocial behavior, and mood. The brief laboratory prosocial manipulation was associated with greater postmanipulation positive affect, less negative affect, and led to more prosocial behavior. These results bolster prior research suggesting that prosocial behavior is highly rewarding and causes people to feel a “warm glow.” This finding is potentially useful in clinical settings as a method of ameliorating the dysphoria typically seen in individuals with BPD. Moreover, these results also support prior research suggesting that prosocial behavior begets further prosocial behavior, leading to an “upward spiral” of compassion. As predicted, participants in the prosocial condition allocated more of their hypothetical income to charity. They also released a larger number of fish, presumably to help others leave the study earlier while the participant stayed longer.

The study also yielded some interesting exploratory results in that participants in the prosocial condition allocated more of their hypothetical income to gifts (for friends and family) than the participants in the control condition. This strengthens the inference

that the prosocial manipulation caused participants to behave more prosocially. Finally, postmanipulation positive affect was significantly correlated with the release of more fish, suggesting that happy people are more likely to behave prosocially. This finding underscores the potential benefits and circular nature of prosocial behavior: those who engage in prosocial behavior are more likely to feel happy and those who are happy are more likely to engage in prosocial behavior.

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APPENDIX A  
TABLES AND FIGURES

Table 1  
Participant Demographic Characteristics for Entire Sample

	<i>n</i>	%	<i>M</i>	<i>SD</i>
Sex				
Female	230	100.0		
Age (years)			19.12	2.10
Race				
African American	101	43.9		
White/Caucasian	81	35.2		
Latino/a	24	10.4		
Asian/Pacific Islander	14	6.1		
Native American	2	0.9		
Other	8	3.5		

*Note.* *n* = 230. *M* = Mean; *SD* = Standard Deviation.

Table 2

Participant Demographic Characteristics for Prosocial Condition

	<i>n</i>	%	<i>M</i>	<i>SD</i>
Sex				
Female	117	100.0		
Age (years)			19.34	2.54
Race				
African American	46	39.3		
White/Caucasian	48	41.0		
Latino/a	11	9.4		
Asian/Pacific Islander	6	5.1		
Native American	2	1.7		
Other	4	3.4		

*Note.* *n* = 117. *M* = Mean; *SD* = Standard Deviation.

Table 3

## Participant Demographic Characteristics for Control Condition

	<i>n</i>	%	<i>M</i>	<i>SD</i>
Sex				
Female	113	100.0		
Age (years)			18.89	1.48
Race				
African American	55	48.7		
White/Caucasian	33	29.2		
Latino/a	13	11.5		
Asian/Pacific Islander	8	7.1		
Native American	0	0		
Other	4	3.5		

*Note.* *n* = 113. *M* = Mean; *SD* = Standard Deviation.

Table 4

## Descriptive Statistics for Study Variables in Sample: PANAS Subscales and Prosocial Measures

Variable	<i>M</i>	<i>SD</i>	Range
PAI-BOR	29.02	12.01	7.00–57.00
Premanipulation PA	21.78	7.52	9.00–44.00
Premanipulation NA	14.19	5.28	10.00–35.00
Postmanipulation PA	22.86	8.27	9.00–44.00
Postmanipulation NA	12.71	4.59	10.00–36.00
Charitable donations	4.65	6.01	0.00–68.50
Fish released	72.93	33.65	0.00–150.00

*Note.*  $n = 230$ . PAI-BOR = Personality Assessment Inventory–Borderline Features. PA = Positive Affect. NA = Negative Affect.

Table 5

## Descriptive Statistics for Study Variables in Prosocial Manipulation: PANAS Subscales

Variable	<i>M</i>	<i>SD</i>	Range
PAI-BOR	29.20	12.20	7.00–54.00
Premanipulation PA	21.23	7.50	9.00-42.00
Premanipulation NA	13.87	5.04	10.00-34.00
Postmanipulation PA	24.28	8.17	9.00-44.00
Postmanipulation NA	12.08	3.43	10.00-29.00
Charitable donations	5.57	7.34	0.00–68.50
Fish released	77.36	35.22	0.00–150.00

*Note.*  $n = 117$ . PAI-BOR = Personality Assessment Inventory–Borderline Features. PA = Positive Affect. NA = Negative Affect.

Table 6

## Descriptive Statistics for Study Variables in Control Manipulation: PANAS Subscales

Variable	<i>M</i>	<i>SD</i>	Range
PAI-BOR	28.83	11.86	8.00–57.00
Premanipulation PA	22.35	7.52	9.00-44.00
Premanipulation NA	14.52	5.53	10.00-35.00
Postmanipulation PA	21.39	8.15	9.00-44.00
Postmanipulation NA	13.35	5.49	10.00-36.00
Charitable donations	3.79	4.10	0.00–25.00
Fish released	68.34	31.45	0.00–142.00

*Note.*  $n = 113$ . PAI-BOR = Personality Assessment Inventory–Borderline Features. PA = Positive Affect. NA = Negative Affect.

