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The sparse literature concerning prosocial behavior in the context of Borderline Personality Disorder (BPD) traits would benefit from behavioral studies using ecologically valid paradigms (e.g., volunteer time, charitable donations). Accordingly, this study examined differences in prosocial behavior in individuals high in BPD traits using ecologically valid behavioral observations. The study also examined potential moderators of BPD traits, specifically childhood maltreatment and emotion dysregulation. Participants were randomly assigned to one of two writing conditions—social rejection or typical day—after completing questionnaires measuring BPD traits, childhood maltreatment, and emotion regulation. The study examined participants' willingness to complete volunteer hours and donate money to charity. Participants were also asked to write up to 10 letters of encouragement to someone in need. This provided three outcome measures of prosocial behavior: volunteer time, charitable contributions, and letters of encouragement. Consistent with prior literature, results across all but one model revealed that BPD traits alone were not predictive of a difference in prosocial behavior. The effect of the rejection condition was not significant except when volunteer hours pledged was the measure of prosocial behavior. Contrary to expectations, childhood maltreatment was predictive of increased prosocial behavior, measured by encouraging letters. Childhood maltreatment and condition had a significant interaction in that the rejection condition reduced the positive correlation between childhood maltreatment and prosocial behavior, as measured by encouraging letters. Emotion dysregulation was associated with reduced prosocial behavior, measured by encouraging letters. Overall results varied across different measures of prosocial behavior.

Keywords: borderline personality disorder, prosocial behavior, altruism, emotion dysregulation, abuse, neglect, invalidation

AN EXAMINATION OF PROSOCIAL BEHAVIOR AND POTENTIAL MODERATING FACTORS IN INDIVIDUALS HIGH IN BORDERLINE PERSONALITY DISORDER TRAITS

by

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DEDICATION

This dissertation is dedicated to my family, as they supported me throughout this process and all of graduate school. For this, I am very grateful.

APPROVAL PAGE

This dissertation written by Shannon Adcock has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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CHAPTER I: INTRODUCTION

The research literature suggests that individuals with Borderline Personality Disorder (BPD) are less likely to engage in prosocial behavior, but studies examining this question are limited to economic games and self-report measures (Grzegorzewski et al., 2019; King-Casas et al., 2008; Saunders et al., 2015; Wingenfeld et al., 2018), rather than observations of actual behavior in a more ecological context. Prosocial behavior is 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 et al., 2005, p. 365). Prosocial behavior has also been defined as including cooperation and the promotion of positive social relationships (Eisenberg et al., 2006). Thus, prosocial behavior can be described very broadly and could consist of actions to benefit an individual, a group, or the world in general, as well as cooperative behavior (Twenge et al., 2007).

Engaging in prosocial behavior not only benefits the world—but also the person engaging in the helping behavior (Dunn et al., 2008). Helping behavior activates the reward center within the brain (Moll et al., 2006), triggering a feeling called a "warm glow." In addition to the so-called "warm glow," prosocial behavior also enhances everyday coping skills, as demonstrated in a recent study using Experience Sampling Methodology (ESM; Raposa et al., 2016). Results suggest that more prosocial behavior could have a buffering effect on the impact of stress with regard to both positive and negative affect. Thus, the purported tendency of individuals with BPD to engage in less prosocial behavior may be a missed opportunity for mood improvement/distress tolerance in a population that particularly needs it.

In addition to the mood benefits of prosocial behavior, it can trigger a positive feedback loop when prosocial behavior is reciprocated. These benefits to those who practice prosocial behavior may offer insight into why "contribution"—or prosocial behavior—is suggested as a method of distress tolerance by Marsha Linehan within her Dialectical Behavior Therapy for BPD (Linehan, 1993). Linehan recognized that prosocial behavior is an excellent method to improve mood; indeed, recent studies concerning other mental health symptoms reveal that engaging in prosocial behavior reduces depression (Schacter & Margolin, 2019) and social anxiety (Alden & Trew, 2013). In addition, engaging in prosocial behavior was associated with increased positive affect and reduced neuroticism in an ESM study (Snippe et al., 2018). Those high in neuroticism particularly benefitted from engaging in prosocial behavior (Snippe et al., 2018), suggesting that prosocial behavior could be a beneficial coping strategy for individuals with BPD.

Borderline Personality Disorder can be highly impairing. It is characterized by interpersonal dysfunction, emotion dysregulation, affective instability, and dysphoria/intense anger, along with symptoms such as fear of abandonment, chronic feelings of emptiness, identity disturbance, and even transient episodes of paranoia/dissociation (American Psychiatric Association [APA], 2013). Of the nine enumerated symptoms, five must be present for a diagnosis to be given. BPD affects approximately 1–6% of the general population (APA, 2013), but milder cases with subclinical traits may be much more prevalent; subclinical presentations can still be quite disabling (Bhatia et al., 2013; Zielinski & Veilleux, 2014); for this reason, much of the newer research on BPD uses a dimensional, rather than categorical, approach (Widiger, 2011).

The PAI-BOR uses four factors to measure BPD traits: affective instability, identity problems, negative relations, and self-harm (Morey, 1991), but little is known about how these factors were created and tested (Jackson & Trull, 2001). Morey's factors for the PAI-BOR were tested on a clinical sample of primarily males between the ages of 30 and 49 (Jackson & Trull, 2001). Subsequent attempts to replicate these factors have been unsuccessful, resulting in the use of a different factor analysis in various studies (Gardner & Qualter, 2009; Jackson & Trull, 2001).

Key features of BPD, such as poor emotion regulation, coupled with developmental history, may explain the purported tendency of individuals with BPD to engage in less prosocial behavior (see Table A1 in Appendix A). These symptoms are described in Table A1. Individuals with BPD have great difficulty with emotion regulation, which could detrimentally affect their ability to engage in prosocial behavior (APA, 2013; Eisenberg, 2000). In addition, many individuals with BPD were abused or otherwise invalidated as children (Fossati et al., 1999; Zanarini, 2000). This mistreatment and the lack of prosocial modeling by caregivers likely contribute to mistrust of others and could be responsible for a lack of prosocial behavior (Music, 2011).

As depicted in Figure B1 (see Appendix B), activation of empathy, desire to cooperate, and trust generally lead to prosocial behavior (Figures B1 and B2 were created by this author and included in a prior unpublished manuscript). For individuals with BPD, the picture is more complex. As shown in Figure B2, individuals with BPD typically experience childhood invalidation, coupled with a biological sensitivity (leading to unusually great difficulty in regulating emotion), all of which play a crucial role in the development of BPD. These etiological factors are likely responsible for the trust and empathy differences observed in

individuals with BPD. The symptoms of BPD (emotion dysregulation, interpersonal dysfunction, low agreeableness, high neuroticism/high dysphoria) make these individuals particularly sensitive to rejection, which leads them to have exaggerated reactions to petty slights, insults, or even just priming regarding the same (King-Casas et al., 2008). Individuals with BPD appear to lose trust in others to a greater degree than other individuals—particularly when there has been a slight or when there is a context in which exploitation could occur (e.g., The Ultimatum Game, as described below; see Seres et al., 2009; Unoka et al., 2009). In the absence of these specific situational factors, the literature suggests that individuals with BPD are just as likely as typical individuals to cooperate with others (Hepp et al., 2014; Thielmann et al., 2014). More research is needed on whether individuals with BPD engage in less prosocial behavior than typical individuals and in what circumstances, particularly examining observed behavior in the context of voluntary prosocial behavior, such as charitable giving and voluntarism.

CHAPTER II: LITERATURE REVIEW

The Research on Prosocial Behavior in Individuals with BPD is Limited

Research on prosocial behavior within the BPD population is quite limited. However, a review of the literature examining prosocial behavior in individuals with BPD or high BPD traits reveals a nuanced pattern of results. First, individuals with BPD describe themselves as *less altruistic* than others (Samuel & Widiger, 2008; Saulsman & Page, 2004). Second, despite the previous finding, extant research suggests that individuals with BPD are *no more likely* than healthy individuals to take advantage of others or to have cooperation difficulties when they perceive others to be cooperative/nonexploitative (Hepp et al., 2014; Thielmann et al., 2014). Third, individuals with BPD demonstrate difficulty trusting others, particularly in situations where they could be exploited, resulting in self-defeating and potentially hurtful behavior (Unoka et al., 2009). Fourth, individuals with BPD have great difficulty with reactive cooperation, that is, the ability to work cooperatively after a perceived slight (Hepp & Niedtfeld, 2022; King-Casas et al., 2008; Thielmann et al., 2014). Fifth, very few studies examine BPD and prosocial behavior outside the context of economic games (Adcock et al., 2021). Some recent studies come close but are limited to examining self-reported altruism or empathy (Grzegorzewski et al., 2019; Wingenfeld et al., 2018).

Individuals with BPD Are Less Altruistic Per Self-Report Questionnaires

Studies examining the Five-Factor Model (FFM) of personality are illustrative of self-reported altruism in persons with BPD, using questionnaires, such as the Five-Factor Inventory (FFI; Costa & McCrae, 1992). Particularly relevant to prosociality is the trait agreeableness, which is one of the five factors along with neuroticism, conscientiousness, extraversion, and

openness to experience that comprise the FFM. Within the factor of agreeableness are five facets, one of which is called "altruism" (Ashton et al., 1998). Altruism has been defined as "a motivational state with the ultimate goal of increasing another's welfare" (Batson, 1991, p. 6). Thus, altruism is a broader concept than prosocial behavior, as it encompasses feelings/ motivational states rather than behavior only. Large-scale studies show that individuals with BPD self-report lower levels of both the facet of altruism and the factor of agreeableness (Morey et al., 2002). Likewise, two meta-analyses examining facets of the FFM (Samuel & Widiger, 2008; Saulsman & Page, 2004) revealed that BPD is negatively correlated with agreeableness and altruism. A recent study using the Self-Report Altruism Scale showed that female patients with BPD reported significantly lower levels of altruism than healthy controls (Grzegorzewski et al., 2019). Individuals with BPD self-report more aggression, anger, and hostility compared to healthy controls, individuals with depression (Stern et al., 1997), and individuals with bipolar disorder (Saunders et al., 2015). Individuals with BPD demonstrated less forgiveness of themselves and others than those with other personality disorders (Ross et al., 2007). Thus, individuals with BPD see themselves as less altruistic, less forgiving, angrier, more hostile, and more aggressive than typical healthy individuals.

Individuals with BPD Are Not Exploitative and Can Be Generous

Economic and trust games are often used in psychology studies to measure altruism, trust, and cooperative behavior (e.g., Cáceda et al., 2014; Edele et al., 2013; Fehr & Fischbacher, 2003). One such game is the Dictator Game, in which players are given money to split between themselves and their partners. The game presents an opportunity to either (a) exploit someone else by sharing little/no money; or (b) be generous by providing a sum equal or greater to half of the money. Edele et al. (2013) noted that affective empathy predicted more generous behavior

during the Dictator Game. Affective empathy is the ability to feel what other people are feeling; cognitive empathy is the ability to engage in perspective-taking, or putting oneself in someone else's shoes (Harari et al., 2010). Repeated exchanges in economic games will typically yield reciprocal altruistic behavior (e.g., cooperating with a partner during the Dictator Game to avoid unfair outcomes). This cooperative behavior results from mutual rewards stemming from social norm observance and the imposition of "altruistic punishment" when a game partner does not cooperate.

Although individuals with BPD see themselves as less altruistic, research reveals that individuals high in BPD features refrained from exploiting others (when given the opportunity to do so in these games) to the same extent as typical, healthy individuals (Thielmann et al., 2014). For example, a recent online study used the Dictator Game paradigm (Thielmann et al., 2014) to examine behavior in those with BPD features. Participants had the role of "allocators" in the Dictator Game; in other words, they were given a sum of money and instructed to split it with a second "participant." Therefore, participants had the opportunity to demonstrate behavior ranging from selfish/exploitative behavior (taking all or most of the money) to prosocial behavior (taking no or less than half of the money). BPD features did not predict any increase in exploitative behavior. Thus, individuals high in BPD features were no more likely to take advantage of others than typical, healthy individuals (Thielmann et al., 2014).

In another study using a variant of the Dictator Game, participants with BPD exhibited similar levels of prosocial behavior but had different motives for the same (Wischniewski & Brüne, 2013). In the study, participant-observers with BPD watched two other players engaged in the Dictator Game and had the option to punish an unfair Dictator and help a disadvantaged recipient (Wischniewski & Brüne, 2013). Interestingly, the participant-observers with BPD did

not differ behaviorally from healthy controls (HC) with regard to altruistic punishment. Participant-observers could punish the unfair Dictator by giving money to another player, increasing the recipient's share and decreasing the Dictator's share. The punishment would also impact the participant-observers by reducing their amount of money; thus, punishing an unfair dictator and helping another player resulted in the loss of money to the participant, which is a form of "costly altruism" or "altruistic punishment" (Wischniewski & Brüne, 2013, p. 535). Despite research suggesting that individuals with BPD are less altruistic, they were equally likely to punish an unfair Dictator and help a recipient, even if it meant that they lost money; however, as discussed below, the motivations for prosocial behavior differed.

The Wischniewski and Brüne (2013) study results suggest that there are profound differences in the motivations for altruism (and economic decisions) in those with BPD. Specifically, the authors examined the concept of Machiavellianism, using the Mach-IV scale; individuals high in Machiavellianism tend to manipulate others and are more cynical (Christie & Geis, 1970). Although participants in the Wischniewski and Brüne (2013) study did not differ by group (BPD or HC) concerning altruistic punishment, the underlying personality traits—agreeableness and Machiavellianism—associated with their behavior were divergent. For participants in the BPD group, agreeableness correlated *inversely* with altruistic punishment. The opposite was true for the HC group. Moreover, in the BPD group, neuroticism was positively correlated with altruistic punishment, but no such relationship appeared was observed in the HC group. With respect to Machiavellianism, participants with BPD, who had higher Mach-IV scores, punished observed unfair behavior more harshly than low-Machs. In contrast, high-Mach healthy controls were less likely to punish perceived unfairness, and low-Mach healthy controls were likelier to punish the same behavior.

The authors speculated that high-Mach participants with BPD identified with the victim of an unfair allocation and sought revenge, even when this meant less money for themselves. By contrast, high-Mach healthy control participants were likelier to act solely per their economic interests. By way of explanation, the authors cited research suggesting that individuals with BPD have higher levels of affective empathy but lower levels of cognitive empathy than typical individuals (Harari et al., 2010). This increased affective empathy, coupled with decreased cognitive empathy, could cause individuals with BPD to feel injustice acutely and be unable to engage in a rational, "big picture" analysis of the situation (Fonagy & Target, 1996). This study again suggests that individuals with BPD can be quite generous in that they chose to help a disadvantaged participant, even though it cost them money, which is a form of "costly altruism" (Wischniewski & Brüne, 2013).

Individuals with BPD Have Difficulties Trusting and Cooperating with Others

As discussed, prosocial behavior can include things as simple as cooperating with others. One of the first studies to examine trust and cooperative behavior in individuals with BPD in an economic game revealed that this population was untrusting and uncooperative to such an extent that their behavior was self-defeating (Unoka et al., 2009). In the Unoka et al. (2009) trust game, individuals with BPD, individuals with depression, and healthy controls played the role of an investor, and another purported participant (the computer) was the trustee. Both players received money and were told that this amount could only be increased through trust and cooperation. The participant-investors were told that they could (and should) send money to the trustee, which would be tripled, and that a part of this sum would be returned to the investor. Participants were unaware of the amount transferred back to them with each transaction. Individuals with BPD demonstrated significantly less trust and cooperation (as measured by money transferred) than

individuals from the depressed and healthy control groups. The latter two groups became more trusting and cooperative over time, but those with BPD demonstrated the opposite pattern. This was likely because the context of the game—an investing scenario in which someone could be taking advantage of you—was enough of a perceived threat to cause impairment in the trust and cooperation of those with BPD. The study also included a risk game using a lottery paradigm. In contrast to the result from the trust game, in the lottery paradigm, individuals with BPD behaved similarly to the depressed and HC groups. Indeed, individuals with BPD were more comfortable playing the lottery than trusting a business partner.

In a study with a similar paradigm to Unoka et al. (2009), participants with BPD demonstrated the same lack of trust and cooperation (King-Casas et al., 2008). In the King-Casas et al. (2008) study, participants with BPD and healthy controls reacted to various offers during an investing game. Those with borderline pathology did not perform well in negotiations. In this version of the investment game, individuals with BPD served as trustees and could see the amounts invested. An investor provided money to the trustee, the amount of which was then tripled in the hands of the trustee. The trustee-participant then chose how much money to repay the investor. If the trustee-participant did not repay at least the amount invested, the investor would receive no benefit, leading to smaller subsequent investments. For typical individuals, increased cooperation occurred throughout the 10-round game. However, individuals with BPD displayed significantly less trust in later rounds of the game, causing less money to be invested. As in Unoka et al. (2009), this was likely because individuals with BPD felt threatened by the context of the game: an investing situation in which they could potentially be exploited by someone else. This differential susceptibility can be illustrated by the difference in how typical individuals reacted to a rupture in negotiations and how those with BPD reacted. When healthy

individuals made lowball payments to investors, they subsequently engaged in "coaxing," or generous payments, to repair the relationship. Individuals with BPD were significantly less likely to do so (King-Casas et al., 2008). Notably, the King-Casas et al. (2008) study used fMRI to analyze brain activity during negotiations. Healthy individuals demonstrated increased anterior insula activity after receiving a large amount of money, but individuals with BPD did not. This could suggest that individuals with BPD do not feel the same "warm glow" as healthy individuals when experiencing cooperative behavior.

In another study, participants with BPD demonstrated a lack of trust and cooperation during the Trust Game only after receiving oxytocin, which typically increases feelings of trust in healthy individuals (Ebert et al., 2013). Participants played the role of investor two times (on different days), once with and once without the administration of oxytocin (Ebert et al., 2013). Participants with BPD were less likely to transfer money after receiving oxytocin, but no such pattern was observed in healthy controls. Healthy controls transferred more money to attractive "business partners" only after the administration of oxytocin whereas participants with BPD demonstrated a preference for attractive business partners with and without oxytocin. Emotional neglect during childhood was associated with less money being transferred in participants with BPD, but only after the administration of oxytocin. Thus, oxytocin appeared to have a paradoxical effect again—causing less trust rather than more trust—in those with BPD. The varying effects of oxytocin are also puzzling and may indicate differences in the processing of this hormone within the BPD population. It is interesting that individuals with BPD demonstrated less trust only after receiving oxytocin; in that regard, the results contradict those of Unoka et al. (2009) and King-Casas et al. (2008). These latter two studies suggest that individuals with BPD have difficulty trusting and cooperating with others in the context of

investment games. This is, presumably, because these investment games are threatening to those with BPD. They perceive the games as an opportunity for others to take advantage of them.