Table 7

Results of *t*-tests and Descriptive Statistics for PAI-BOR, Premanipulation Positive, and Premanipulation Negative Affect

Variable	Control group			Prosocial group			95% CI for mean difference	<i>t</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>			
PAI-BOR	28.83	11.86	113	29.20	12.20	117	[-3.49, 2.76]	-0.23	228
Pre-PA	22.35	7.52	113	21.23	7.50	117	[-0.84, 3.07]	1.12	228
Pre-NA	14.52	5.53	113	13.87	5.03	117	[-0.72, 2.02]	0.93	228

*Note.* Levene's test for equality of variances was insignificant for each result; therefore, results reflect the assumption of equal variances. PAI-BOR = Personality Assessment Inventory–Borderline Features. Pre-NA = premanipulation negative affect. Pre-PA = premanipulation positive affect.

Table 8

Pearson Correlations Among BPD Traits, PANAS Scales: Positive Affect and Negative Affect and Prosocial Behavior for Entire Sample

	PAI	PAD	NAD	Pre_Pos	Post_Pos	Pre_Neg	Post_Neg	Charitable donations	Fish released
PAI	–	-.04	.11	.02	-.01	.37**	.35**	-.05	-.05
PAD		–	.09	-.28**	.49**	.02	-.04	.07	.12
NAD			–	.13*	.19**	.50**	-.07	.05	.05
Pre_Pos				–	.71**	.15*	.09	.05	.15*
Post_Pos					–	.15*	.05	.10	.23**
Pre_Neg						–	.83**	-.05	.05
Post_Neg							–	-.08	.03
Charitable donations								–	.01
Fish released									–

*Note.*  $n = 230$ . NAD = negative affect difference. PAD = positive affect difference. PAI = PAI-BOR score. Post\_Neg = postmanipulation negative affect. Post\_Pos = postmanipulation positive affect. Pre\_Neg = premanipulation negative affect. Pre\_Pos = premanipulation positive affect.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 9

Pearson Correlations Among BPD Traits, PANAS Scales: Positive Affect and Negative Affect and Prosocial Behavior for Prosocial Condition

	PAI	PAD	NAD	Pre_Pos	Post_Pos	Pre_Neg	Post_Neg	Charitable donations	Fish released
PAI	–	–.03	.10	–.10	–.12	.27**	.29**	–.09	–.08
PAD		–	.10	–.34**	.50**	.06	–.01	.03	.11
NAD			–	.14	.21*	.73**	.06	.00	.04
Pre_Pos				–	.65**	.17	.10	.10	.23*
Post_Pos					–	.20*	.09	.12	.31**
Pre_Neg						–	.72**	–.02	.04
Post_Neg							–	–.03	.03
Charitable donations								–	–.02
Fish released									–

Note.  $n = 117$ . NAD = negative affect difference. PAD = positive affect difference. PAI = PAI-BOR score. Post\_Neg = postmanipulation negative affect. Post\_Pos = postmanipulation positive affect. Pre\_Neg = premanipulation negative affect. Pre\_Pos = premanipulation positive affect.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 10

Pearson Correlations Among BPD Traits, PANAS Scales: Positive Affect and Negative Affect and Prosocial Behavior for Control Condition

	PAI	PAD	NAD	Pre_Pos	Post_Pos	Pre_Neg	Post_Neg	Charitable donations	Fish released
PAI	–	–.06	.12	.15	.10	.47**	.43**	.01	–.01
PAD		–	.02	–.18*	.42**	.01	.02	.01	.02
NAD			–	.15	.13	.22*	–.19*	.12	.05
Pre_Pos				–	.82**	.12	.06	–.01	.07
Post_Pos					–	.12	.06	.00	.09
Pre_Neg						–	.91**	–.08	.08
Post_Neg							–	–.13	.06
Charitable donations								–	–.01
Fish released									–

Note.  $n = 113$ . NAD = negative affect difference. PAD = positive affect difference. PAI = PAI-BOR score. Post\_Neg = postmanipulation negative affect. Post\_Pos = postmanipulation positive affect. Pre\_Neg = premanipulation negative affect. Pre\_Pos = premanipulation positive affect.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 11

Hypotheses 1 and 5: Multiple Regression Analysis with Standardized Beta Coefficients, Using BPD Traits and Condition with Premanipulation Positive Affect as a Control Variable to Predict PANAS Postmanipulation Positive Affect

Predictor variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Premanipulation PA	.79	.05	.72	15.95	<.001
Condition	3.78	0.74	.23	5.11	<.001
Borderline traits	-0.00	0.05	-.05	-0.79	.43
Interaction	-0.03	0.06	-.03	-0.42	.68

*Note.* *n* = 230. *B* = unstandardized beta coefficient;  $\beta$  = standardized beta coefficient; *SE B* = standard error of unstandardized beta coefficient; PA = positive affect.