A similar study suggests that individuals with BPD are significantly less trusting and less cooperative than healthy individuals when they perceive a potential threat. Individuals with BPD displayed less cooperation than healthy individuals in a study using a variant of the Prisoner's Dilemma called the Assurance Game; a lack of cooperation in those with BPD was observed before and after administration of oxytocin (Bartz et al., 2011). In the original version of the Prisoner's Dilemma, the police have arrested two suspects, or prisoners, and are interrogating them in separate rooms. Each can either confess or keep silent. No matter what the other prisoner does, each has an incentive to confess. If one prisoner confesses, the other prisoner is better off doing the same to avoid a much harsher sentence. If one prisoner stays silent, the other prisoner can obtain a lighter sentence by confessing. This incentivizes both parties to confess in a one-time version of the game. In a multi-sequence version of the game, there is a built-in incentive to cooperate by staying silent—due to the repeated rounds. The Assurance Game is similar to the Prisoner's Dilemma in that players can either cooperate or defect, but the game more heavily rewards mutual cooperation than mutual defection (Bartz et al., 2011). Participants played several rounds of the Assurance Game. Despite the clear financial payoffs associated with cooperation, participants with BPD were likelier to defect than healthy controls. This was true before and after administration of nasal oxytocin; interestingly, nasal oxytocin was associated with significantly less cooperation than placebo in those with BPD. This pattern was not observed in healthy controls who were marginally more cooperative after the administration of oxytocin. Individuals with BPD were less likely to cooperate than typical individuals—likely because of the context of the game in which another player could defect, which can be

interpreted as a slight or rejection. This fear of injury/rejection/slights appears to be situational; this is likely why a lack of cooperation is observed in the Prisoner's Dilemma and Ultimatum Game, but not in the Dictator's Game. (Participants in the Dictator's Game can determine their fate, whereas they are subject to the whims of others in the Prisoner's Dilemma and the Ultimatum Game.)

Individuals with BPD Have Difficulty with Reactive Cooperation/Forgiveness

Being high in BPD features did not predict a tendency to exploit others without provocation or priming (Thielmann et al., 2014). In contrast, BPD features *did* predict a tendency to become reactive/uncooperative in response to the perception that the individual with borderline features was being exploited (Thielmann et al., 2014). In the context of the Ultimatum Game, participants were told that another purported participant (in actuality, a computer) would make them an offer between 0 and 100 Euros (Thielmann et al., 2014). Participants were further instructed that if they did not take the offer, then both participants would forfeit all money. Researchers then assigned each participant to one of two versions/conditions of the Ultimatum Game: (a) in one condition ("strategy"), participants stated a minimum offer that they would accept rather than forcing both players to forfeit the money; and (b) in the other condition ("game"), participants responded to a series of computer-generated offers in which three objectively equitable (50/50) offers occurred after a "breakdown" in negotiations (consisting of an objectively unfair offer) followed by a "repair" in negotiations (a fair offer which ranged from 50-65 Euros). For the "strategy" version of the Ultimatum Game, the minimum acceptable offer was the dependent variable and the level of BPD features was the predictor variable. BPD traits predicted significantly higher amounts for a minimum level of acceptance in the "strategy" version of the Ultimatum Game. Likewise, BPD traits predicted a significantly larger number of

rejections after the breakdown in negotiations, the dependent variable in the "game" version of the Ultimatum Game (Thielmann et al., 2014).

The Thielmann et al. (2014) study reveals that although individuals with BPD do not tend to exploit others, they react much more negatively/aggressively than others in the face of perceived slights. The breakdown in negotiations during the Ultimatum Game caused participants higher in BPD features to have difficulty negotiating effectively thereafter. This seemingly inconsistent behavior can be explained by the concepts of reactive and active cooperation. Active cooperation is akin to non-exploitation (or even simply cooperating when things are going well), and reactive cooperation is akin to cooperation after a perceived insult. The latter is problematic for individuals high in BPD features. Other research confirms that individuals with BPD have much greater difficulty than healthy individuals in forgiving others, making this an appropriate area for future intervention research (Sandage et al., 2015).

In multiple iterations of the Ultimatum Game, partners tend to cooperate with each other and when partners switch repeatedly, altruistic punishment often occurs when one participant engages in greedy behavior (e.g., the participant will refuse the offer of an unfairly small amount so that other participants will not suffer a similar fate even though this means that the participant does not receive any money during that round; Fehr & Fischbacher, 2003). A study using a multi-round variant of the Ultimatum Game (UG) revealed a lack of cooperation in participants with BPD compared to healthy controls (Polgár et al., 2014). Participants played 40 trials of UG with four other purported participants with four different "headshot" pictures; this was a deception, as all proposers were the computer. Researchers hypothesized that HC participants would be more likely to engage in "altruistic punishment," defined in this context as the refusal to accept unfair offers, even though the participant would receive no money during that round.

The researchers posited that healthy individuals would not tolerate unfair treatment in a 40-round game with multiple participants, as this would create a situation in which predators could take advantage of others. By contrast, it was hypothesized that participants with BPD would be more willing to accept unfair offers because of their disinclination to be cooperative, which in this context is defined as refusing to accept unfair offers to benefit the group as a whole. Indeed, healthy controls were more like to engage in altruistic punishment by refusing unfair offers. Individuals with BPD were more likely to accept unfair offers. This difference could result from a lack of interest in partnership and cooperation evidenced by individuals with BPD, causing themselves and others to be subjected to unfair treatment. Another way to view this behavior is self-protective, much like the behavior observed in investing games. In the investment games, individuals with BPD chose to invest less or repay less than typical individuals, likely due to fear of being exploited (King-Casas et al., 2008; Unoka et al., 2009). In the Polgár et al. (2014) study, participants did not cooperate with the group. Rather than acting to help others, those with BPD acted to protect themselves in the moment by taking a low offer to avoid receiving nothing. Such decision-making could make individuals with BPD more susceptible to unfair treatment and in the context of a 40-trial Ultimatum Game with multiple participants, the decisions made by those with BPD were less prosocial than those made by healthy individuals (Polgár et al., 2014). By accepting objectively unfair offers, the individuals with BPD could obtain more money than the other participants.

In other studies involving negotiations in the BPD population, a pattern of impaired trust and impaired cooperation is apparent, which may be linked to difficulty with managing conflict, as well as poor impulse control (Hepp & Niedtfeld, 2022). A study examining the behavior of 60 females (20 with diagnoses of BPD, 20 with diagnoses of Bipolar Disorder, and 20 healthy

controls) in the context of the Prisoner's Dilemma (PD) revealed significantly more defections by those with BPD (Saunders et al., 2015). In the Saunders et al. (2015) version of the Prisoner's Dilemma, participants could earn differing amounts of money based on whether they and their partners cooperated or defected. Participants played two sets of PD games, each consisting of 20 rounds. Before starting the game, participants played four training rounds that demonstrated the four possible combinations of cooperation and defection outcomes (CC, CD, DC, DD). The purported partner (the computer) cooperated (C) in the first game and defected in the second game (D), which modeled both cooperative and uncooperative behavior. Individuals with BPD made significantly fewer cooperative responses compared to all other participants. They were also significantly less likely than other participants to respond cooperatively even after mutual cooperation—that is, after the individual with BPD and their purported partner had both cooperated with each other by either confessing together or remaining silent together. These results were obtained after controlling for age, cognitive ability, and reaction time.

The failure of participants with BPD to engage in reciprocal altruism/cooperative behavior even after mutual cooperation may be due to a diminished reward value assigned to mutual cooperation in those with BPD (Saunders et al., 2015; *see also* King-Casas et al., 2008). In other words, while healthy individuals feel rewarded after mutual cooperation, this may not be true in those with BPD. Additional research is needed on this issue. In addition, because the Prisoner's Dilemma is based upon the stated premise that one's partner may engage in betrayal, this may have primed the participants to expect betrayal, causing individuals with BPD to immediately demonstrate a lack of trust and lack of reactive cooperation.

Individuals with BPD may perceive unfairness, rejection, or slights when others do not. In a recent study using a variant of the Ultimatum Game, participants with BPD punished their

interaction partner more often than healthy controls when receiving fair offers and also perceived their partner's fair offers as less fair than controls (De Panfilis et al., 2019). This suggests that individuals with BPD may have distorted perceptions of the fairness of others. Interestingly, there was no response difference between those with BPD and healthy controls for objectively unfair offers. Based on these results, an argument can be made that individuals with BPD anticipate and perceive mistreatment when there is none.

A recurring theme throughout these economic game studies is the lack of trust, cooperation, understanding of context, social cues, and negotiating techniques demonstrated by individuals with BPD. Jeung et al. (2016) posit that these studies of the behavior of individuals with BPD during trust/economic games reveal that BPD patients do not value mutual cooperation (e.g., Polgár et al., 2014; Saunders et al., 2015) and have great difficulty forgiving a partner's perceived unfairness (e.g., Thielmann et al., 2014), which is supported by these research results. Jeung et al. (2016) also propose that these studies indicate that individuals with BPD act rationally and consistently with their own interests. However, the behavior of individuals with BPD in these various trust/ economic game studies appears far from rational or self-beneficial. For example, the failure to cooperate in investment games (e.g., King-Casas et al., 2008; Unoka et al., 2009) meant less money for individuals with BPD. Indeed, those with BPD felt more comfortable investing their money in the lottery than investing with a business partner (Unoka et al., 2009). The mere thought that a partner might defect (e.g., Prisoner's Dilemma) was enough to make individuals with BPD act uncooperatively and illogically (Saunders et al., 2015). These studies reveal a lack of trust, cooperation, and forgiveness (see Table A2 for a summary). Although these studies are interesting and illustrative of behavior in one context (economic/trust games), additional research is needed in more diverse and

ecologically valid contexts (e.g., measurement of everyday behavior, such as volunteerism or charitable giving).

Recent Studies Focus on Empathy and/or Self-Reported Altruism

More studies are needed examining individual differences in prosocial behavior—particularly in the context of BPD. Although two recent studies (Dziobek et al., 2008; Wingenfeld et al., 2018) came close to doing so, examining the measures and methodology reveals that both studies analyzed differences in empathy—not prosocial behavior—between participants with BPD and healthy individuals. Empathy is an emotional experience whereas prosocial behavior is the helping behavior that typically stems from feelings of empathy.

In Wingenfeld et al. (2018), women with BPD and healthy controls were subjected to the Trier-Social-Stress-Test, which elicits distress in most people by asking them to make a speech in front of strangers and subsequently receiving no feedback. Following the Trier, participants completed the Multi-Faceted Empathy Test (Dziobek et al., 2008), which measures both affective and cognitive empathy. Compared to healthy controls, participants with BPD had lower scores on affective (but not cognitive) empathy after the Trier. The authors speculated that this comparatively reduced affective empathy in participants with BPD following a stressful experience suggests that individuals with BPD engage in "fight-and-flight" behavior. In contrast, healthy individuals engage in "tend and befriend" behavior when distressed. This behavioral prediction may hold, but the study only contained a self-report measure of empathy rather than any behavioral observation. Thus, this study provides information concerning self-reported empathy differences, but nothing about observed differences in prosocial behavior. A replication and extension of this study using some sort of prosocial behavioral measure (e.g., response to a request for volunteer time or a charitable donation) would be very helpful.

Similarly, the recent Grzegorzewski et al. (2019) study did not examine prosocial behavior; it framed the study as examining the relationship between altruism and empathy in individuals with BPD. Women with BPD and healthy women completed the Questionnaire of Cognitive and Affective Empathy (Reniers et al., 2011) and the Self-Report Altruism Scale (Rushton et al., 1981). Women with BPD "demonstrated lower altruism" self-report scores. Women with BPD also had significantly lower scores for cognitive empathy but similar scores to healthy women concerning affective empathy. Although the authors stated that the results suggest that women with BPD have difficulty with "altruistic responding," the study did not contain any sort of manipulation or behavioral observation of altruistic behavior; instead, it was based upon correlations between several self-report measures. Thus, studies containing behavioral observation in the context of BPD and prosocial behavior are still greatly needed.

In sum, the extant research reveals an incomplete picture of prosocial behavior—and the reasons for the same—in individuals with BPD. The studies described above touch on prosocial behavior in the context of trust and cooperation games but do not address prosocial behavior squarely in more ecological contexts, such as charitable giving or willingness to volunteer for a cause. This is a research area that is ripe for further development and will aid in understanding the behavior of those with BPD, their symptomatology, and how these differ from other disorders (such as Antisocial Personality Disorder, with which BPD is often conflated), as well as possible interventions.

Differences in Prosociality May Be Explained by the Proposed Etiology of BPD

The research establishes that individuals with BPD see themselves as less altruistic than others (Samuel & Widiger, 2008; Saulsman & Page, 2004) and that there are marked impairments in trust and reactive cooperation within this population (Hepp et al., 2014; King-

Casas et al., 2008; Thielmann et al., 2014). The reasons for these differences in prosocial self-image and prosocial behavior likely relate to the proposed development and etiology of BPD, which is discussed below. As is discussed, these etiological factors, as well as symptom correlates, are nuanced, complex, and often intertwined. The present study examined potential reasons for differences—if any there are—in prosocial behavior between individuals high in BPD traits and typical individuals.

Individuals with BPD Have Typically Been Subjected to Abuse/Neglect/Invalidation Which Does Not Foster Prosocial Behavior

The presumed etiology of BPD can provide insight into differences in prosocial behavior between this population and typical, healthy individuals. BPD has been conceptualized as a disorder that occurs in individuals who have a biological susceptibility for difficulty with emotion regulation, coupled with some sort of childhood invalidation, which can include abuse or neglect (Crowell et al., 2014; Linehan, 1993; Paris et al., 2013; Zanarini, 2000). The literature establishes that physical, sexual, and emotional abuse are typical risk factors for the development of BPD (Crowell et al., 2014; Rogosch & Cicchetti, 2005). Up to 71% of individuals diagnosed with BPD report a childhood history of severe maltreatment (Ibrahim et al., 2018). Abuse can also create vulnerability to the development of BPD features, rather than a clinical diagnosis. A study of college students revealed that childhood physical abuse significantly predicted BPD features and a corresponding lack of cognitive empathy (Bujalski et al., 2019). Another study of college students revealed that emotional abuse significantly predicted the development of BPD features (Kuo et al., 2015).

Childhood Sexual Abuse is Typically Identified as a Risk Factor

The literature reveals that childhood sexual abuse has a particularly strong association with the development of BPD, as estimates of abuse frequency in this population range as high as 60-76% (Silk et al., 1995; Temes et al., 2017). In addition, the severity, frequency, and type of sexual abuse predict the severity of BPD symptoms, again suggesting the unique role of this risk factor (Temes et al., 2017). The most recent systematic review of sexual abuse examined 40 studies and concluded that sexual abuse is a significant risk factor for the development of BPD and is more prevalent in this population than other personality disorders (de Aquino Ferreira et al., 2018).

In contrast to a recent review of 40 studies demonstrating the high prevalence of childhood sexual abuse among the BPD population (de Aquino Ferreira et al., 2018), older research questions whether this risk factor is overstated. The Fossati et al. (1999) meta-analysis, which examined 21 previous studies, concluded that there was no support for childhood sexual abuse as a major risk factor or causal antecedent for BPD. Based on this study, it was concluded that childhood sexual abuse is neither necessary nor sufficient for the development of BPD (Temes et al., 2017).

Other Types of Abuse or Neglect May Be Considered Risk Factors

Physical and emotional abuse can also be considered significant risk factors in the development of BPD. Children who experienced harsh parenting, physical abuse, and negative maternal expressed emotion demonstrated a BPD risk 13 times that of the general population when these risk factors combine with a family history of psychiatric illness (Belsky et al., 2012). In a sample of adults with BPD, 71% reported a childhood history of emotional abuse; of this same sample, 75% reported a childhood history of verbal abuse (Reed et al., 2015). In addition,

27% of adults with BPD reported a childhood history of physical neglect, 71% reported parental invalidation of their emotions, 58% reported that parents failed to protect them, and 62% reported the need to act as a parent to their own caregiver (Reed et al., 2015).

Invalidation, Harsh Parenting and/or Parental Separation Are Potential Risk Factors as Well

In addition to the abuse research discussed previously, the literature indicates that harsh parenting practices and parental invalidation of a child's emotions can play a crucial role in the development of BPD (Cohen et al., 2008; Crowell et al., 2014; Ibrahim et al., 2018). Parental invalidation devalues a child's emotions; in common parlance, it is called *gaslighting* (Musser et al., 2018). The combination of low maternal warmth coupled with harsh punishment has been identified as conferring a strong susceptibility to the development of BPD (Cohen et al., 2008). Parental separation and parental absence can also be associated with the development of BPD (Reed et al., 2015). Highly sensitive children who are subjected to problematic parenting are at a higher risk for developing BPD and BPD features (Musser et al., 2018). This observation is based in part on parenting research generally, which demonstrates that much of a child's developmental outcome and temperament is determined by the "goodness of fit" between parenting style and child temperament (Musser et al., 2018).

In Addition to Childhood Maltreatment, BPD May Be Precipitated by Biological Sensitivity

The most accepted model to explain the development of BPD pathology is the biopsychosocial model first articulated by Linehan (1993), which expanded (Calkins & Dollar, 2014) to include consideration of genetic and environmental interactions (Amad et al., 2019; see also Flasbeck et al., 2018). The biopsychosocial model proposes that BPD is the result of an interaction between biological susceptibility to difficulties with emotion regulation/impulsivity and an invalidating/abusive childhood (Ensink et al., 2015). Studies examining genetic

vulnerability and adverse childhood experiences have revealed a synergistic effect between these two factors. For example, a study by Belsky et al. (2012) showed that only 7% of children exposed to maltreatment who lacked a family history of psychiatric disorders developed BPD. By contrast, 42% of children with a family history of psychiatric disorders who experienced maltreatment developed BPD. The presence of a family psychiatric disorder could indicate either biological or environmental risk factors (or both).

Biological Sensitivity and Harsh Parenting Practices Have Bidirectional Effects

In addition to the interaction between biological susceptibility and harsh parenting style, research also suggests that there is an interaction between the behavior of the child/adolescent with BPD traits and that of the parent (Linehan, 1993). In other words, research suggests that there is a bidirectional relationship between the child's difficult behavior (e.g., impulsivity, aggression, hostility) and the parent's harsh response style (Crowell et al., 2009).

The import of the invalidation, abuse, and harsh parenting practices which most individuals with BPD have endured is that this type of caregiving does not provide an appropriate model for behavior, and it is a particularly poor model for prosocial behavior (Music, 2011). Children who experience harsh parenting practices, abuse, neglect, or invalidation are at higher risk for developing antisocial behavior, as opposed to prosocial behavior (Abrams et al., 2019; Music, 2011). Positive attachment with a caregiver fosters the development of prosocial behavior (Mikulincer et al., 2005). The harsh caregiving typically experienced by those with BPD is inconsistent with positive attachment. Research suggests that those with a secure, positive attachment to a caregiver are more likely to engage in prosocial behavior (Mikulincer et al., 2005). The insecurity and distress experienced by those who have experienced childhood maltreatment interfere with the development of trust, cooperation, compassion, and prosocial

behavior (Mikulincer et al., 2005). Thus, the high likelihood that an individual with BPD has experienced a childhood marred by abuse, neglect, or invalidation may suggest that this population is less equipped to engage in prosocial behavior. Indeed, Unoka et al. (2009) theorized that early childhood experiences were responsible for the lack of trust displayed by participants with BPD as compared to typical individuals in the trust/economic investment games. The authors noted that maltreatment and poor fit between childhood temperament and parenting style create ideal conditions for the development of BPD and distrust of others.

Diminished Prosocial Behavior Can Be Consistent with the Symptoms of BPD

Individuals with BPD Have Poor Emotion Regulation

Individuals with BPD have poor emotion regulation skills (APA, 2013). Indeed, Linehan and others conceptualize this deficiency as the core feature of BPD (Conklin et al., 2006; Glen & Klonsky, 2009; Linehan, 1993). Research suggests that empathy and emotion regulation are positively correlated (Eisenberg, 2000). Per the empathy-altruism hypothesis, seeing someone in distress should lead to helping behavior (Batson et al., 2015). However, research concerning children (Eisenberg et al., 1998) and adults (Eisenberg et al., 1994) suggests that the inability to quell one's own distress, through emotion regulation, may lead to less prosocial behavior. Perhaps this is why children with greater abilities to regulate emotions show both greater empathy and greater prosocial behavior (Hein et al., 2018). Eisenberg (2000) reasoned that negative emotionality and emotional overarousal would lead to a focus on one's own distress, rather than focusing on the needs of others, which explains the robust relationship between empathy and emotion regulation, as well as the relationship between emotion regulation and prosocial behavior (Eisenberg et al., 1998). Per the model articulated by Eisenberg et al. (1998), people who experience frequent personal distress (such as those with BPD) typically lack

emotion regulation skills; this distress leads to self-focus and less attention to the emotions of others. All of this makes both empathy and prosocial behavior less likely. Indeed, empathy-related responding is predicted by the combination of emotional response to the distress of another and emotion regulation rather than by either of these factors separately (Eisenberg et al., 1998).

One recent study examined the use of emotion regulation strategies by individuals with BPD and controls during the Ultimatum Game (UG; De Panfilis et al., 2019). First, participants saw emotionally evocative photographs and were instructed to use cognitive reappraisal to formulate a less negative view of the situation. Second, participants were instructed on distancing techniques (e.g., "this situation will not affect me."). Participants were instructed to use these techniques during the UG (e.g., "my partner is not being stingy; it's just the best he can do"). The use of reappraisal was equally effective in decreasing punishment behavior after receiving unfair offers during the UG across groups (BPD and typical, healthy individuals). This finding suggests that individuals with BPD may be as capable as healthy individuals in learning to apply cognitive control strategies to regulate their emotions during social interactions (De Panfilis et al., 2019). Future research is needed to expound upon this emotion regulation strategy within the context of a distressing situation, as it could be beneficial to individuals with BPD.

Given that BPD is typified by intense emotion dysregulation that strongly affects thoughts, feelings, and behaviors (Crowell et al., 2014), it follows that prosocial behavior may be negatively affected. Within the context of BPD, emotion dysregulation is correlated with aggression and even antisocial behavior (Mancke et al., 2017; Newhill et al., 2012; Terzi et al., 2017).

In addition to predicting aggressive behavior, emotion dysregulation may also predict distress and a resulting disinclination to engage in prosocial behavior. Part of emotion regulation is the ability to recognize one's own emotions. An 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). Emotion dysregulation remains to be explored as one predictor of potentially reduced prosocial behavior among those with BPD. It is likely that rejection, petty slights, or even simply the fear of these things create an exaggerated response in those with BPD due to their emotion dysregulation. Indeed, individuals with BPD tend to expect, fear, and perceive rejection/insults much more than typical individuals (Gratz et al., 2013). This lack of trust, coupled with poor emotion regulation, likely plays a crucial role in prosocial behavior differences between typical individuals and those with BPD.

Studies are needed examining the relationship between BPD traits, emotion regulation, and prosocial behavior. In particular, research concerning adults, using behavior measures (e.g., laboratory observations), would expand our understanding of the role of emotion regulation within the context of prosocial behavior and BPD. The few studies that have (somewhat tangentially) examined BPD and prosocial behavior are limited to economic/trust games. Research is needed that directly addresses prosocial behavior within the context of BPD, using paradigms such as requests for charitable contributions, requests for volunteer time, or requested help in the context of an experiment (*see* Twenge et al., 2007). These behavioral observations, coupled with measures of emotion regulation, would help elucidate the differences in prosocial behavior between healthy individuals and those with BPD, along with the role that various facets of emotion regulation play in contributing to these differences.

Goals and Hypotheses

The current study examined whether BPD traits predict reduced prosocial behavior by giving participants the choice to engage in volunteer work, charitable giving, and the preparation of encouraging notes to people who are struggling. These three prosocial measures were given after a writing manipulation: one condition was designed to induce feelings of social rejection, whereas the other condition was designed to be neutral. This manipulation allowed an examination of whether BPD traits alone predict reduced prosocial behavior (control condition) or whether BPD traits will only be predictive of reduced prosocial behavior following feelings of social rejection (rejection condition). In addition, the study examined what aspects of BPD, if any, predict a reduction in prosocial behavior compared to typical healthy individuals. Specifically, the study analyzed whether emotion dysregulation and childhood maltreatment predict reduced prosocial behavior. It was hoped that this study would provide insight into how and whether individuals with BPD differ from typical individuals with regard to prosocial behavior, and whether recalling a rejection experience increased this possible difference using ecological measures of prosocial behavior as outcome variables. In addition, the study was intended to elucidate what factors and symptom correlates predict these differences, such as emotion dysregulation and childhood maltreatment. These questions are theoretically important to understand the roles of rejection, childhood maltreatment, and emotion dysregulation in prosocial behavior in those high in BPD traits. This research also has potential clinical implications for this population and how rejection can affect behavior. Below are the *a priori* hypotheses related to this research.

1. I predict that the rejection condition will be associated with reduced prosocial behavior for participants in that condition, regardless of BPD traits.

2. I predict that the rejection condition will be associated with reduced prosocial behavior, particularly those who are high in BPD traits; in other words, I predict that BPD traits alone will not be predictive of differences in prosocial behavior; instead, rejection will moderate the relationship between BPD traits and reduced prosocial behavior in that prosocial behavior differences will not be observed between typical individuals and those high in BPD traits except in the presence of rejection.
3. I predict, based on prior literature, that emotion dysregulation will be associated with reduced prosocial behavior, regardless of condition and regardless of the level of BPD traits.
4. I predict, based on prior literature, that childhood maltreatment will be associated with reduced prosocial behavior, regardless of condition and regardless of the level of BPD traits.
5. I predict that emotion dysregulation and childhood maltreatment will have a moderating effect on the negative correlation between BPD traits and prosocial behavior in the rejection condition. In other words, these symptom correlates (emotion dysregulation and the potential etiological factor of childhood maltreatment) are predicted to affect the inverse relationship between BPD traits and prosocial behavior in the rejection condition, depending upon the level of each variable (emotion dysregulation and childhood maltreatment). Specific hypotheses are articulated below:
    a. I predict that higher levels of emotion dysregulation will moderate the relationship between BPD and rejection in that the predicted inverse relationship

between BPD and prosocial behavior will be greater for those with higher levels of emotion dysregulation.

b. I predict that higher levels of childhood maltreatment will moderate the relationship between BPD and rejection in that the predicted inverse relationship between BPD and prosocial behavior will be greater for those with higher levels of childhood maltreatment.

CHAPTER III: METHODOLOGY

Methods

Participants

Two-hundred ninety-two female participants were recruited through mass screening of the University of North Carolina at Greensboro (UNCG) student subject pool using a free measure of Borderline Personality Disorder features, the Wisconsin Inventory of Personality-Borderline (WISPI-BOR; Klein et al., 1993). This measure can be used with the permission of the author, which was obtained. The study was limited to females because 75% of those diagnosed in clinical samples are female (APA, 2013); moreover, the population of UNCG is predominantly female. Participants scoring at least .5 of a deviation above the mean on the WISPI-BOR were invited to participate in the study initially (via email); other female students were able to sign up for the study through the SONA system. Oversampling was successful because the mean PAI-BOR score for the final sample was 32.82 (*SD* = 11.28). Nonclinical sample means for the PAI-BOR are much lower, as evidenced by the standardization sample used in creating the PAI-BOR (*M* = 18.03, *SD* = 10; Morey, 1991). Samples comprised of undergraduate students typically yield mean higher PAI-BOR scores than the standardization sample, but, nonetheless, feature lower mean scores than the current sample (e.g., Gardner & Qualter, 2009: *M* = 26.71, *SD* = 14.70; Jackson & Trull, 2001: *M* = 24.71, *SD* = 10.56). The success of oversampling was also evident in that 31.98% of this sample scored above 38, which is often used as a cut score indicative of clinically significant BPD traits (Trull, 1995). Thus, the sample represents a full continuum of BPD traits, with nearly a third of the sample having clinically significant BPD traits.

Power Analysis

The study was conducted online to attract more participants, as studies using Structural Equation Modeling should include a minimum of 200 participants (Curran et al., 2002; Herzog & Boomsma, 2009). The initial number of participants recruited (n = 292) was based upon the expectation that 15% of the data would need to be excluded, as data quality in online studies can be problematic due to inattention and missing data (Fleischer et al., 2015). Budgetary constraints precluded a larger sample due to the $5 payment used in the study.

Additional power analyses were performed based on a scenario in which the model failed to converge, necessitating the use of regression models instead. These analyses used G*Power (Erdfelder et al., 1996), with seven predictors (from the example equation below, which was only one part of the regression analysis that would be used if SEM was not feasible due to convergence issues; a separate regression equation would also be used for childhood maltreatment) in a multiple regression with an alpha of .05, power of .80, and a .08 (small to medium) effect size. This power analysis suggested that a sample of 179 participants would be sufficient to detect a .08 effect size.

Full Model: $Measure\ of\widehat{Prosocial\ behavior} = \alpha + \beta1(condition) + \beta2(BPD\ traits) + \beta3(emotion\ dysregulation) + \beta4(condition\ x\ BPD) + \beta5(emotion\ dysregulation\ x\ BPD\ traits) + \beta6(emotion\ dysregulation\ x\ condition) + +\beta7(emotion\ dysregulation\ x\ BPD\ traits\ x\ conditon)$

The final sample consisted of 247 participants. Demographic information for the sample is included in Table A2. The sample was young in age (M = 19.42, SD = 3.96) and racially diverse (40.9% African-American, 30.5% White, 14.6% Latinx). Data from 17 participants in the original sample were excluded based on the results of the Attentive Responding Scale – 18 item

(ARS; Maniaci & Rogge, 2014). In addition, the data from five participants in the original sample were excluded because they guessed that the purpose of the study was to examine prosocial behavior. The data of one participant were excluded due to failure to respond to one of the required writing prompts. These latter two types of exclusions (content and guessing the purpose of the study) were made based upon coding by independent undergraduate raters; kappas were excellent (99.60% agreement for writing prompt content; 96.40% for guessing study purpose). Finally, the data of 22 additional participants in the original sample were excluded due to failure to complete more than 15% of a section of the study.

Materials

Wisconsin Personality Disorders Inventory–Borderline Features (WISPI-BOR). The WISPI-BOR (Klein et al. 1993) 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 – Fourth Edition (WISPI-IV), which contains 214 self-report items concerning symptoms of DSM-IV personality disorders. The WISPI-IV has demonstrated excellent internal reliability and 2-week test-retest reliability, as well as good discriminant and concurrent validity. Although it is used less often than the PAI-BOR, it is, nonetheless, a reliable and valid measure that is appropriate to use 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 who scored .5 standard deviations above the mean. These individuals were invited to participate in the study in an attempt to represent those high in BPD traits. The WISPI-BOR is located in Appendix C.

Personality Assessment Inventory–Borderline Features (PAI-BOR). The PAI-BOR (Morey, 1991) is a 24-item self-report measure of borderline traits. Participants were asked to

rate how accurately each item describes them on a 4-point scale (ranging from 0 to 3) —false, slightly true, mainly true, and very true. The PAI-BOR is comprised of the following subscales or factors: unstable affect, identity problems, maladaptive impulsivity, and negative relationships, all of which are symptoms of BPD. The present researcher programmed Qualtrics to assign an equal number of individuals high in BPD traits (defined as those females scoring above 28 on the PAI-BOR) to each condition: "rejection" 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 also programmed to assign an equal number of participants with lower PAI-BOR scores (defined as below 18) to each condition to minimize any differences in PAI-BOR scores between conditions. Sample items from the PAI-BOR are attached in Appendix C; the full measure cannot be included for copyright reasons.

Comprehensive Child Maltreatment Scale – Adult Version (CCMS-A; Higgins & McCabe, 2001). The CCMS-A is a 22-item self-report questionnaire that measures five types of adverse childhood experiences, including physical abuse, sexual abuse, psychological maltreatment, neglect, and witnessing family violence. All scales except the witnessing scale were used to form a latent variable of childhood maltreatment. In addition, one sexual abuse question was omitted as it was only applicable to males and this study was limited to females. Each item of the CCMS is rated for the frequency of perpetration experienced at the hands of three individuals: the primary maternal figure, the primary paternal figure, and/or another older adolescent or adult. This measure has satisfactory test-retest reliability and internal consistency for each subscale of the CCMS-A (Higgins & McCabe, 2001). The questions used are attached in Appendix C.

Difficulties in Emotion Regulation Scale (DERS). The DERS (Gratz & Roemer, 2004) is a 36-item self-report measure of six facets of emotion regulation. Items are rated on a scale of 1 ("*almost never [0–10%]*") to 5 ("*almost always [91–100%]*"). Higher scores indicate more difficulty in emotion regulation. The DERS includes the following subscales: ability to identify emotions, ability to differentiate emotions, acceptance of emotional experiences, engagement in goal-directed behavior, and ability to inhibit impulsive behavior in the context of negative emotion, and the ability to use effective emotion modulation strategies. The DERS is attached in Appendix C.

The Attentive Responding Scale – 18 item (ARS). The ARS (Maniaci & Rogge, 2014*)* was used to detect inconsistent patterns of responding. The 18-item form consists of matched items (inconsistency suggests inattentive responding) and infrequency items (endorsement suggests inattentive responding). The measure uses a 5-point (1 = not at all true, 5 = very true) scale. The first pair of inattentive responding items, for example, presents the item "I am an active person" and the second set presents the item "I have an active lifestyle." Participants completed one set at the start of the survey and the other at the end. As the item content is nearly identical, variance in responses was likely due to inattentive or random responding. The scale also included infrequency items, such as "My favorite subject is agronomy." Items that were not expected responses were summed according to the magnitude of variation from the expected response (for example, a response of "very true" to the previous question had a higher infrequency score than a response of "a little bit true.") The authors' suggested cut scores of 6.5 for inconsistency items and 7.5 for infrequency items were used, resulting in the exclusion of 17 participants. The ARS is attached in Appendix C.

Writing Task: Half of the participants wrote about a rejection experience with the following prompt:

> Please write for five (5) minutes, using at least 300 characters, about a time in which you felt the most rejected in a social situation. This rejection needs to be interpersonal in nature (e. g., a time in which someone you loved broke up with you, or your best friend no longer wanted to be your friend). The rejection experience about which you write needs to be something that you still find upsetting. If there is not a rejection experience that you still find upsetting, write about the most devastating social rejection that you have experienced.
>
> Please write for five (5) minutes, using at least 300 characters. You will not be able to advance to the next screen until five (5) minutes have elapsed and 300 characters have been written.

The social rejection manipulation used in the present study was based on a reliving task that Pickett et al. (2004) developed. The other half of the participants wrote about their typical day with the following prompt: "Write for 5 minutes about your typical day. Please include aspects of your day that are positive, negative, and neutral." Qualtrics was programmed to require participants to spend at least 5 minutes and to write using at least 300 characters for each condition (rejection and typical day).

Prosocial Tasks: Five measures were used in an attempt to form a latent variable of prosocial behavior. First, participants were told that UNCG had partnered with an organization called moreloveletters.com to provide notes of encouragement to people who are struggling. Qualtrics presented ten sad stories (screen by screen) with the choice to either write a kind note or discontinue this portion of the study by clicking to advance to the next section of the study. Qualtrics instructed participants to write at least two sentences in each note; thus at least two sentences to each person in need of encouragement were needed for the note of encouragement to "count." Undergraduate raters reviewed the notes to make sure that they were

encouraging/prosocial. An example of such a person in need of encouragement (from the website moreloveletters.com) is below:

> Emily is an amazing friend going through a challenging time. Her best friend shared some of her story with us:
>
> > Emily always knows the right things to say, she's witty, and so creative. She loves all things pink and kawaii and all she wants is to spread cuteness and happy vibes to everyone.
> >
> > Emily is dealing with ongoing health challenges, including a severe physical challenge that forces her to eat a highly restrictive diet, and ongoing agoraphobia that has been compounded by the pandemic. Additionally, she is going through a divorce and is forced, for the time being, to live in less than ideal circumstances. She tends to think that others don't care about her as much as she cares about them.

This manipulation was created to provide a continuous latent variable measuring prosocial behavior, as participants could choose to send between 0 and 10 notes of encouragement. This is similar to the "request for help" used by Twenge et al. (2007) to measure prosocial behavior. In addition to the number of letters written, the amount of time spent on each letter was recorded, along with the number of words used. Based upon a small pilot study (n = 31) in which about half of the participants wrote no encouraging letters, additional language was added ("most people wrote five letters") in order to increase variability in the data. The added language was based on research suggesting that people are more likely to engage in prosocial behavior when they think others are doing so (Nook et al., 2016). This task was originally placed at the end of the pilot study, but for the experiment reported here, it was moved to appear immediately after the writing prompt to reduce fatigue when asked to write letters. The order of measures was the same for every participant.

Participants were also asked if they would be willing to donate their time in volunteer work (yes or no) to one of three chosen charities—or a charity of their choice—and how much

volunteer time they were willing to donate (1-50 hours). Volunteer time has been used as a measure of prosocial behavior in other studies (Maner et al., 2002; Xu et al., 2020).

Finally, participants were offered $5 in Amazon gift credits and allowed to either keep the money or donate some or all of it to charity, providing another measure (0-5) of prosocial behavior. An opportunity to donate a $5 gift card to charity has been used as a measure of prosocial behavior in other studies (Bruine de Bruin & Ulqinaku, 2020; Young et al., 2012). Likewise, the opportunity to keep or donate even smaller amounts of money has been used as a measure of prosocial behavior in other studies (Twenge et al., 2007; Xu et al., 2020). Most participants donated all of the money in the pilot study; to increase the variability of the data, language was added to state: "most people donated $1 and kept $4." This change was based upon the assumption that conformity can increase compliance with prosocial norms (Nook et al., 2016).