Table 12

Hypotheses 1 and 5: Multiple Regression Analysis with Standardized Beta Coefficients, Using BPD Traits and Condition with Premanipulation Negative Affect as a Control Variable to Predict PANAS Postmanipulation Negative Affect

Predictor variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Premanipulation NA	.79	.05	.72	15.95	<.001
Condition	-.83	.34	-.10	-2.47	.02
Borderline traits	.05	0.02	.12	2.09	.04
Interaction	-0.04	0.03	-.07	-1.44	.15

*Note.* *n* = 230. *B* = unstandardized beta coefficient;  $\beta$  = standardized beta coefficient; *SE B* = standard error of unstandardized beta coefficient; NA = negative affect.

Table 13

Hypotheses 2 and 6: Multiple Regression Analysis Using BPD Traits and Condition to Predict Charitable Donations

Predictor variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Condition	1.70	0.79	.14	2.15	.03
Borderline traits	0.00	0.05	.01	0.08	.93
Interaction	-0.06	0.07	-.08	-0.84	.40

*Note.*  $n = 230$ . *B* = unstandardized beta coefficient;  $\beta$  = standardized beta coefficient; *SE B* = standard error of unstandardized beta coefficient.

Table 14

Outliers Excluded/Hypotheses 2 and 6: Multiple Regression Analysis Using BPD Traits and Condition to Predict Charitable Donations

Predictor variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Condition	1.23	0.45	.18	2.74	.01
Borderline traits	0.00	0.03	.02	0.16	.87
Interaction	0.00	0.04	-.01	-0.12	.91

*Note.*  $n = 226$ . *B* = unstandardized beta coefficient;  $\beta$  = standardized beta coefficient; *SE B* = standard error of unstandardized beta coefficient

Table 15

Multiple Regression Analysis Using BPD Traits and Condition to Predict Fish Released

Predictor variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Condition	9.06	4.42	.14	2.05	.04
Borderline traits	-0.13	0.27	-.01	-0.05	.96
Interaction	-0.22	0.37	-.06	-0.61	.54

*Note.*  $n = 230$ . *B* = unstandardized beta coefficient;  $\beta$  = standardized beta coefficient; *SE B* = standard error of unstandardized beta coefficient.

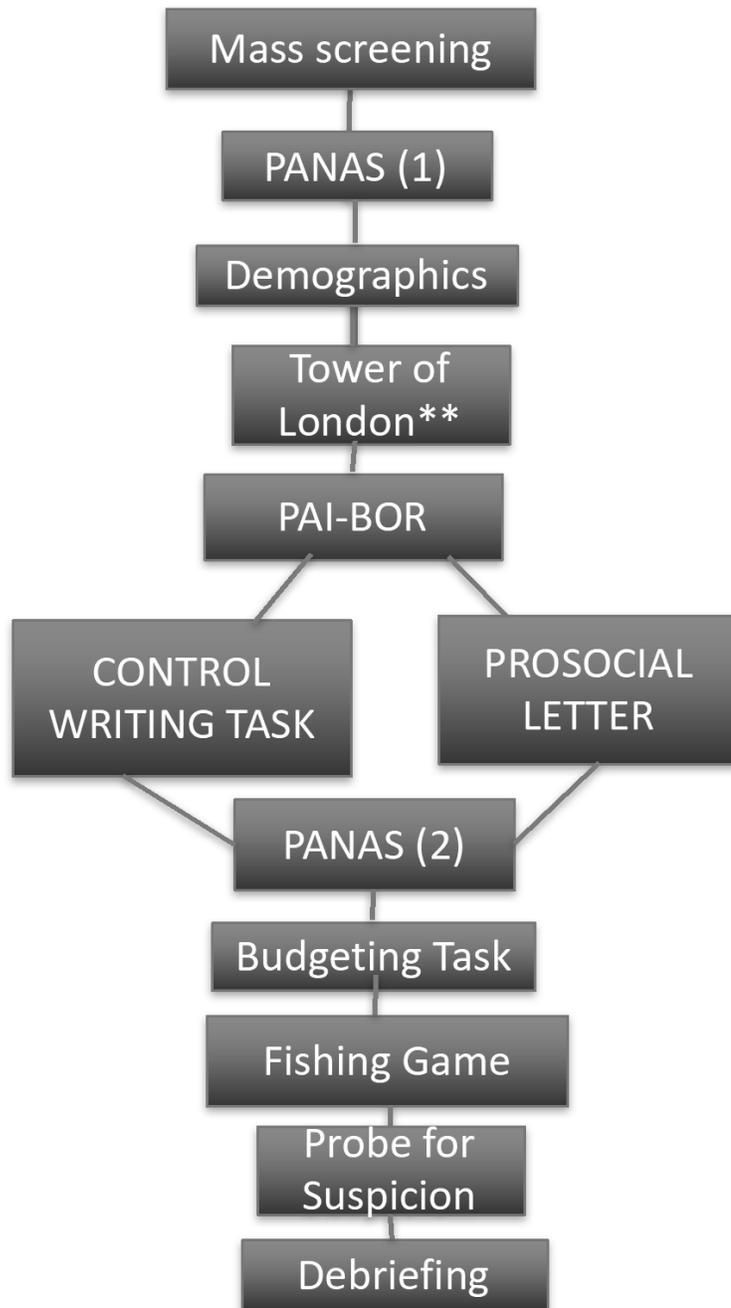


Figure 1. Method Flow Chart. A Double Asterisk Indicates a Filler Task.