Procedure

Participants completed the Personality Assessment Inventory – Borderline and two additional questionnaires: the Difficulties in Emotion Regulation Scale (DERS) and Comprehensive Childhood Maltreatment Scales (CCMS), although for the latter, the witnessing abuse subscale was omitted due to concern that the other subscales would be more relevant to the development of BPD traits. Next, participants completed a 5-minute writing task in which half of the participants (by random assignment) recounted an incident in which they experienced their most painful social rejection. The other half of the participants wrote for five minutes about their typical day. The following outcome measures were given to all participants in the same order. Participants had the opportunity to write up to 10 letters of encouragement to people who are struggling (e.g., due to cancer or depression). After that, participants were told that the

Psychology Department was partnering with national charities to encourage student voluntarism. Participants were asked if they would like to volunteer for the charity of their choice and how many hours (1-50) that they would be willing to serve to benefit their chosen charity over the next 12 months. Participants were told that they could fulfill these hours over the course of one year to account for differences in the ability to volunteer caused by the time of year (e.g., mid-terms, final exams). Finally, participants were told that in appreciation for completing the study, they could claim Amazon gift credits up to $5 in value or donate some or all of the money to a charity of their choice. Participants were told explicitly that the money would be given to the charity of their choice if they chose to donate any amount to charity. The last question of the study asked participants to guess the study's purpose.

At the study's conclusion, participants received a debriefing explaining that their money and information would not actually be provided to their chosen charities and that all of their Amazon gift credits would be given to them regardless of their allocation in the study. Participants were given the contact information for the various charities in the debriefing.

Latent Variables

The combination of five outcome variables (charitable contributions, volunteer time, number of letters of encouragement, time spent on letters, and number of words in letters) was intended to create a latent variable of prosocial behavior. The PAI-BOR items were used to create a latent variable of BPD traits. The DERS was used to create a latent variable of emotion dysregulation. The CCMS was used to create a latent variable of childhood maltreatment.

CHAPTER IV: RESULTS

Preliminary Analyses

Preliminary analyses were conducted using SPSS version 26. Means, standard deviations, and alphas are included for all of the measures used in the current study (Table A3). The internal consistency for the self-report measures was .73 (PAI-BOR), .89 (CCMS), and .90 (DERS), which indicates that the internal consistency reliability for the global measures employed in the current study ranged from adequate to excellent; however, it should be noted that the Physical Abuse scale of the CCMS had questionable reliability (.63). Correlations between the original predictor variables can be found in Table A5. Correlations between outcome variables are shown in Table A6.

A series of *t*-tests were performed using SPSS to determine if group differences (writing about a rejection experience versus writing about a typical day) existed with regard to the PAI-BOR, DERS, physical abuse, sexual abuse, psychological abuse, or neglect. No significant differences were detected between the groups (Table A4). Thereafter, Mplus (Version 8.8; Muthén & Muthén, 2017) was used to conduct the structural equation model analyses of the hypotheses. Model fit of predictor variables was assessed by examining the comparative fit index (CFI; Marsh et al., 2007), the standardized root-mean-square residual (SRMR), and the root mean square error of approximation (RMSEA; Cole & Maxwell, 2003). CFI values close to or greater than .95 indicate good model fit, RMSEA values less than .06 indicate good model fit, and SRMR values less than or equal to .08 indicate good model fit (Hu & Bentler, 1999).

The data for both predictor and outcome variables (number of letters, number of words in letters, time spent on letters, money donated, and volunteer time) were skewed, as is often the

case with behavioral data (Curran et al., 1996). In the case of skewed data, one option is to transform variables; however, transformations can alter the linear relationship between variables, making it difficult to interpret the data (Field & Wilcox, 2017). Another option, robust maximum likelihood, effectively offsets the bias introduced by a non-normal distribution and preserves interpretability (Field & Wilcox, 2017; Gao et al., 2020). Accordingly, robust maximum likelihood estimation was used for the analysis.

Measurement Models

BPD Traits

The PAI-BOR was used to create a latent variable of BPD traits. As created by Leslie Morey (1991), it is comprised of four factors intended to capture the core symptoms of BPD (affective instability, identity problems, negative relations, and self-harm). Because results can vary when using a different sample than the original norming group, a confirmatory factor analysis (CFA) was conducted to determine if good model fit existed using Morey's four factors with these data. The initial CFA using Morey's four factors had poor model fit (CFI = .62; TLI = .61; RMSEA= .09; SRMR = .10). In addition to these indicators of poor fit, two factors in the model (affective instability and identity disturbance) were so highly correlated (r = .87) that they, in effect, measured the same construct (Kline, 2011). The Morey four-factor model as applied to this data set also included several very low indicator loadings (e.g., < .3), making it a poor choice for analysis of the data.

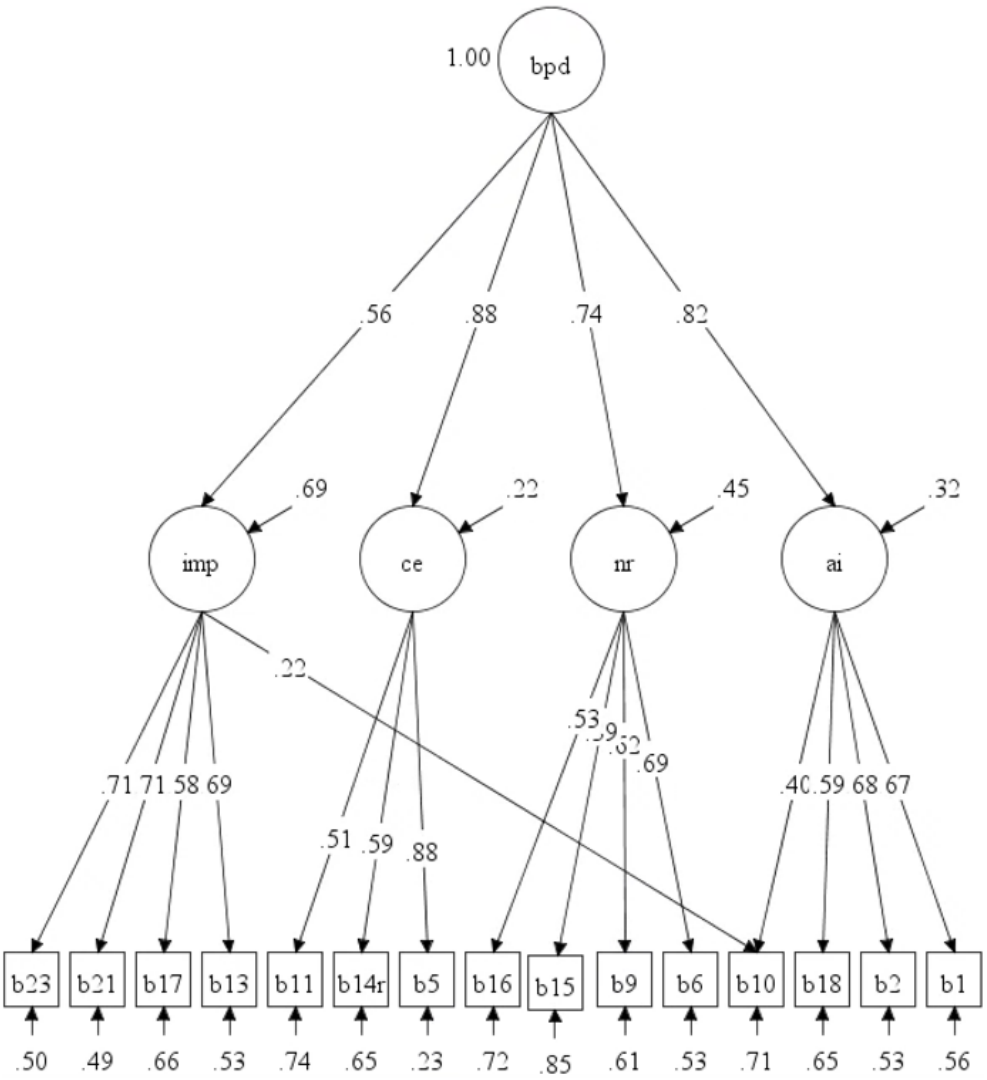
Because of the poor fit of Morey's four-factor model, the six-factor model (impulsivity/dyscontrol, mood instability, chronic emptiness, separation concerns, negative relations, reckless spending with indicators for each factor varying from two to six) created by Jackson and Trull (2001) was assessed. A CFA using this six-factor model was still inadequate

(CFI = .81; TLI = .80; RMSEA = .08; SRMR = .07) and two factors (separation difficulties and negative relationships) were, again, so highly correlated that they appeared to measure the same construct (r = .90). In addition, several indicators had extremely low standardized loadings onto their respective factors (e.g., < .3) and one indicator (reckless spending) had a standardized loading greater than one.

Because neither the 4-factor model created by Morey, nor the 6-factor model suggested by Jackson and Trull (2001) resulted in good model fit, an exploratory factor analysis (EFA) was undertaken using PAI-BOR data from prior studies at this university. In two separate exploratory factor analyses based upon prior data and current data, respectively, there was very high multicollinearity between two factors (> .85), which prevented the use of these models (Kline, 2011). Next, an exploratory structural equation model (ESEM) was used to create a more parsimonious model for the PAI-BOR, which resulted in an adequate model with indicators loading onto five factors (recklessness, chronic emptiness, negative relationships, financial irresponsibility, and affective instability). The model was refined by removing items with large standardized residual variance (> 2). One cross-loading was added, due to the overlap between the affectively instability and impulsivity for the question: "I have little control over my anger." The resulting model had good fit (CFI = .94; TLI = .93; RMSEA = .05; SRMR = .05). However, the factor entitled "financial irresponsibility" had a poor loading on the overall construct of BPD (r = .26); therefore, this factor was dropped from the model, creating a final four-factor model comprised of recklessness, chronic emptiness, negative relationships, and affective instability. This model (see Model 1 below) had excellent fit (CFI = .96; TLI = .95; RMSEA = .04; SRMR = .05; *see* Table A7 in Appendix A for fit statistics) and dropped eight (questions 3, 4, 7, 8, 12, 19, 22, 24; see Appendix C for selected list of questions) of the original 24 PAI-BOR indicators.

Unless otherwise indicated, models use standardized (xy) loadings. For terms used in models, see Table A8 in Appendix A.

Figure 1. Model 1: BPD as Measured by the PAI-BOR



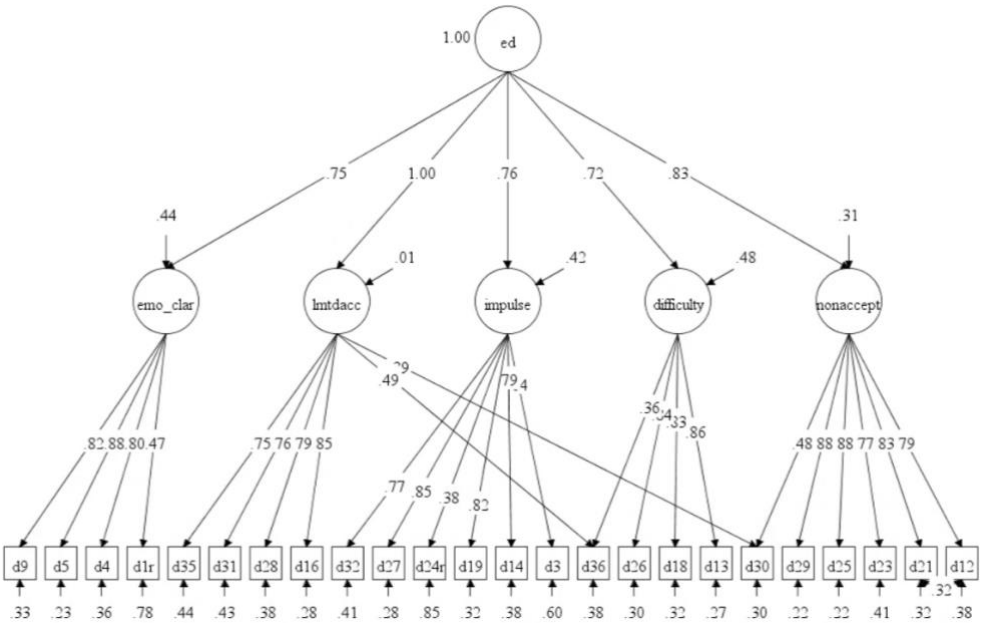
Note. BPD = BPD traits as measured by the PAI-BOR
ai = affective instability
reck = recklessness
nr = negative relationships
ce = chronic emptiness

Emotion Dysregulation

A latent variable of emotion dysregulation was based upon the DERS (Gratz & Roemer, 2004). Confirmatory Factor Analysis was performed on the DERS, using the six factors created by Gratz and Roemer (2004). The model was refined by removing six items with large standardized residual variances (> 2; Items 7, 11, 15, 20, 22, and 33). Modification indices also suggested that Item 36, an item measuring "limited ability to access emotion regulation strategies" ("When I'm upset, my emotions feel overwhelming") should crossload on the factor entitled "difficulty engaging in goal-directed behavior"; there was also a crossloading for item 30, which measures "limited ability to access emotion regulation strategies" ("When I'm upset, I start to feel very bad about myself") onto the "nonacceptance of emotional responses" factor. In addition, Items 12 and 21 correlated. This yielded a model with adequate fit (CFI = .94; TLI = .93; RMSEA = .06; SRMR = .07), but one factor, "lack of emotional awareness" had a low loading (r = .32). Thereafter, this factor was dropped from the model, yielding a model with better fit (CFI = .95; TLI = .95; RMSEA = .06; SRMR = .05), and which included 24 of the original 36 indicator questions (See Model 2).

Once good model fit was achieved for these two latent variables, as measured by the PAI-BOR and the DERS, they were tested together, revealing a correlation of .89, which indicated that they were measuring the same construct (Kline, 2011). Due to this high multicollinearity, the two measures could not be included in the same model. Given that emotion dysregulation has been identified as not only a symptom, but indeed the core feature of BPD, it was not surprising that there was multicollinearity between these two constructs (Carpenter & Trull, 2013; Crowell et al., 2009; Linehan, 1993).

Figure 2. Model 2: Emotion Dysregulation (ED) as Measured by the DERS-36



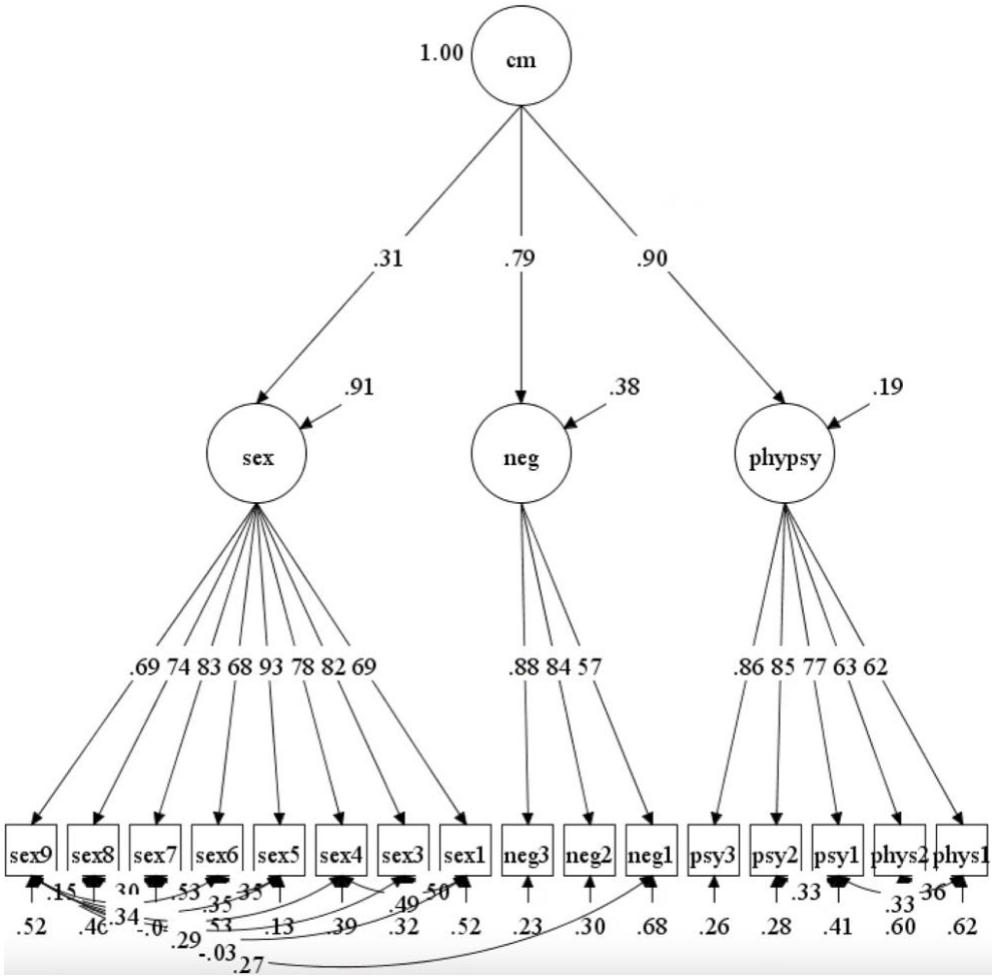
Note. Standardized(xy) loadings were used; however, Limited Acceptance of Difficult Emotions has a standardized loading that rounds up to 1.00
ED = Emotion Dysregulation as measured by the DERS
emo_clar = lack of emotional clarity
ltdacc = limited access to emotion regulation strategies
difficulty = difficulty engaging in goal-directed behavior
nonaccept = nonacceptance of emotional responses
impulse = impulse control difficulties

Childhood Maltreatment

The latent variable of childhood maltreatment was based upon a modified version of the CCMS, which included four categories of maltreatment: physical abuse, sexual abuse, psychological abuse, and neglect. These categories were originally designed to load onto three factors: nonsexual abuse, sexual abuse, and uncommon sexual abuse. Because the witnessing abuse scale of the original CCMS was not used and items specific to males were also removed from the CCMS, an EFA was performed to determine appropriate factors for this version of the CCMS. The EFA yielded three factors (1) sexual abuse, 2) physical and psychological abuse together as one factor comprising nonsexual abuse, and 3) neglect as the third factor. A

subsequent CFA revealed good model fit after dropping several items with large standardized residual variance and adding correlated residuals between types of abuse where theoretically justified (see Model 3, below; CFI = .98; TLI = .97; RMSEA = .05; SRMR = .06).