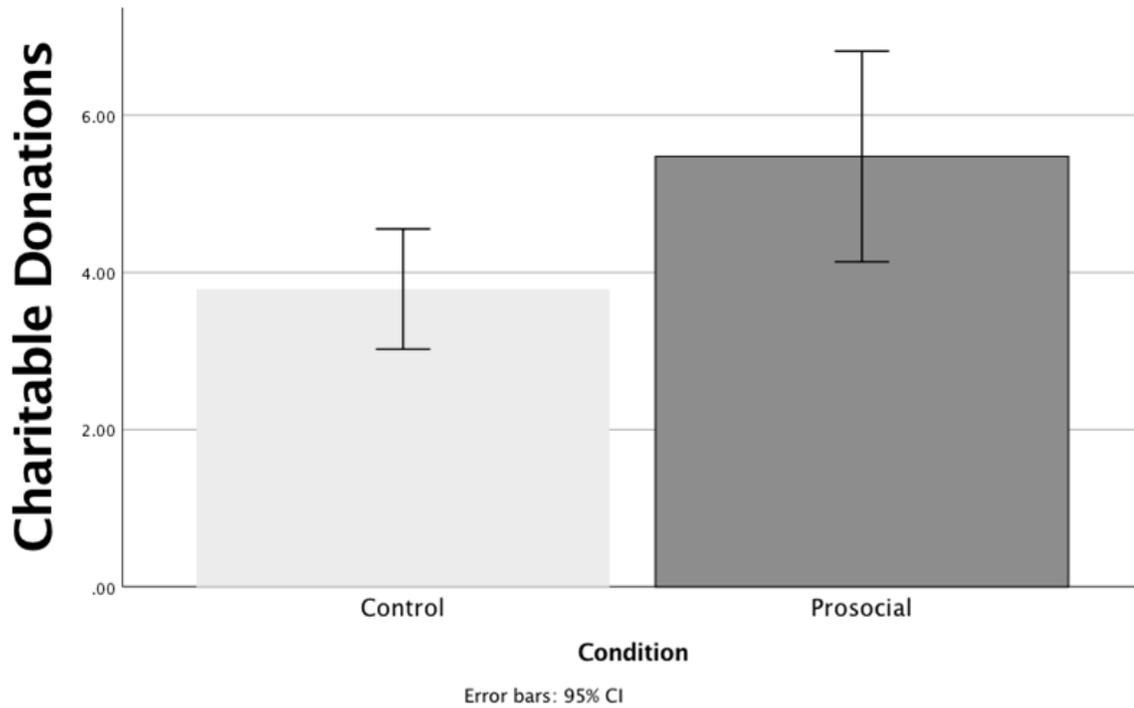


Figure 2. Charitable Contributions by Condition. Participants Who Received the Prosocial Manipulation Allocated Significantly More of Their Budget to Charitable Donations Than Did Those Receiving the Control Manipulation,  $t(228) = 2.15, p = .03$ .

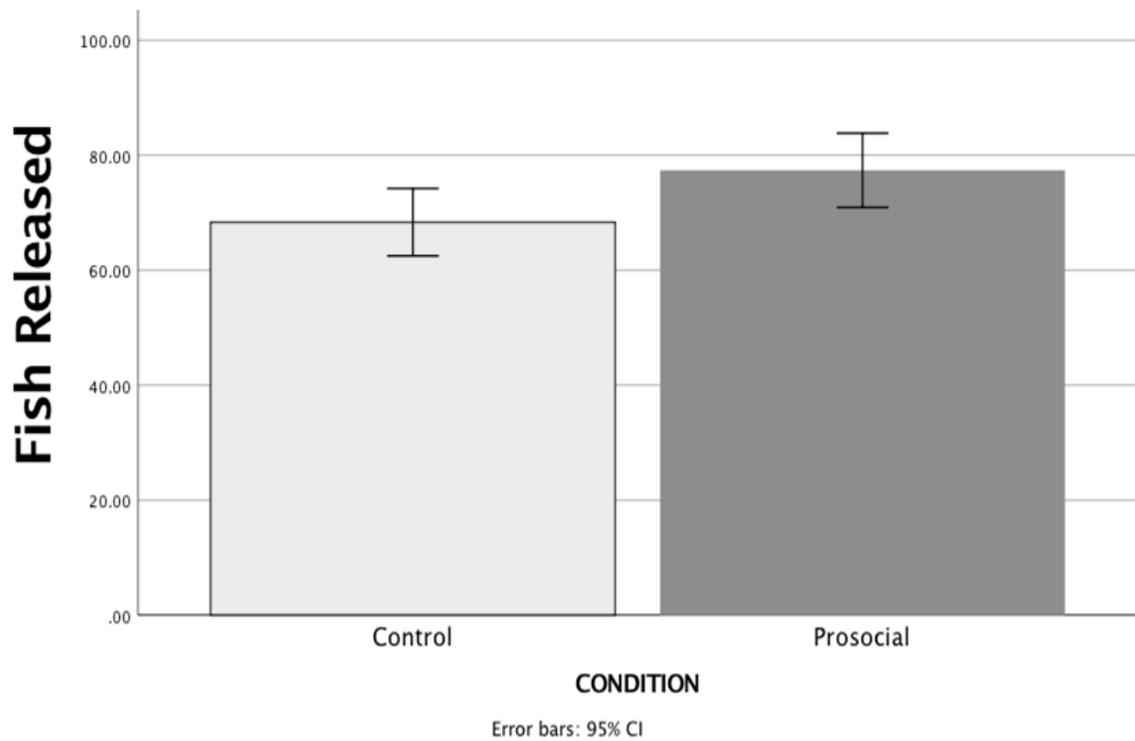


Figure 3. Fish Released by Condition. Those Participants Who Received the Prosocial Manipulation Released Significantly More Fish Than Participants in the Control Condition,  $t(228) = 2.05, p = .04$ .

APPENDIX B

MEASURES AND MATERIALS

WISCONSIN PERSONALITY DISORDERS INVENTORY–IV (WISPI-IV), BPD  
SCALE ITEMS

Instructions: Below you will find a list of statements. Please rate the extent to which each statement describes you. Use the following scale to make your choice:

0      1      2      3      4      5      6      7      8      9  
Never  
Always  
Not at all  
Extremely

1. \_\_\_ One day I'm absolutely sure about what I'm like and what I want to become, and the next day everything changes and I want to do something completely different.
2. \_\_\_ I go wild when I am left alone because it means that the people who have left me must hate me.
3. \_\_\_ I have huge blow-ups with people about whether they are taking good care of me.
4. \_\_\_ Sometimes I sense there may be horrible danger or harm coming, but people close to me don't recognize it.
5. \_\_\_ If I like someone I have just met, I will reveal the most intimate details about all of my troubles right away.
6. \_\_\_ When I am really stressed, I "lose time"—have periods when I do things that later are a complete blank to me.
7. \_\_\_ Sometimes I let myself be taken over by urges to do things like spend or eat too much, do drugs, or drive recklessly.
8. \_\_\_ If things are going well for me, it doesn't take much to get me feeling hollow, empty, or bored.

9. \_\_\_ When someone close to me threatens to abandon me, I feel attacked and lash out furiously to punish them.
10. \_\_\_ If someone important to me is a few minutes late, I feel abandoned, I panic, and then I lash out at them.
11. \_\_\_ I like to stir up excitement, and am attractive enough to become the “life of the party.”
12. \_\_\_ Even when I’m in a relationship, I feel incredibly empty.
13. \_\_\_ I like to be intimate with people, and if I sense any rejection, I deliberately hurt myself by doing something like cutting or burning myself, and then I feel better.
14. \_\_\_ If someone important ignores me, I have to hurt myself real bad.
15. \_\_\_ I can get very anxious, depressed or irritable for no reason, and then suddenly return to normal.
16. \_\_\_ I have a pattern of doing well in something important (school, job, relationship), and then suddenly dropping it all together.
17. \_\_\_ I recklessly give in to urges to do things which are sure to get me in trouble—like gambling, over-spending, shoplifting, overeating, etc.
18. \_\_\_ Sometimes I feel incredibly irritable, and then suddenly the bad mood will just disappear and I feel fine.

Positive and Negative Affect Schedule (PANAS)  
(Watson, Clark, & Tellegen, 1988)

Instructions: This scale consists of a number of words that describe different feelings and emotions. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely
Interested			Irritable	
Distressed			Alert	
Excited			Ashamed	
Upset			Inspired	
Strong			Nervous	
Guilty			Determined	
Scared			Attentive	
Hostile			Jittery	
Enthusiastic			Active	
Proud			Afraid	

Personality Assessment Inventory–Borderline Features Scale (PAI-BOR) (Morey, 1991)  
Sample items

Instructions: Read each statement and decide if it is an accurate statement about you.

If the statement is FALSE, NOT AT ALL TRUE, select F.

If the statement is SLIGHTLY TRUE, select ST.

If the statement is MAINLY TRUE, select MT.

If the statement is VERY TRUE, select VT.

Give your own opinion of yourself. Be sure to answer every statement.

1. My mood can shift quite suddenly.
2. My attitude about myself changes a lot.
3. My relationships have been stormy.
4. My moods get quite intense.
5. Sometimes I feel terribly empty inside.

### **Prosocial Manipulation**

We have partnered with a nonprofit website to provide letters of encouragement to people who are currently experiencing hardship. Friends or family members can nominate someone to receive a packet of kind and encouraging letters. For this study, you will write a kind letter of encouragement to one of the three people listed below. Please read their stories and decide to whom you would like to send your letter. Please note that your letter will be sent to the recipient at the conclusion of the study. Please write your letter in such a way to encourage the recipient and make her feel good.