Figure 3. Model 3: Childhood Maltreatment as measured by CCMS



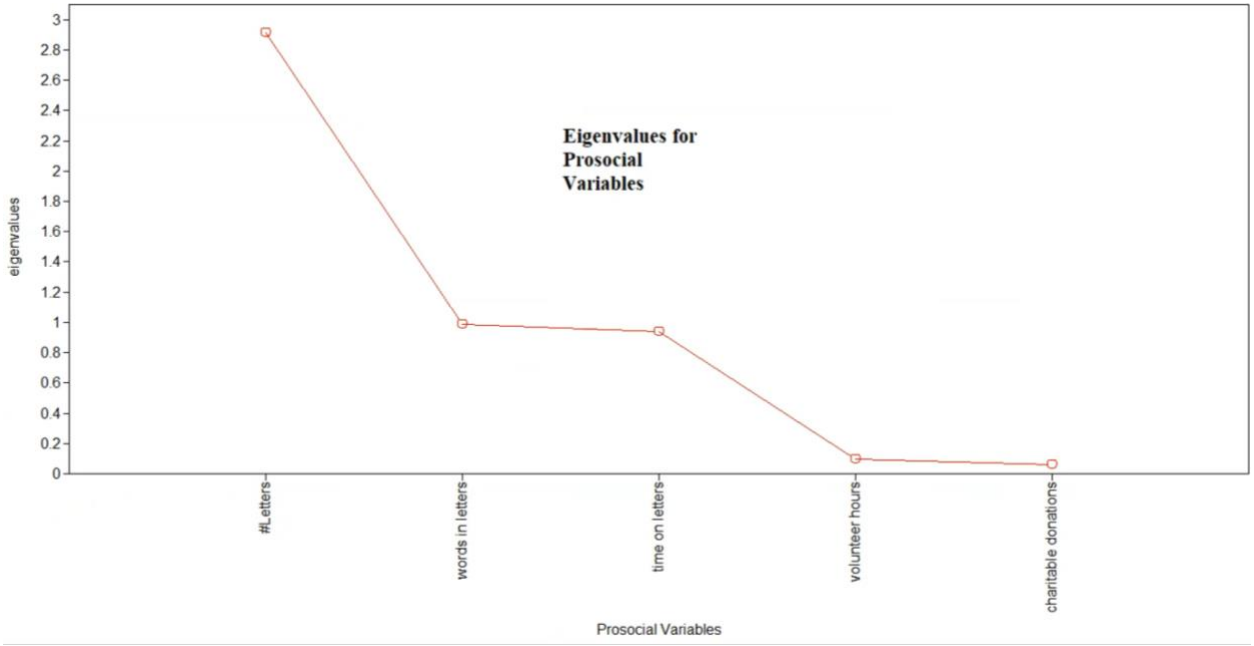
Note. CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect

Prosocial Behavior

Thereafter, an EFA was performed to create an outcome variable (see Table A6 in Appendix A) of prosocial behavior to be potentially comprised of (a) number of encouraging

letters written; (b) time spent on encouraging letters; (c) number of words in encouraging letters; (d) amount of time willing to volunteer over the course of one year; and (e) money donated to charity, using MPlus Version 8.8. The eigenvalues for number of letters and time spent on letters were both greater than one, suggesting that these two items should be included in the latent variable. The third item (words in letters) had an eigenvalue slightly less than one, but it is theoretically connected to the other letter-related items (see Figure 4). Accordingly, the three "letter-related" components were retained to create a latent variable of "letters of encouragement." The other two indicators (volunteer hours and money donated to charity) were analyzed in separate models because they failed to load onto a single construct.

Figure 4. Eigenvalues for Prosocial Measures



Hypothesis Testing

Models Using Encouraging Letters as Measure of Prosocial Behavior

The hypotheses analyzed are stated on pages 27-29**.** These hypotheses were tested using path analysis within the structural equation models. To minimize the number of models, the models are depicted using condition as a predictor variable, rather than using separate grouping models for each condition. (In addition, the effect of condition alone was significant in only two models.) Three sets of models with three different outcome variables were used due to the failure of all five prosocial measures to load onto a single construct of prosocial behavior. The three letter-related measures (number of letters written, words in letters, time spent on letters) did load onto a single construct and were used to create a single latent variable of "letters of encouragement." This outcome variable is used in Models 4-6. The remaining two prosocial measures (money donated to charity and volunteer hours) were analyzed as separate outcome measures (Models 7-12). Because of the multi-collinearity between BPD traits and ED, these constructs were analyzed using separate models; accordingly, ED was included in Models 5, 8, and 11. BPD traits were examined in Models 4, 6-7, 9-10, and 12.

Traditional indicators of model fit (CLI, TLI, RMSEA) were not available for Models 4-12 due to the examination of the interaction between condition and latent variables necessitating the use of an integration algorithm in MPlus (Muthén & Muthén, 2017). Accordingly, Akaike information criterion (AIC) and Bayesian information criterion (BIC) indicators of model fit can be substituted by comparing the fit of various models and selecting the model with lower values for AIC and BIC, as lower values are indicative of better fit and a more parsimonious model (Asparouhov & Muthén, 2021; Huang, 2017; see Table A9 in Appendix A).

Hypothesis 1 (Examined Using Model 4: Encouraging Letters Regressed on BPD/CM/Condition)

To test the first hypothesis—namely, that the rejection condition would be associated with reduced prosocial behavior, particularly in those individuals high in BPD traits, a moderation model with "letters of encouragement" as the outcome variable was created (see Model 4, below). BPD traits and childhood maltreatment were included in this model, but emotion dysregulation was not (due to the multicollinearity between BPD traits and emotion dysregulation). Model 4 revealed that condition did not have a significant main effect on prosocial behavior, as measured by letters of encouragement (Hypothesis 1).

Hypothesis 2 (Examined Using Model 4: Encouraging Letters Regressed on BPD/CM/Condition)

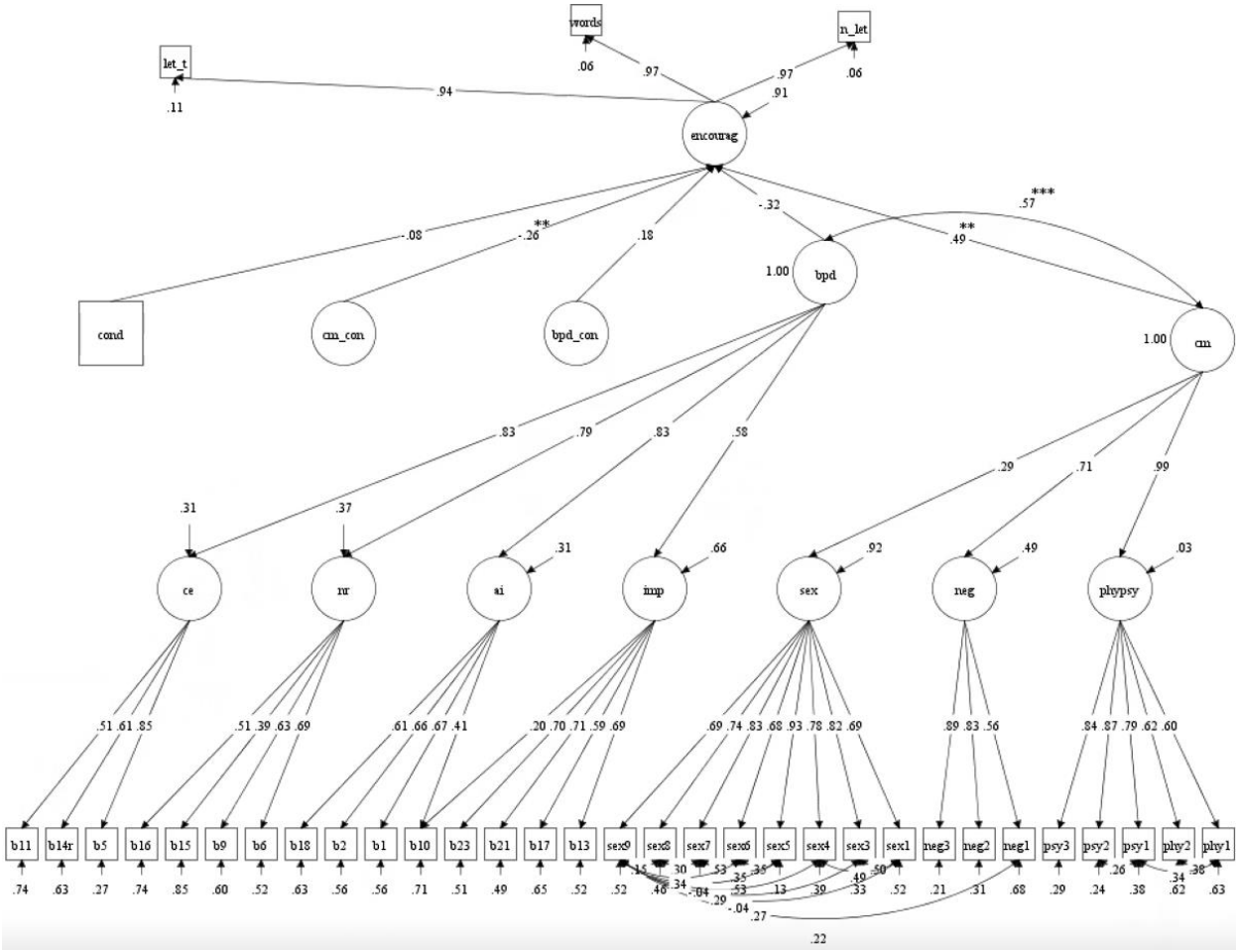
Contrary to Hypothesis 2, there was not a significant interaction between condition and BPD traits (*ß* = .19 *p* = .14). For participants in the typical day condition (coded as 0), a one standard deviation increase in BPD traits was associated with a .32 standard deviation decrease in prosocial behavior, as measured by encouraging letters (*ß* = -.32, *p* = .14); for participants in the rejection condition (coded as 1), there was a .13 standard deviation decrease in prosocial behavior for each one standard deviation increase in BPD traits. There was a decrease in prosocial behavior associated with BPD traits in both conditions, but neither was significant.

Hypothesis 4 (Examined Using Model 4: Encouraging Letters Regressed on BPD/CM/Condition)

There was a significant interaction between childhood maltreatment and condition in that participants with higher levels of childhood maltreatment engaged in less prosocial behavior (encouraging letters) in the rejection condition, as compared to the control condition (*ß* = -.26., *p*

=. 009). For participants in the typical day condition (coded as 0), there was a .49 standard deviation increase in prosocial behavior, as measured by encouraging letters, for each standard deviation increase in childhood maltreatment (ß = .49, p = .009). For participants in the rejection condition (coded as 1), there was a .23 standard deviation increase in prosocial behavior, as measured by encouraging letters, for each standard deviation increase in childhood maltreatment. In addition, there was a significant association between BPD traits and childhood maltreatment (ß = .57, p < .001; see Table A10 for regression coefficients and factor loadings for Model 4).

Figure 5. Model 4: BPD, CM, and Condition on Encouraging Letters



Note. Significant paths between predictor and outcome variables are noted.
*p <05
**p <.01

***p <.001
BPD = BPD traits as measured by the PAI-BOR
ai = affective instability
reck = recklessness
nr = negative relationships
ce = chronic emptiness
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
encourag = latent variable composed of the following indicators: 1) num_lett (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) letter_t (amount of time (in seconds) spent on writing encouraging letters).

Hypothesis 3 (Examined Using Model 5: Encouraging Letters Regressed on ED/CM/Condition)

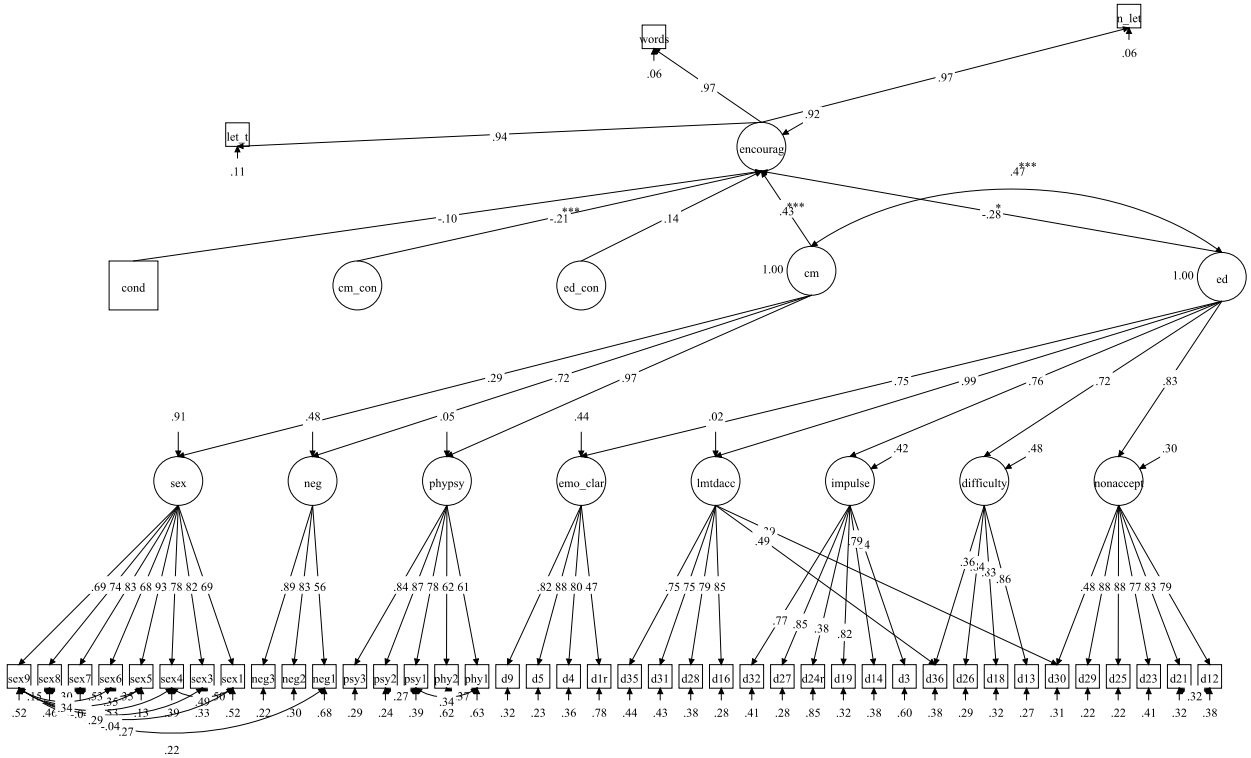
In order to examine Hypothesis 3 (that there would be a negative correlation between prosocial behavior and emotion dysregulation), Model 5 (see below) included emotion dysregulation, childhood maltreatment, and condition as predictors. There was not a significant interaction between emotion dysregulation and condition (ß = .14, p = .06). Emotion dysregulation was associated with significantly reduced prosocial behavior, as measured by encouraging letters. For participants in the typical day condition (coded as 0), there was a .28 standard deviation decrease in prosocial behavior, as measured by encouraging letters, for each standard deviation increase in emotion dysregulation (see Model 5 below; ß = -.28, p = .03). For participants in the rejection condition (coded as 1), there was a .14 standard deviation decrease in prosocial behavior, as measured by encouraging letters, for each standard deviation increase in emotion dysregulation.

Hypothesis 4 (Examined Using Model 5: Encouraging Letters Regressed on ED/CM/Condition)

As in Model 4, there was a significant interaction between childhood maltreatment and condition in that participants with higher levels of childhood maltreatment engaged in less

prosocial behavior in the rejection condition than in the control condition (*ß* = -.21, *p* = .009). Contrary to prediction (Hypothesis 4), childhood maltreatment was associated with significantly increased prosocial behavior in the control condition. For participants in the typical day condition (coded as 0), there was a .43 standard deviation increase in prosocial behavior, as measured by encouraging letters, for each standard deviation increase in childhood maltreatment (*ß* = .43, *p* = .009). For participants in the rejection condition (coded as 1), there was a .22 standard deviation decrease in prosocial behavior, as measured by encouraging letters, for each standard deviation increase in childhood maltreatment. Thus, the rejection condition changed the magnitude of the effect of childhood maltreatment on prosocial behavior (see Table A11 for factor loadings and regression coefficients for Model 5).

Figure 6. Model 5: ED, CM & Condition on Encouraging Letters



Note. Significant paths between predictor and outcome variables are noted.
$^{*}p < .05$

** $p < .01$
*** $p < .001$
ED = Emotion Dysregulation as measured by the DERS
emo_clar = lack of emotional clarity
ltdacc = limited access to emotion regulation strategies
difficulty = difficulty engaging in goal-directed behavior
nonaccept = nonacceptance of emotional responses
impulse = impulse control difficulties
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
encourag = latent variable composed of the following indicators: 1) num_lett (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) letter_t (amount of time (in seconds) spent on writing encouraging letters).

Hypothesis 5 (Examined Using Model 6: Encouraging Letters Regressed on BPD/CM/Condition With Three-Way Interaction Between Predictors)

To examine Hypothesis 5 (that a 3-way interaction between BPD, CM, and condition would be significant), Model 6 was created with BPD, CM, condition as predictors with their respective interactions (BPD*CM, BPD*condition, CM*condition, CM*BPD*condition). Contrary to prediction, the three-way interaction between condition, BPD traits, and childhood maltreatment was not significant (unstandardized Beta [*B*] = 1.94, $p = .10$). Standardized loadings and standardized regression coefficients were not available due to the analysis of the three-way interaction (see Table A12 for unstandardized factor loadings, regression coefficients, and incident rate ratios [IRR] for Model 6). The model is not pictured due to limitations in MPlus software. There was a significant interaction between BPD traits and condition in that individuals higher in BPD traits engaged in more prosocial behavior, as measured by encouraging letters, in the rejection condition, as compared to the typical day condition ($B = 1.88$, $p = .01$); this was contrary to the direction of the prediction articulated in Hypothesis 4. As in Models 4-5, there was an interaction between childhood maltreatment and condition, such that those with higher levels of childhood maltreatment engaged in less prosocial behavior in the rejection condition, as

compared to the typical day condition (B = -1.36, p = .004). As in Models 4-5, the effect of condition on encouraging letters was not significant (B = -.47, p = .055). As in Models 4-5, childhood maltreatment was associated with increased prosocial behavior, as measured by encouraging letters, in the control condition (coded as 0; B = 1.32, p =.004). Incident rate ratio (IRR) data based upon exponentiated coefficients can be interpreted alongside parameter estimates (Table A12). Using IRR, when other predictors were held constant, those with higher levels of childhood maltreatment had 3.73 more incidents of prosocial behavior, as defined by encouraging letters, in the control condition. In this model, BPD traits were associated with significantly reduced prosocial behavior, as measured by encouraging letters, in the control condition (B = -1.73, p =.02). Using IRR, this can be interpreted as individuals in the control condition who were high in BPD traits having 82.3% fewer incidents of prosocial behavior, as measured by encouraging letters, when other predictors were held constant. The interaction between BPD traits and childhood maltreatment was not significant (B = -2.12, p = .07), just as the three-way interaction between BPD traits, condition, and childhood maltreatment was not significant (p = .10). Due to multicollinearity, BPD and ED could not be analyzed in the same model precluding examination of Hypothesis 5a.

Models Using Volunteer Hours as Measure of Prosocial Behavior

Hypothesis 1 (Examined Using Model 7: Volunteer Hours Regressed on BPD/CM/Condition With Three-Way Interaction Between Predictors)

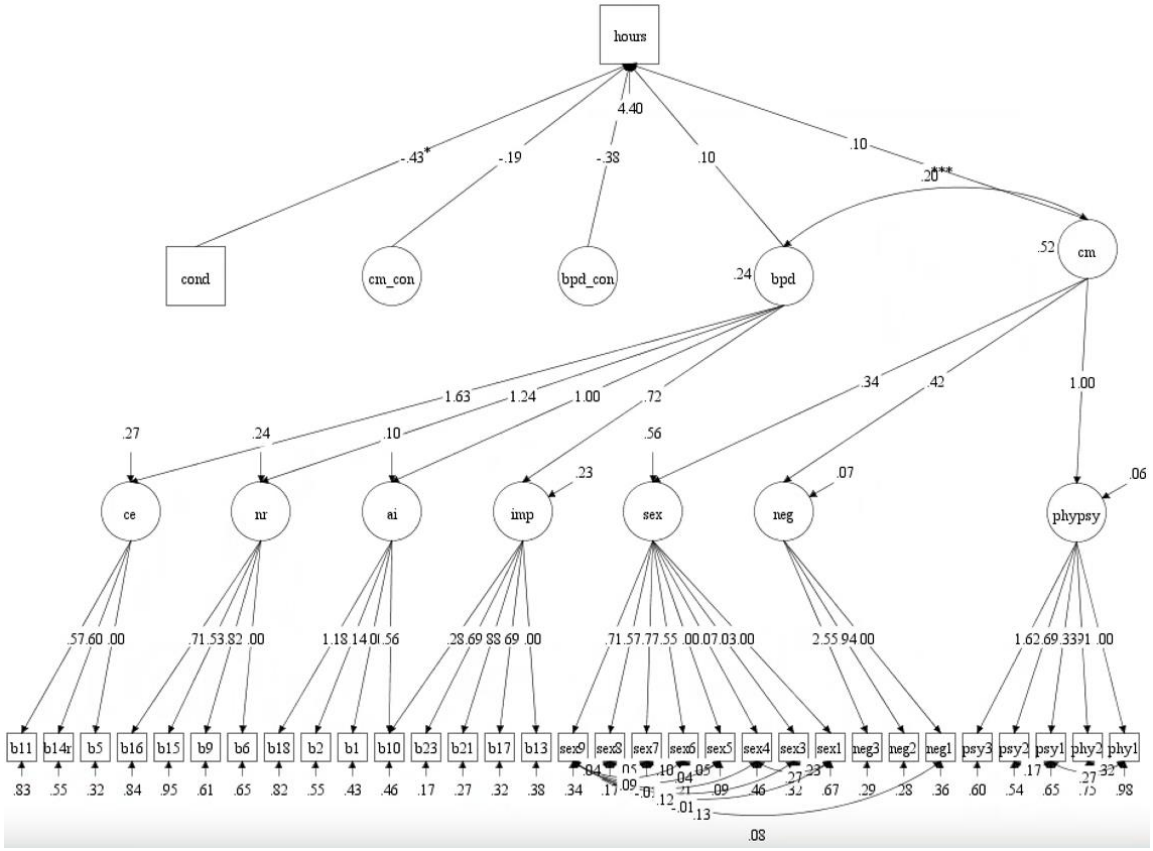
Volunteer hours and money donated did not load onto a single component, necessitating separate models for these two outcome variables, respectively. Because the volunteer hours variable was analyzed as a count variable using a negative binomial distribution (appropriate for models using outcome variables with variance greater than their mean) with a general random

type analysis, standardized estimates are not available, requiring that unstandardized coefficients (denoted as *B*) be used. In Model 7, the only significant predictor variable of volunteer hours was condition (B = -.43, p = .04) in that the rejection condition was associated with fewer volunteer hours. This model is consistent with the hypothesis that the rejection condition would predict less prosocial behavior, as measured by volunteer time (Hypothesis 1).

Hypotheses 3, 4, 5 (Examined Using Model 7: Volunteer Hours Regressed on BPD/CM/Condition)

Model 7 results reveal that neither BPD traits (B = .10, p = .80), nor childhood maltreatment (B = .10, p = .65), predicted reduced prosocial behavior (Hypotheses 2 and 3) as measured by volunteer hours. There was no significant interaction between BPD traits and condition (Hypothesis 5; B = -.38, p = .47). Likewise, no significant interaction existed between childhood maltreatment and condition (B = -.20, p = .62). As in other models, BPD traits and childhood maltreatment had significant shared variance (B = .18, p < .001). This model is parsimonious with regard to fit (AIC_{model7} = 18620.59; BIC_{model7} = 19059.261; see Table A13 for regression coefficients, confidence intervals, and incident rate ratios).

Figure 7. Model 7: BPD, CM, and Condition Regressed on Volunteer Hours



Note. This model contains covariance estimates due to unstandardized data in count model using negative binomial distribution.
*p <.05
**p < .01
***p <.001
BPD = BPD traits as measured by the PAI-BOR
ai = affective instability
reck = recklessness
nr = negative relationships
ce = chronic emptiness
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
Hours = number of volunteer hours

Hypothesis 1 (Examined Using Model 8: Volunteer Hours Regressed on ED/CM/Condition)

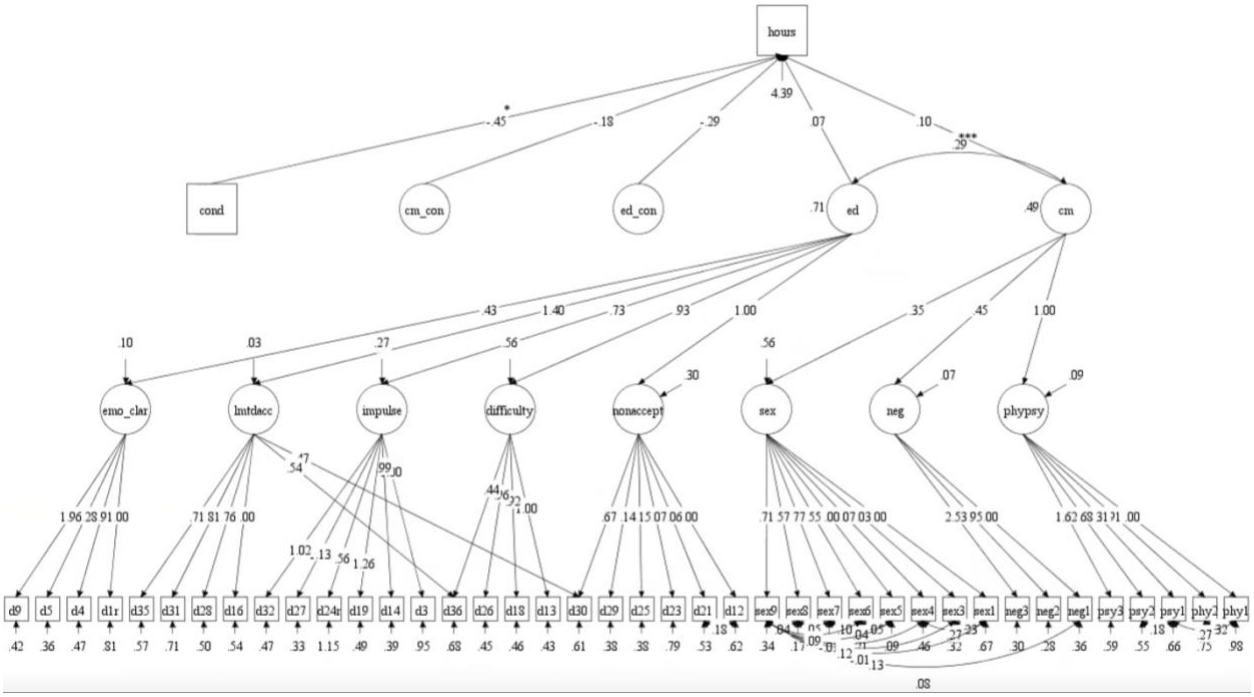
Model 8 examined the regression of volunteer hours on emotion dysregulation, childhood maltreatment, and condition. The only significant predictor variable of volunteer hours was

condition (B = -.45, p = .04); the rejection condition was associated with fewer volunteer hours. This model is consistent with the hypothesis that the rejection condition would predict less prosocial behavior, as measured by volunteer time (Hypothesis 1).

Hypotheses 3, 4, 5 (Examined Using Model 8: Volunteer Hours Regressed on ED/CM/Condition)

Model 8 results reveal that neither emotion dysregulation (B = .07, p = .76) nor childhood maltreatment (B = .10, p = .65) predicted reduced prosocial behavior (Hypotheses 3 and 4). The interaction between emotion dysregulation and condition was not significant (B = -.30, p = .32). Likewise, no significant interaction was found between childhood maltreatment and condition (B = -.18, p = .65). Emotion dysregulation and childhood maltreatment had a significant shared variance (B = .29, p < .001). This model is less parsimonious with regard to fit, when compared to Model 7 (AIC_{model8} = 24893.25; BIC_{model8} = 25437.20; see Table A12 for regression coefficients, confidence intervals and incident rate ratios). As in Model 7, the effect of condition was significant in that the rejection condition predicted fewer volunteer hours (B = -.45, p = .04; see Table A14 for regression coefficients and factor loadings).

Figure 8. Model 8: Emotion Dysregulation, Childhood Maltreatment, and Condition Regressed on Volunteer Hours



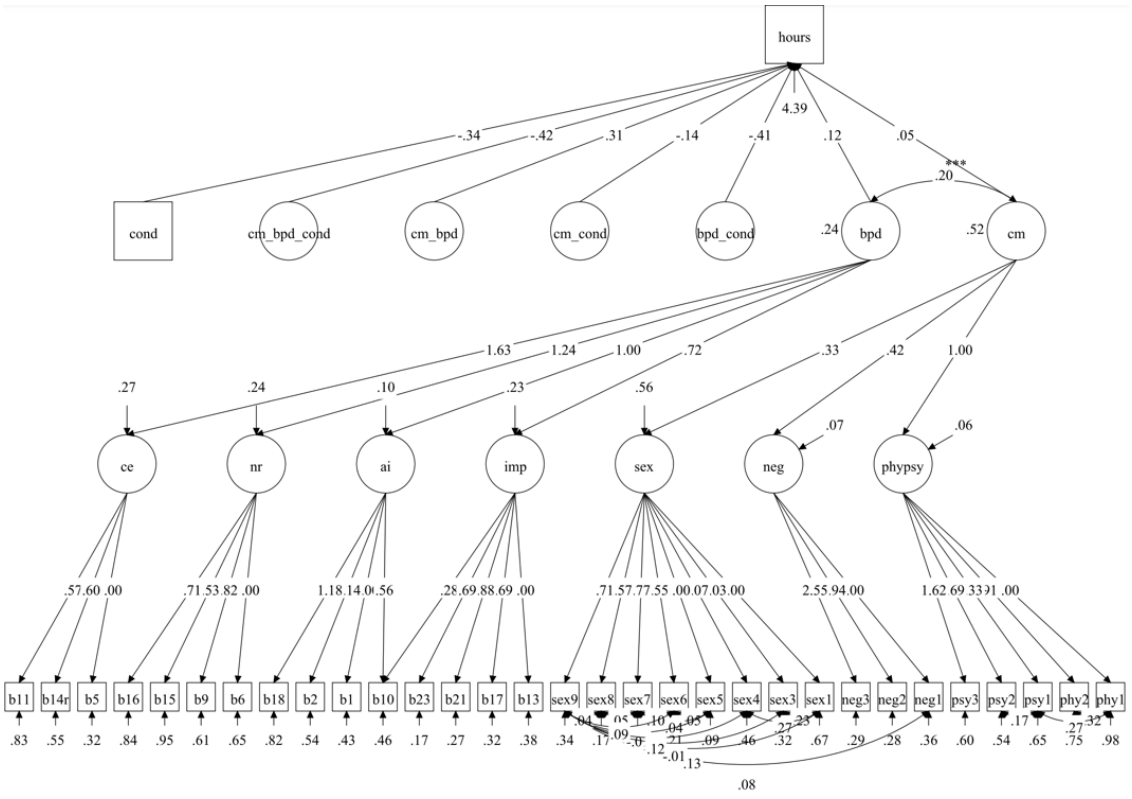
Note. This model contains covariance estimates due to unstandardized data in count model using negative binomial distribution.
$^{*}p$ <.05
$^{**}p$ < .01
$^{***}p$ <.001
ED = Emotion Dysregulation as measured by the DERS
emo_clar = lack of emotional clarity
ltdacc = limited access to emotion regulation strategies
difficulty = difficulty engaging in goal-directed behavior
nonaccept = nonacceptance of emotional responses
impulse = impulse control difficulties
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
Hours = number of volunteer hours

Hypotheses 1-2, 4-5 (Examined Using Model 9: Volunteer Hours Regressed on BPD/CM/Condition With Three-Way Interaction Between Predictors)

Model 9 examined volunteer hours regressed on BPD traits, childhood maltreatment, and condition with a three-way interaction between predictors. In this model, condition did not

predict any difference in prosocial behavior, as measured by volunteer hours pledged (Hypothesis 1; B = -.34, p = .16). Neither BPD traits (Hypothesis 2; B = .12, p = .74), nor childhood maltreatment (Hypothesis 4; B = .05, p = .83), were predictive of prosocial behavior, as measured by volunteer hours. There was no significant interaction between BPD traits and condition with regard to prosocial behavior, as measured by volunteer hours (Hypothesis 5; B = -.41, p = .44). There was no significant interaction between BPD traits and childhood maltreatment (B = .31, p = .47). Finally, there was no significant three-way interaction between condition, BPD traits, and childhood maltreatment (Hypothesis 5; B = -.42, p = .43). Model fit data were was similar to Model 7 (without the three-way interaction; AIC_{model9} = 18624.32; BIC_{model8} = 19070.01; see Table A15 for regression coefficients and factor loadings for Model 9).

Figure 9. Model 9: 3-Way Interaction Between BPD, Childhood Maltreatment, and Condition



Note. This model contains covariance estimates due to unstandardized data in count model using negative binomial distribution.
$^{*}p$ <.05
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$^{***}p$ <.001
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nonaccept = nonacceptance of emotional responses
impulse = impulse control difficulties
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
Hours = number of volunteer hours

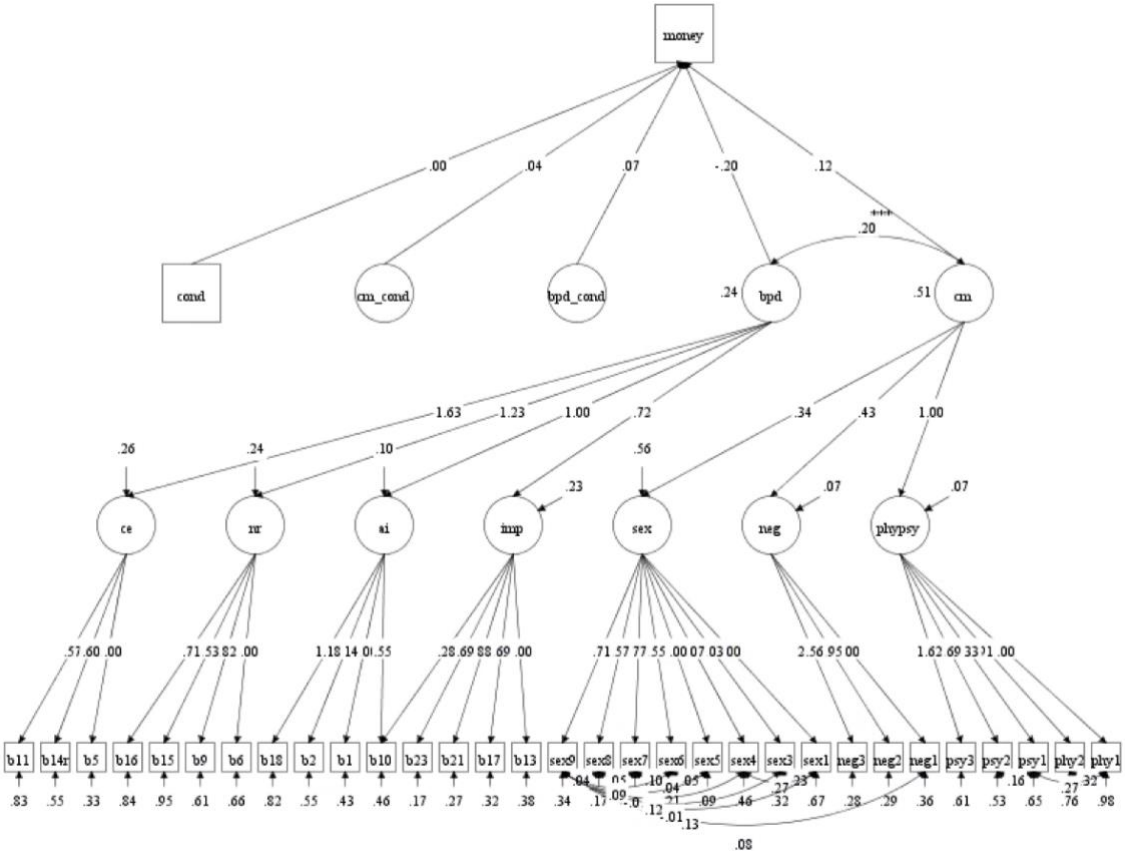
Models Using Money Donated to Charity as Measure of Prosocial Behavior

Hypotheses 1-2, 4-5 (Examined Using Model 10: Money Donated Regressed on BPD/CM/Condition)

Model 10 examined prosocial behavior, as measured by money donated, using BPD traits, childhood maltreatment, and condition as predictors. As in Models 7-9, only parameters (e.g., covariances) were available using MPlus, due to the use of a Poisson distribution for money donated, as this was the best fitting model for this count variable, per comparison of fit measures (AIC, BIC). There was no significant effect of condition (Hypothesis 1; B < .01, p = .98). The effect of BPD traits upon prosocial behavior, as measured by money donated to charity, was insignificant (Hypothesis 2; B = -.20, p = .27). Contrary to expectation, the effect of childhood maltreatment on money donated was non-significant (Hypothesis 4; B = .12, p = .28). Contrary to prediction, there was no significant interaction between BPD traits and condition (Hypothesis 5; B = .08, p = .75). Likewise, there was no significant interaction between

childhood maltreatment and condition (B = .04, p = .77; *see* Table A16 for regression coefficients and factor loadings for Model 10).