### **CARLEE**

Carlee's loving cousin has reached out to us to request a bundle of letters for her. Her cousin wrote "Carlee is only 22 years old, but she has come under a lot of stress. She was in school and recently earned a sports medicine certificate, but has gone back to working to help pay household rent, along with my grandmother and aunt. Carlee has always been the type to do things and not complain, unlike the rest of us cousins. She's the one, living with our ailing grandmother and is there to help give medications, and other things that my grandmother needs help with. I know that right now especially it can seem for her that the entire world is against her, as I know she doesn't have many people to befriend besides coworkers, as she works so often. Even then, it seems she rarely has time away from her job or our grandmother to have any fun, or receive a lot of love from others. I would love for her to receive some love letters, because I think she needs to be reminded how awesome she is." Remind Carlee that she is awesome & loved!

**Please write your letter in such a way to encourage Carlee and make her feel good. Please write for 10 minutes, using at least 300 characters. You will not be able to advance to the next screen until 10 minutes have elapsed and 300 characters have been written.**

Your kind letter of encouragement will be sent to Carlee at the conclusion of the study. We appreciate your kindness and encouragement.

### **MARISSA**

"Marissa is the most inspiring person I have ever met. She is dedicated, to life and to her responsibilities. She puts everyone in her life before herself and there's no doubt in my mind that if she could hug every single person who needed a smile, she would travel days on end to do so." A close friend wrote to us.

“I have never seen someone work as hard as this girl does. We're entering our senior year in college, and if the lingering nerves of the unknown weren't daunting enough, Marissa is going through the process of applying to grad school.

I saw Marissa last week and she is struggling. For the last eight years, Marissa has fought a very long hard battle with bulimia. She has demons that she tries so hard to fight but seems to always find herself a little short of strength.

If you met this girl, you would never see her pain. She hides everything with the most comforting smile and demeanor you have ever seen. When I saw her last week, she broke down and begged for help that I didn't know how to give. I have never seen herself doubt her abilities as much as she currently is. The pressure she's putting on herself with an upcoming GRE and extensive applications is pushing her to an edge that's affecting her body image and self-worth in a way I've never seen her. Marissa needs and deserves to know how incredible she is even though she just can't see it right now. She just needs a push to give her the strength to get her through the next few months. When Marissa is around, she makes everyone around her feel like they're the most important person in the world in that moment and she deserves for once in her life to feel the way she makes others feel.” Start typing to remind Marissa how strong and incredible she is!

**Please write your letter in such a way to encourage Marissa and make her feel good. Please write for 10 minutes, using at least 300 characters. You will not be able to advance to the next screen until 10 minutes have elapsed and 300 characters have been written.**

Your kind letter of encouragement will be sent to Marissa at the conclusion of the study. We appreciate your kindness and encouragement.

### **MAMA OLGA**

“My granny is the most awesome human being in the world.” Mama Olga’s granddaughter wrote to us. “When she was really young she had to escape from her country in the 1940s because of the World War II in Slovenia. She even had to leave her mom behind. Without knowing how to speak Spanish she came to Argentina and with a lot of hard work and persistence she built her family here. She has one son and one daughter (my mom). My grandpa died in 2007. He had Alzheimer's.

Mama Olga has proven to be very strong. She had to deal with her husband's illness and, at the same time, with her own illness: cancer. Thankfully, it all turned just fine. This year, 2017, she celebrated her 95th birthday. One day before it, she fell on the street and broke her hip. Tragedy had visited our home once again. The doctor that came home told us that it was nothing to worry so, that night, at midnight, she requested for her birthday to be celebrated. We had cake and took many photos at her house, in her bedroom.

Three days after her fall she underwent surgery and had her hip replaced. All of the family came together to give her hope and strength. She is now living at a retirement home temporarily in order to recover completely. Her absence is unbearable at home. It's been four months and recently, she's been starting to feel sad. The psychiatrist of the institution said that she's depressed. She feels lonely and is constantly calling us home crying. We don't know what to do to make her feel better. She always says that even though the place is beautiful, she feels sad. All of the other patients have either dementia or are a bit lost, so she feels like there's no one to talk to. She used to watch TV and read, and she is not doing that anymore. She has been through a lot and has proven to be stronger than any of us. Her passion for life has even given me the strength to move on. I would love to see her smile and enjoy herself again!" Remind Mama Olga of all the joys in life and show her that she is not alone.

**Please write your letter in such a way to encourage Mama Olga and make her feel good. Please write for 10 minutes, using at least 300 characters. You will not be able to advance to the next screen until 10 minutes have elapsed and 300 characters have been written.**

Your kind letter of encouragement will be sent to Mama Olga at the conclusion of the study. We appreciate your kindness and encouragement.

### **Control Manipulation**

The University would like to have a better idea of what the typical student experience at UNC-G is so that we can provide improved academic and nonacademic support to all students. Accordingly, the Dean of Students has requested that students participating in this research study provide letters describing their typical day at UNC-G. Please write a letter to the Dean of Students describing your typical day at UNC-G in the space below. Please describe all aspects of your experience, including your living situation, typical experiences during classroom time, paid employment, purchase of food from on-campus vendors, and interactions with professors and other University staff. Please include as much detail as possible. It is also important to the University that these letters present as accurate a picture as possible of each student's typical day experience. Therefore, please include items that are positive, negative, and/or neutral. ***Please write for at least 10 minutes, using at least 300 characters. You will not be able to advance to the next screen until 10 minutes have elapsed and 300 characters have been written.*** These letters will be sent to the Dean of Students upon conclusion of this study. We appreciate your detail and accuracy.

## Budgeting Task

*How would you spend your annual salary, given an annual salary of \$100,000? Please indicate the **percentage** of income you would spend annually on the expenses listed below. Please be sure that the sum of the percentages totals 100%.*

- \_\_\_\_\_ Food (1)
- \_\_\_\_\_ Housing (2)
- \_\_\_\_\_ Luxury Items (3)
- \_\_\_\_\_ Recreation (4)
- \_\_\_\_\_ Clothing (5)
- \_\_\_\_\_ Gifts (for friends, family) (6)
- \_\_\_\_\_ Bills (7)
- \_\_\_\_\_ Education (8)
- \_\_\_\_\_ Travel (9)
- \_\_\_\_\_ Charitable Donations (10)
- \_\_\_\_\_ Other (11)

## Infrequency Scale

Chapman, L. J., & Chapman, J. P. (unpublished)

- False* 1. *On some mornings, I didn't get out of bed immediately when I first woke up.*
- False 2. There have been a number of occasions when people I know have said hello to me.
- False 3. There have been times when I have dialed a telephone number only to find that the line was busy.
- False 4. At times when I was ill or tired, I have felt like going to bed early.
- False 5. On some occasions I have noticed that some other people are better dressed than myself.
- True* 6. *Driving from New York to San Francisco is generally faster than flying between these cities.*
- False 7. I believe that most light bulbs are powered by electricity.
- True 8. I go at least once every two years to visit either northern Scotland or some part of Scandinavia.
- True* 9. *I cannot remember a time when I talked with someone who wore glasses.*
- False 10. Sometimes when walking down the sidewalk, I have seen children playing.
- True 11. I have never combed my hair before going out in the morning.
- True 12. I find that I often walk with a limp, which is the result of a skydiving accident.
- True 13. I cannot remember a single occasion when I have ridden on a bus.

Italicized items were embedded within the PAI-BOR.

Protocols with more than two of the infrequency items endorsed are considered invalid.

**UNIVERSITY OF NORTH CAROLINA AT GREENSBORO**

***CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM***

Project Title: Writing & Cognition Study

Project Director: Rosemary Nelson-Gray

Student Investigator: Shannon Adcock

**What are some general things you should know about research studies?**

You are being asked to take part in a research study. Your participation in the study is voluntary. You may choose not to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. There may not be any direct benefit to you for being in the research study. There also may be risks to being in research studies. If you choose not to be in the study or leave the study before it is done, it will not affect your relationship with the researcher or the University of North Carolina at Greensboro.

Details about this study are discussed in this consent form. It is important that you understand this information so that you can make an informed choice about being in this research study.

If you have any questions about this study at any time, you should ask the researchers named in this consent form. Their contact information is below. Please ask for assistance if needed.

**What is the study about?**

This is a research project investigating the relationship between writing tasks, cognition and personality in college students. Your participation is completely voluntary.

**Why are you asking me?**

We are asking you because you are a female student at UNCG who is taking a psychology class, and are at least 18 years old. Some of the participants were selected based on their responses at mass screening; and other participants simply signed up for the study on Sona.

**What will you ask me to do if I agree to be in the study?**

We will ask you to answer a series of questionnaires and writing tasks on a computer. We will also administer a simple computerized task. This study will take about 60 minutes to complete.

**What are the risks to me?**

This study involves minimal risk, no more than what most people would experience in their daily lives. It is possible that some of the survey questions may be temporarily upsetting or frustrating, but these effects are usually mild and last briefly. Remember, you may choose not to respond to any questions that make you uncomfortable. Also, if you are upset by the questions, or any other aspects of your life, we would like to remind you of the free services you can access on campus at the Counseling and Testing Center (336-334-5874).

If you have any concerns about your rights or how you are being treated, please contact the Office of Research Integrity at UNCG at 336-256-1482 or (855) 251-2351. Questions, concerns, or complaints about this project or benefits or risks associated with being in this study can be answered by Dr. Rosemary Nelson-Gray who may be contacted at [r\\_nelson@uncg.edu](mailto:r_nelson@uncg.edu).

**Are there any benefits to me for taking part in this research study?**

There are no direct benefits to you.

**Are there any benefits to society as a result of me taking part in this research?**

Your participation may help us better understand how cognition, writing and personality interact in college students.

**Will I get paid for being in the study? Will it cost me anything?**

There is no cost or payment for participation in this study. However, you will receive two Sona credits for completing the study.

**How will you keep my information confidential?**

All information obtained in this study is strictly confidential unless disclosure is required by law. The researcher has a legal obligation to break this confidentiality if a participant threatens to kill him/herself or someone else.

To protect your confidentiality, all participants are assigned an ID number, and that code number will be used in all the information gathering during the study. This assigned ID number will not be connected to your name in any way. Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing.