Figure 10. Model 10: BPD, Childhood Maltreatment, and Condition Regressed on Money Donated

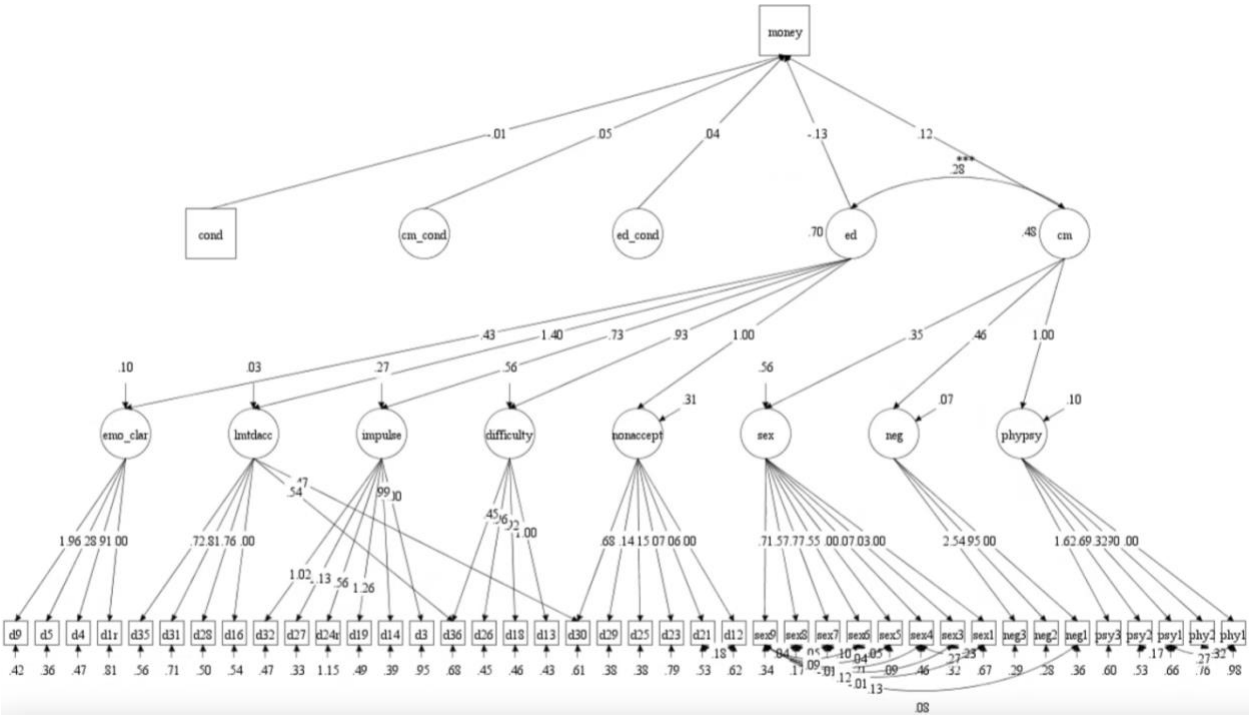


Note. This model contains covariance estimates due to unstandardized data in count model using Poisson distribution.
$^{*}p$ <.05
$^{**}p$ < .01
$^{***}p$ <.001
BPD = BPD traits as measured by the PAI-BOR
ai = affective instability
reck = recklessness
nr = negative relationships
ce = chronic emptiness
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
money = amount of money donated to charity from Amazon gift card

Hypotheses 1, 3-5 (Examined Using Model 11: Money Donated Regressed on ED/CM/Condition)

Model 11 examined prosocial behavior, as measured by money donated, using emotion dysregulation, childhood maltreatment, and condition as predictors. As in Models 7-10, only parameters (e.g., covariances) were available using MPlus, due to the use of a Poisson distribution for money donated, as this was the best fitting model for this count variable. There was no significant effect of condition (Hypothesis 1; B < .01, $p = .85$). Contrary to expectation, the effect of emotion dysregulation upon prosocial behavior, as measured by money donated to charity, was insignificant (Hypothesis 2; $B = -.13$, $p = .10$). Contrary to expectation, the effect of childhood maltreatment on money donated was not significant (Hypothesis 4; $B = .12$, $p = .19$). Contrary to prediction, there was no significant interaction between emotion dysregulation and condition (Hypothesis 5; $B = .04$, $p = .72$). Likewise, there was no significant interaction between childhood maltreatment and condition ($B = .05$, $p = .70$; see Table A17 for regression coefficients and factor loadings for Model 11).

Figure 11. Model 11: Emotion Dysregulation, Childhood Maltreatment, and Condition Regressed on Money Donated

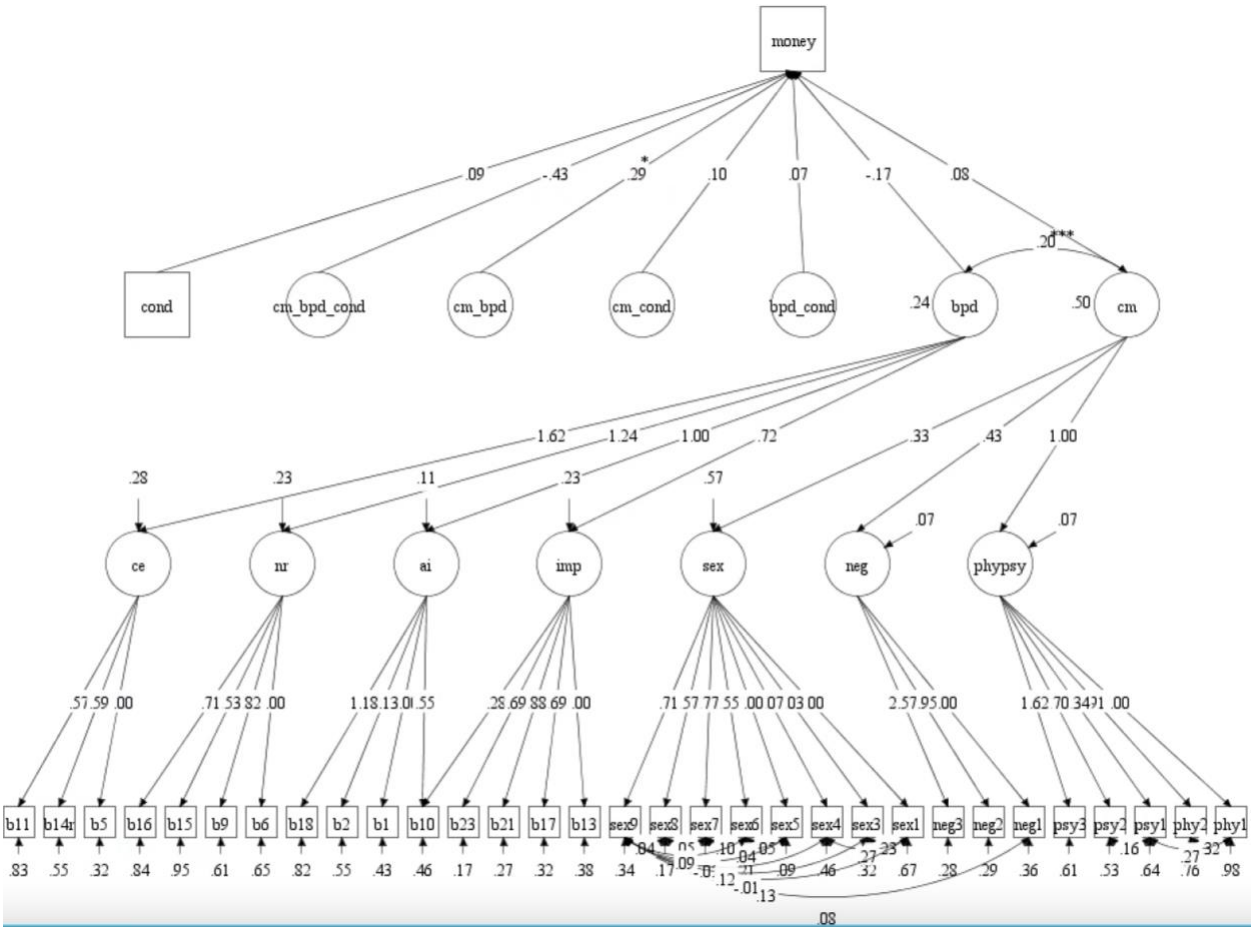


Note. This model contains covariance estimates due to unstandardized data in count model using negative binomial distribution.
$^{*}p$ <.05
$^{**}p$ < .01
$^{***}p$ <.001
ED = Emotion Dysregulation as measured by the DERS
emo_clar = lack of emotional clarity
ltdacc = limited access to emotion regulation strategies
difficulty = difficulty engaging in goal-directed behavior
nonaccept = nonacceptance of emotional responses
impulse = impulse control difficulties
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
money = amount of money donated to charity from Amazon gift card

Hypotheses 1-2, 4-5 (Examined Using Model 12: Money Regressed on BPD/CM/Condition With Three-Way Interaction Between Predictors)

Model 12 examined charitable monetary donations regressed on BPD traits, childhood maltreatment, and condition with a three-way interaction between predictors. In this model, condition did not predict any difference in prosocial behavior, as measured by money donated (Hypothesis 1; B = .09, p = .33). Neither BPD traits (Hypothesis 2; B = -.17, p = .37), nor childhood maltreatment (Hypothesis 4; B = .08, p = .53), were predictive of prosocial behavior, as measured by money donated. There was no significant interaction between BPD traits and condition with regard to prosocial behavior, as measured by money donated (Hypothesis 5; B = -.07, p = .79). There was a significant interaction between BPD traits and childhood maltreatment (B = .30, p = .015) in that childhood maltreatment increased prosocial behavior in those high in BPD traits, as measured by charitable donations. Finally, there was no significant three-way interaction between condition, BPD traits, and childhood maltreatment (Hypothesis 5; B = -.43, p = .15). Model fit data indicated parsimony, as compared to the other models (AIC_{model9} = 18471.74; BIC_{model8} = 18913.93; see Table A18 for regression coefficients and factor loadings for Model 12).

Figure 12. Model 12: 3-Way Interaction Between BPD, Childhood Maltreatment, and Condition With Money Donated as Outcome Variable



Note. This model contains covariance estimates due to unstandardized data in count model using negative binomial distribution.
$^{*}p$ <.05
$^{**}p$ < .01
$^{***}p$ <.001
BPD = BPD traits as measured by the PAI-BOR
ai = affective instability
reck = recklessness
nr = negative relationships
ce = chronic emptiness
CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale
sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect
Prosocial Behavior
money = amount of money donated to charity from Amazon gift card

CHAPTER V: DISCUSSION

Effects of BPD Traits on Prosocial Behavior

Many of the results defied expectations. As expected, BPD traits alone did not have a significant effect on prosocial behavior in the majority of the models. In just one model (Model 6), BPD traits predicted reduced prosocial behavior; this model examined the three-way interaction between condition, BPD traits, and childhood maltreatment with an outcome variable of encouraging letters (Model 6). The remaining models, both using encouraging letters to measure prosocial behavior as the outcome variable (Models 4-5) and using volunteer hours and money as outcome variables (Models 7-12) revealed no significant main effect of BPD traits.

The non-significant results in all but one model that included BPD traits suggest that these traits alone do not significantly impact prosocial behavior in everyday situations. These results are consistent with past research examining prosocial behavior in the context of BPD traits (Hepp et al., 2014); BPD traits did not predict reduced prosocial behavior in another study using two different prosocial measures—hypothetical charitable donations and observed behavior during a prosocial game (Adcock et al., 2021). More specifically, the literature suggests BPD traits are associated with reduced prosocial behavior when there has been some type of rejection or petty slight, as the writing rejection in this study was intended to simulate (Hepp et al., 2014; King-Casas et al., 2008). However, as discussed below, the rejection manipulation may have been too weak to have the effect seen in other studies (i.e., revealing reduced prosociality in individuals high in BPD traits where there has been rejection or a slight). In the current study, the only significant interaction between BPD and condition was seen in Model 6, which examined a three-way interaction between BPD, condition, and childhood maltreatment. Although there was

a significant interaction between BPD and condition in Model 6, the direction of the interaction was contrary to prediction, as those high in BPD traits wrote *more* letters in the rejection condition as compared to the control condition, not fewer.

Effects of Rejection on Prosocial Behavior

The rejection condition was associated with reduced prosocial behavior, as measured by hours volunteered, in only two models—those with volunteer hours as the outcome (Models 7-8), suggesting that writing about social rejection caused participants to commit to fewer volunteer hours. This is consistent with prior research in which social rejection manipulations have been associated with reduced prosocial behavior (Twenge et al., 2007). The null effect of condition in all but two models is puzzling but may be explained, at least in part, by the nature of the writing task. Although some research (Pickett et al., 2004; Skinner, 2015) has shown significant results (e.g., reduced positive affect) using a rejection-reliving writing task, other studies suggest that writing about a stressful experience can be cathartic to the participant, resulting in more positive mood (Niles et al., 2014), rather than the negative mood that was intended with the use of this manipulation. Writing about social rejection may have created increased—rather than decreased—empathy and/or positive mood in some individuals, leading to more prosocial behavior than expected.

Condition did not have a significant effect on prosocial behavior, as measured by encouraging letters or the amount of charitable donation in any of the models. The reasons for this may be related to differences in the types of prosocial behavior, as discussed below, as well as limitations of the reliving rejection manipulation.

Interaction Between BPD Traits and Condition

The expected interaction between BPD traits and condition, in which the combination of the rejection condition and BPD traits would result in reduced prosocial behavior, was not observed in any of the models. In one model with BPD traits and childhood maltreatment as predictors of prosocial behavior, as measured by encouraging letters (Model 6), there *was* a significant interaction between BPD traits and condition; however, the direction of this interaction was unexpected in that the rejection condition was associated with an increase in prosocial behavior for those high in BPD traits. It is perplexing that the rejection condition had the opposite effect than expected, but one explanation may, again, be the cathartic nature of writing about rejection (Niles et al., 2014). In addition, research suggests that participants dislike writing tasks (Lyubomirsky et al., 2006), which may have made participants in both conditions feel negative affect. This could have obscured the effect of writing about rejection, leading to unexpected results.

None of the models using volunteer hours and charitable contribution as outcome variables showed any significant interaction between BPD traits and condition (Models 7-12). As discussed below, the outcome measures for these models may have been hampered by low variability for money donated. The remoteness in time of volunteer hours compared to the encouraging letters task may also account for differences in outcomes.

Childhood Maltreatment

A striking and unexpected result was the positive association between childhood maltreatment and increased prosocial behavior observed in all models in which prosocial behavior was measured by encouraging letters (Models 4-6). Contrary to prediction, childhood maltreatment predicted increased prosocial behavior, as measured by encouraging letters. It was

hypothesized that childhood maltreatment would be associated with reduced prosocial behavior due to the lack of prosocial modeling (Music, 2011) and the tendency of child abuse survivors to demonstrate aggression rather than prosocial behavior (Dodge et al., 1990). However, other research suggests that trauma can create greater empathy, which could lead to increased prosocial behavior (Frazier et al., 2013). This phenomenon has been termed "altruism born of suffering" (ABS; Staub, 2005; Staub & Vollhardt, 2008; Vollhardt, 2009). The effect of ABS may be explicative of the tendency of participants who identified childhood maltreatment to write more letters of encouragement. The positive correlation between childhood maltreatment and encouraging letters is a potential area for future research, as it suggests that childhood maltreatment may be associated with increased, rather than decreased, prosocial behavior in certain contexts.

In models using volunteer hours or charitable donations as an outcome measure, the effect of childhood maltreatment was null. These results may be due to the limitations concerning these outcome measures. For example, the amount of money that could be kept or donated ($5) may have been too small to generate the requisite variability to see the impacts of childhood maltreatment (as well as BPD traits and/or condition). In addition, volunteer time as a measure of prosocial behavior may have been affected by other factors, such as time discounting, which is the notion that one will have more time in the future than in the present (Ein-Gar, 2015). This may had led participants to pledge volunteer hours that could be accomplished over the course of a year and led participants to decide that their current time was too restricted to allow for completion of encouraging letters. Research suggests that self-control moderates the effect of time-discounting; high-control individuals tend to engage in less time discounting than low-

control individuals (Ein-Gar, 2015). These competing effects may have obscured the effect of childhood maltreatment concerning the volunteer hours outcome variable.

Interaction Between Childhood Maltreatment and Rejection Condition

All models (models 4-6) employing the outcome variable of encouraging letters revealed an interaction between childhood maltreatment and condition in that the rejection condition reduced the magnitude of the increase in prosocial behavior in those participants reporting childhood maltreatment. These results may be a fruitful area for future research, as it would be helpful to know how individuals who experienced childhood maltreatment respond to rejection and how this affects prosocial behavior in other contexts.

In models using volunteer hours or charitable donation as an outcome measure, the effect of the interaction between childhood maltreatment and condition was null. These results may, again, be due to the limitations identified above concerning these outcome measures (e.g., charitable donation amount was too small; volunteer hours were too remote in time).

Emotion Dysregulation and Prosocial Behavior

As expected, emotion dysregulation predicted reduced prosocial behavior in the models using encouraging letters as an outcome measure (Models 4-6). This result is consistent with extensive past research demonstrating a negative relationship between emotion dysregulation and prosocial behavior (Eisenberg, 2000; Eisenberg et al., 2006). By contrast, emotion dysregulation did not predict reduced prosocial behavior when the outcome measure used was volunteer hours or money donated. This result, again, may be due to limitations associated with these two outcome measures (see below). The rich research literature demonstrating a strong negative association between emotion dysregulation and prosocial behavior suggests that encouraging

letters may be the most accurate measure of prosocial behavior, as the model using this outcome variable replicated this well-accepted result.

Interaction Between Emotion Dysregulation and Rejection Condition

Emotion dysregulation did not have a significant interaction with condition in any of the models. Recent research suggests that rejection would intensify the negative effects of emotion dysregulation on prosocial behavior (Casini et al., 2022). However, this interaction was not observed in the present study. This surprising result may be due to the nature of the writing manipulation; a stronger rejection manipulation using the future alone manipulation (Twenge et al., 2007), the Trier Social Stress task (Wingenfeld et al., 2018), or a paradigm similar to that used by Chapman et al. (2014) may have produced a significant interaction between emotion dysregulation and condition. Unfortunately, these "stronger" manipulations could not be used in the current online study due to concerns about the potential harm of these manipulations in a sample high in BPD traits.

Three-way Interaction Between BPD Traits, Childhood Maltreatment, and Condition

The three-way interaction between BPD traits, childhood maltreatment, and condition was not significant in all models examining it (Models 6, 9, 12). This is likely due to a lack of power, as very large samples are needed to detect three-way interactions. Indeed, the sample size to detect a three-way interaction may be four times the size of that needed to detect a two-way interaction (Heo & Leon, 2010).

Summary of Models

In sum, models using encouraging letters as measures of prosocial behavior revealed a relatively consistent pattern of results. There was no effect of condition, likely due to the manipulation having a cathartic effect on participants rather than creating feelings of

rejection/hurt. Childhood maltreatment was predictive of increased prosocial behavior, presumably due to the phenomenon that has been described as "Altruism born of suffering" (ABS). Childhood maltreatment interacted with condition so that the magnitude of this positive association was reduced in the rejection condition. Emotion dysregulation was associated with decreased prosocial behavior when "encouraging letters" was the outcome measure. BPD traits alone did not have a significant impact on prosocial behavior except in Model 6, in which BPD traits predicted reduced prosocial behavior. In that model, BPD traits and condition had a significant interaction in that individuals higher in BPD traits tended to write *more* letters in the rejection condition than those in the control condition, which was a surprising result.