De-identified electronic data files will be stored on a password-protected computer on the UNCG campus and backed up on a flash drive that remains in a locked room. No personally identifiable information will be stored in online data files. Data will be destroyed or deleted within five years of completion of data collection.

**What if I want to leave the study?**

You have the right to refuse to participate or to withdraw at any time and still be able to sign up for other experiments. You will receive two Sona credits for the 60 minutes or less of the time you spend completing this study. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state. You have the option to complete a paper instead of participating in research. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped.

**What about new information/changes in the study?**

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

**Voluntary Consent by Participant:****Do you have any questions about this study?**

By continuing with the online survey, you are agreeing that you have read this consent form and you fully understand the contents of this document and are openly willing to consent to take part in this study. All of your questions concerning this study have been answered by the research team. You are also verifying that you are 18 years of age or older and are agreeing to participate in this research study.

I have read, understood, and had the opportunity to print a copy of, the above consent form and desire of my own free will to participate in this study.

- Yes (1)
- No (2)

## Demographic Questions

What is your gender?

- Male (1)
- Female (2)

Please state your age:

What is your race?

- African-American/Black (1)
- Asian (2)
- White/Caucasian (3)
- Hispanic/Latino (4)
- Native American/Alaskan Native (5)
- Other (6)

*Debriefing:*

You have just completed Study 1613: Cognition, Writing & Personality. The purpose of this study is to investigate the associations between personality variables, mood, and prosocial behavior. Although the study purportedly measured reasoning ability/cognition, the study actually measured mood and prosocial behavior. This deception was necessary in order to perform this study and measure your responses. There were no other participants fishing with you during the fishing game. Your choices during the fishing game did not affect the amount of time that you spent completing the study. If you wrote a letter to the Dean of Students, your letter will not actually be sent; this was a deception necessary for the study. Your data is not linked with your name in any way; however, if you do not want your data to be used in the study, please let us know that. Thank you for your time and effort in working through the questionnaires. Your responses are valued and will be used to help us answer important questions about personality and prosocial behavior. If you were upset by this study, the questions, or any other aspects of your life, we would like to remind you of the free services you can access on campus at the Counseling and Testing Center (336-334-5874). Questions about the study can be directed to Dr. Rosemary Nelson-Gray ([r\\_nelson@uncg.edu](mailto:r_nelson@uncg.edu)). ***In order to maintain the validity of this study, please do not discuss this study with, or within earshot of, any students at UNC-G (with the exception of the Counseling Center). If you will, please sign that you have received and understand this debriefing statement.***

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## Coding Protocol

### \*Part One: Manipulation Check

Did the participant write about the correct topic?

- 1) Letter to Dean of Students describing typical day
- 2) Letter of encouragement to person in need of hope

\*I will be surprised if we throw out more than a couple participants for this. Do note if their writing does not correspond to the prompt. Do note if they just hit the spacebar or a bunch of random characters. Code these P for prosocial or C for control or EXCLUDE, which means that the participant: (1) wrote something that clearly does not respond to the prompt; (2) wrote gibberish; or (3) just hit the spacebar or random characters.

\*\*They should be almost 100% in compliance, but note any concerns and if there is an EXCLUDE, please code it that way.

### \*Part Two: Debriefing Check

Determine if a participant guesses the true purpose of the study.

0=did not guess the purpose of the study in any meaningful way

1=gussed the study was intended to produce better mood (no mention of nice letter)

2= gussed the study was intended to measure prosocial behavior in the fishing game (no mention of nice letter) AND/OR gussed the study was intended to measure prosocial behavior through charitable donations (no mention of letter as causing this)

3=gussed that nice letter intended to produce better mood

4=gussed that nice letter intended to produce more prosocial behavior

5=gussed that nice letter intended to produce both better mood and more prosocial behavior

In order to guess the true purpose of the study and be coded as a 5, the participant would need to state that the (1) THE MANIPULATION (letter) was used to induce (2) BETTER MOOD and (3) MORE PROSOCIAL BEHAVIOR. Guessing the true purpose of the study would be a response such as: “I think this study is trying to determine whether having me write a nice letter to someone will improve my mood and cause me to engage in more prosocial behavior.”

\*This guesses the true purpose of the study (rate as 5) because it links the manipulation to the two items that we are measuring—mood and prosocial behavior. To get a 5, the manipulation, mood, and prosocial behavior need to be stated.

\*I will be surprised if many people guess the entire true purpose of the study. There may be participants who “partially” guess the true purpose of the study with a response such as:

“I think you’re trying to figure out if writing a nice letter will make us do nice things”

This answer would be a 4 (manipulation + prosocial)

-or-

“I think you’re trying to figure out if writing a nice letter will change our mood” This answer would be a 3 (manipulation + mood)

-or-

Participants may have a vague idea that the study measures changes in mood (code as a 1) or prosocial behavior (code as 2).

Examples would be:

“you’re trying to see if I’m a good person” (rate as 2)

“you’re trying to measure change in mood” (rate as 1)

Examples of a 0 would be:

“you’re trying to measure personality” (rate as 0)

“you’re trying to measure mood” (rate as 0)