Models using volunteer hours or money donated to measure prosocial behavior did not demonstrate the same pattern of results. There was no main effect for BPD traits, emotion dysregulation, or childhood maltreatment in any of these models. While models using encouraging letters as a measure of prosocial behavior showed no significant impact of condition upon prosocial behavior, two models using volunteer hours to measure prosocial behavior (Models 7-8) revealed that condition significantly predicted decreased prosocial behavior. However, this effect disappeared once a three-way interaction (BPD*condition*CM) was added (Model 9). Model 12, which measured prosocial behavior using charitable donations, included one significant interaction between BPD traits and childhood maltreatment, in that participants high in both BPD traits and childhood maltreatment donated more money to charity, an interesting result because individuals high in BPD traits as a whole did not donate significantly more or less than typical individuals.

Borderline personality disorder traits, childhood maltreatment, and emotion dysregulation had no significant impact on charitable donations. The constraint on the size of the donation ($5)

may partially explain this result; many participants chose to donate the entire sum, as it was a small amount. The gift of a larger sum of money with the option to keep or donate to charity may have resulted in greater variability in the amount donated, allowing for greater power. Budgetary limitations precluded this option in the current study; however, future researchers should consider using larger amounts of money to more effectively examine prosocial behavior in the context of choosing to donate or keep money given to participants in the context of a research study. Likewise, BPD traits, emotion dysregulation, and childhood maltreatment had no significant impact on volunteer hours. Potential reasons are discussed below.

As expected, there were significant correlations between BPD traits and psychological abuse (r = .47), neglect (r = .32), physical abuse (r = .26) and sexual abuse (r = .16). It should be noted that the relatively low correlation between BPD traits and sexual abuse was surprising, as this is typically identified as a risk factor for the development of BPD (Silk et al., 1995; Temes et al., 2017). One possible explanation is that participants felt uncomfortable disclosing these details due to perceived stigma. In addition, this sample was comprised of college students, rather than a clinical population, which could explain these unexpected results.

Differences in Outcome Variables

While the difference in results for different types of prosocial social behavior (letters, money donated, volunteer time) is puzzling, the nature of, and motivations for, prosocial behavior may partially explain these differences. Some research suggests that volunteer time and charitable donations are positively correlated (Cappellari et al., 2011); however, other studies indicate that charitable donations and volunteer time do not correlate (Slonim et al., 2013). One explanation for this latter phenomenon is that participants may act in accordance with their motivations for engaging in prosocial behavior. For example, those who are motivated by

notions of social justice gravitate toward volunteering their time (Piatak, 2016); in contrast, those motivated by public interest tend to make monetary donations (Piatak, 2016). Other research also demonstrates that different types of prosocial acts do not necessarily correlate with each other. For example, the willingness to engage in prosocial behavior during a game with seemingly immediate consequences did not correlate with hypothetical charitable donations (Adcock et al., 2021).

Another way to view the potential reasons for differences in results/lack of correlation between types of prosocial behavior is to use the lens of time. Individuals tend to be more generous with their time when the requested prosocial activity (e.g., volunteer work, reviewing a psychology journal article) is viewed as far in the future (Ein-Gar, 2015; Zauberman & Lynch, 2005). The perception of participants that they would have more time in the future (they were given a span of 12 months) to engage in volunteer work may have been responsible for the unwillingness of these same participants to spend time writing letters of encouragement during the study.

Licensing effects may also explain the divergent results among models using different types of prosocial behavior as outcome variables. Licensing is the phenomenon in which the recollection or recent performance of "good deeds" will cause people to feel "licensed" (or entitled) to refrain from additional prosocial behavior (Conway & Peetz, 2012; Gneezy et al., 2012; Mullen & Monin, 2016). Thus, writing encouraging letters or making a pledge of volunteer time may have made some participants feel that they had no obligation to donate as much money.

Conversely, some participants may have felt guilty about not writing letters or not agreeing to volunteer their time; this feeling of guilt may have led them to donate more money.

This latter idea is consistent with the theory that some prosocial behavior is motivated by a desire to reduce aversive feelings, such as guilt (Batson & Oleson, 1991).

Difficulty Creating a Latent Variable of Prosocial Behavior

As would be expected, all letter-related variables had a significant positive correlation. There was also a significant correlation between hours volunteered and number of words written (B = .16, p = .01). However, there was an insignificant correlation between hours volunteered and money donated (B = -.02, p =.80). Indeed, money donated did not correlate significantly with any other outcome variable, which may be due to the small size of the donation (as discussed above). These divergent results made it difficult to create a latent variable of prosocial behavior.

The formative nature of the measures used in creating a latent variable of prosocial behavior likely made it difficult to create one overarching latent outcome variable. Reflective measures, which include a set of positively correlated items, are typically used to create a latent variable (Bollen & Lennox, 1991). Examples are the PAI-BOR for BPD traits or the Beck Depression Inventory for depression. By contrast, a formative measure combines indicators to form a construct, often without regard to the correlation between the indicators (Coltman et al., 2008). Examples would be health status (measured by indicators such as lipids, blood glucose, body mass index, and physical activity). Capturing a formative construct is more challenging (Coltman et al., 2008). The difficulties inherent in using formative constructs may explain why other studies using helping behavior as an outcome variable in SEM analyses have focused upon one behavioral task, rather than multiple tasks (Maner et al., 2002) or have used only a reflective self-report measure to capture prosocial behavior (Chen et al., 2022; Zhu et al., 2022). This

writer was not able to find other examples of prosocial behavior being combined to create a latent variable.

Limitations

Nature of the Manipulation

Unlike some other studies examining prosocial behavior in the context of BPD, this experiment did not use a reciprocal manipulation (e.g., Ultimatum Game). Thus, participants' frustration after writing about rejection was not naturally channeled into a vengeful motivation to act with less prosociality, as may have been the case in paradigms such as the Ultimatum Game and Investor Game.

Moreover, research indicates that participants typically do not like the act of writing and experience a drop in positive affect after a writing task (Lyubomirsky et al., 2006). If a drop in positive affect occurred in both conditions—due to the writing tasks—this could have obscured the effect of the rejection manipulation. Happy people are more likely to behave prosocially (e.g., Kayser et al., 2010); thus, a drop in positive affect associated with the act of writing—across conditions—could partially explain the null effect concerning condition in all but two models (Models 7-8 using volunteer hours as a measure of prosocial behavior revealed a significant effect of condition).

In addition, this manipulation, based upon writing about one's prior rejection, may not have been strong enough to elicit feelings of rejection in participants. Due to the COVID-19 pandemic and the need for sufficient power, an online format was used for the study. This precluded the use of a "stronger" manipulation, such as the "future alone" manipulation (Twenge et al., 2007), as this would have been inappropriate and possibly, unethical, to use a potentially damaging manipulation in an online study with oversampling for BPD traits. Individuals with

BPD are at greater risk for NSSI, suicide attempts, and completed suicide (Cunningham et al., 2021; Zanarini et al., 2008); accordingly, care must be taken to prevent harm to this population, making some manipulations inappropriate. The study included a compliance check, which was completed by using undergraduate coders. Future researchers using this manipulation may consider using a manipulation check as well to determine whether the rejection writing manipulation induced feelings of rejection.

Limitations of the Sample

The sample was smaller than would be desired when using SEM; the smaller sample size was necessitated by budgetary constraints, as participants each received a $5 gift card.
The sample demographics also represent a potential weakness concerning generalizability, as this sample was all-female and solely comprised of college students. The fact that participants were college students indicates that they were more likely to be more high-functioning than participants in a clinical sample. However, it should be noted that oversampling BPD traits was successful in that 32% of the sample met the clinical cutoff for BPD using the PAI-BOR.

Limitations of Measures

The use of the PAI-BOR to measure BPD was problematic in the context of SEM. Neither the four-factor model proposed by Morey (1991), nor the six-factor model proposed by Jackson and Trull (2001) produced good fit. Creating a good-fitting model required the exclusion of several indicator questions, which suggests that PAI-BOR questions could be phrased more clearly and with less overlap. Future studies using SEM in the context of BPD should include multiple measures of BPD (e.g., McLean Screening Instrument for Borderline Personality Disorder (Zanarini et al., 2003); Wisconsin Personality Disorders Inventory (Klein et al., 1993) in addition to the PAI-BOR, in order to better capture this construct.

Clinical Implications

These results align with the research literature on BPD traits and prosocial behavior (Adcock et al., 2021; Hepp et al., 2014). The results suggest that individuals high in BPD traits do not differ from typical individuals with regard to prosocial behavior, as measured by encouraging letters, charitable donations, and volunteer time. This information is beneficial from a diagnostic standpoint, as BPD is often conflated with Antisocial Personality Disorder (ASPD; Paris et al., 2013). The difference in both prosocial and antisocial behavior between these two populations is illustrative. Although both BPD and ASPD predict externalizing behavior, the motivation for the externalizing behavior is very different: exploitation for those with ASPD, compared to revenge for a perceived slight in those with BPD (Hepp et al., 2014). Indeed, individuals with ASPD are often callous and take advantage of others; by contrast, individuals with BPD are often victimized, particularly due to abusive relationships (Gunderson & Links, 2007). This study strengthens the theory that individuals high in BPD traits are just as prosocial as typical individuals, except when subjected to rejection in the moment (as opposed to writing about a past rejection).

This study, along with other research, confirms that in ordinary circumstances, individuals with BPD can engage in—and benefit from—prosocial behavior (Adcock et al., 2021). Prosocial behavior benefits healthy individuals and those with BPD traits (Adcock et al., 2021), social anxiety (Alden & Trew, 2013), or depression (Schacter & Margolin, 2019). Prosocial behavior, or "contribution" as it is known in DBT, is recommended as a method of distress tolerance. The knowledge that individuals high in BPD traits can engage in prosocial behavior is helpful, as it demonstrates that "contribution" is a solid skill within the context of distress tolerance in DBT.

One of the most striking results of this study is the significant effect of childhood maltreatment in predicting increased prosocial behavior, as measured by encouraging letters. This result supports the research suggesting that individuals who have experienced suffering may become more, rather than less, empathetic/altruistic (Staub, 2005). Likewise, research on posttraumatic growth also supports the idea that even survivors of childhood abuse can experience posttraumatic growth (Tranter et al., 2021).

Future Directions

Future research is needed to explore the impact of rejection on prosocial behavior in individuals high in BPD traits, using ecological manipulations, such as the Trier Social Stress task (Wingenfeld et al., 2018), combined with ecological measures of prosocial behavior, such as writing kind letters, making charitable donations or pledging volunteer time. Consideration could also be given to the use of the future-alone paradigm to induce feelings of rejection (Twenge et al., 2007). A particularly promising paradigm was used by Chapman et al. (2014), in which a sample, comprised of both participants high in BPD traits and individuals low in BPD traits, created social media profiles, which were purportedly "reviewed" by other participants who responded in a negative, callous manner, stating that they would not want to waste their time meeting the participant. This paradigm is a powerful rejection manipulation and could combine with a reciprocal prosocial task (e.g., the fishing game in Adcock et al. [2021]) to better measure the effects of rejection on prosocial behavior in individuals high in BPD traits. A study using the Chapman et al. (2014) or future alone (Twenge et al., 2007) manipulation would likely need to be conducted in person with extensive debriefing due to the potentially hurtful nature of the manipulation and the sensitivity of this population.

This study also suggests the need for better measures of BPD and BPD traits. It was challenging to create a good fitting model using the PAI-BOR. The dearth of information on how the PAI-BOR was factor analyzed suggests that additional research is needed (Jackson & Trull, 2001). Hopefully, a new measure with better phrasing and less overlap between questions could provide a "cleaner" factor structure for future studies using SEM methodology.

Finally, this study's surprising results concerning increased prosocial behavior (as measured by encouraging letters) in those who experienced childhood maltreatment suggest that future research should explore this correlation further. It would be interesting to know the contexts in which abuse survivors exhibit increased or decreased prosocial behavior. Moreover, writing letters of encouragement may be therapeutic to individuals who have experienced childhood maltreatment.

Conclusion

This study is the first to examine prosocial behavior in individuals high in BPD traits using ecological behavioral measures. All but one model revealed that BPD traits had no effect on prosocial behavior, which adds to the extant literature supporting the notion that individuals high in BPD traits are just as prosocial as everyone else. Prior research suggests that a drop in prosocial behavior occurs where there has been a rejection or petty slight; the results of this study were unexpected in that those higher in BPD traits wrote *more* letters in the rejection condition as compared to those in the control condition. This study is also unique in that it appears to be the first to attempt to create a latent variable comprised of different prosocial behaviors.

The knowledge that individuals high in BPD traits are just as capable of helping behavior as typical individuals has clinical implications; prosocial behavior is a method of mood improvement and is effective for everyone. It is also included in the distress tolerance module of

DBT. This study supports prosocial behavior as a method of distress tolerance in those high in BPD traits.

In addition, this study adds to the literature exploring the nature of BPD, which has 256 possible combinations (any combination of five of nine symptom criteria). The diverse presentations of BPD and BPD traits make it difficult to recognize, diagnose, and treat. This research differentiates BPD from antisocial personality disorder (ASPD), with which it is often confused (Anderson et al., 2022). Individuals with ASPD are less likely to engage in prosocial behavior, regardless of the circumstances. The same is not true of individuals with BPD.

The surprising results regarding the positive effect of past childhood maltreatment on prosocial behavior (as measured by encouraging letters) adds to the literature on altruism born of sadness (ABS) and posttraumatic growth. This study provides a basis for future research to explore the relationship between childhood maltreatment and adult prosocial behavior.

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APPENDIX A: TABLES

Table A1. Descriptions of Studies Examining Prosocial Behavior and BPD in the Context of Economic/Trust/Investment Games

Study	Sample	Paradigm	Results
Bartz et al. (2011)	BPD (14) HC (13)	Assurance Game	BPD group cooperated less; particularly after oxytocin
Dougherty et al. (1999)	BPD (14) HC (17)	Point Subtraction Aggression Paradigm	BPD group more likely to punish perceived wrong than healthy controls. Punishment behavior associated with self-reported hostility.
Ebert et al. (2013)	BPD (13) HC (13)	Trust Game	BPD group did not differ from HC in placebo condition except more money transferred to attractive partners; with oxytocin, this became more pronounced.
Franzen et al. (2011)	BPD (30) HC (30)	Trust Game	BPD group invested less than HC with partners who behaved unfairly; BPD group disregarded emotional cues provided by faces, but opposite true of HC.
King-Casas et al. (2008)	BPD (55) HC (38)	Trust Game	Significant decrease in repayment occurred from early to late rounds in BPD group, suggesting lack of trust. BPD group appeared

Study	Sample	Paradigm	Results
			unskilled at negotiating tactics.
McCloskey et al. (2009)	BPD (127) Other PD (122) HC (112)	Point Subtraction Aggression Paradigm	BPD group more likely to punish perceived wrong than healthy controls. Punishment behavior associated with self-reported aggression.
Polgár et al. (2014)	BPD (47) HC (43)	40-round Ultimatum Game	Individuals with BPD less likely to engage in altruistic punishment across 40-round game.
Saunders et al. (2015)	BPD (20) BD (20) HC (20)	40-round Prisoner Dilemma Game	BPD group cooperated less; this was true even after a partner cooperated.
Thielmann et al. (2014)	Continuum of 559	3 paradigms: Dictator Game & Ultimatum Game & Ultimatum Strategy	Those high in BPD traits did not exploit others in the Dictator Game; high in BPD trait individuals required larger amount of money for acceptance in Ultimatum Strategy and rejected more offers in the Ultimatum Game.
Unoka et al. (2009)	BPD (25) MDD (25) HC (25)	Trust Game (participant = investor) & Lottery Paradigm	BPD group became less trusting over time compared to two other groups; BPD group was more comfortable with gambling.
Wischniewski and Brüne (2013)	BPD (30) HC (30)	Costly Altruism variant of Dictator Game	BPD group did not differ with regard to altruistic punishment but appeared to be motivated by revenge rather than altruism.

Table A2. Summary of the Sample Demographic Information

Variable	Classification	*n*	%
Ethnicity			
	African-American	101	40.9
	White	76	30.5
	Latinx/Latina/Hispanic	36	14.6
	Asian	3	2.0
	Native American/Alaskan	2	0.8
	Other	19	7.6
	Total	247	100.0
		M	***SD***
Age		19.42	3.96

Note. *M* = Mean, *SD* = standard deviation.

Table A3. Means, Standard Deviations, and Cronbach's Alphas for Study Measures

Measure	*M*	*SD*	Alpha
1. PAI-BOR	32.82	11.28	.74
2. DERS	93.65	26.61	.90
3. Sex Abuse	12.17	5.89	.91
4. Physical Abuse	4.81	2.23	.63
5. Psychological Abuse	8.40	3.83	.89
6. Neglect	7.47	2.43	.79
7. Volunteer Time	6.78	11.10	
8. Donation Amount	13.30	4.30	
9. Number of Letters Written	0.61	1.07	
10. Words in Letters	38.38	77.35	
11. Number of Seconds Spent on Letters	146.18	298.46	

Note. $n = 247$. * Measures 7-11 are not appropriate for the calculation of internal consistency because they contain only one score. Accordingly, only means and standard deviations are reported for these measures.

Table A4. Results of *t*-tests and Descriptive Statistics for PAI-BOR, DERS, Sex Abuse, Physical Abuse, Psychological Abuse, and Neglect

	Control group			Rejection group				
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*df*
PAI-BOR	32.68	10.96	126	32.97	11.65	121	-0.20	245
DERS	96.68	26.04	126	90.49	26.94	121	1.84	245
Sex Abuse*	12.30	6.20	126	12.03	5.57	121	0.35	245
Physical Abuse	4.85	2.20	126	4.77	2.28	121	.28	245
Psychological Abuse	8.17	3.61	126	8.64	4.05	121	-.95	245
Neglect	7.56	2.37	126	7.37	2.50	121	.59	245

Note. None of the t-values were significant; thus, there were no significant differences between groups with regard to the above variables.

* Sex Abuse scale had a greater number of questions, which yielded higher values.

Table A5. Correlations Among Predictor Variables

Measures	1	2	3	4	5	6
1. PAI-BOR	--	.75**	.16*	.26**	.47**	.32**
2. DERS		--	.19**	.24**	.40**	.32**
3. Sexual Abuse			--	.32**	.25**	.29**
4. Physical Abuse				--	.64**	.56**
5. Psychological Abuse					--	.56**
6. Neglect						--

Note. * $p < .05$; ** $p < .01$; for SEM, PAI-BOR and DERS were placed in separate models due to high correlation (.89) after removal of low loadings; likewise, some indicators were removed from CCMS due to low loadings/poor model fit. See Model 1.

Table A6. Correlations Among Outcome Variables

Measures	1	2	3	4	5
1. Time on Letters (in seconds)	--	.91**	.91**	.16*	.09
2. Number of Letters Written		--	.94**	.15*	.08
3. Words in Letters			--	.18**	.14*
4. Volunteer Time				--	-.02
5. Charitable Donations					--

Note. * $p < .05$; ** $p < .01$

Table A7. Fit Statistics for SEM Construct Models

#	Model Variable	CFI	TLI	RMSEA	SRMR
1	BPD	.96	.95	.04	.05
2	ED	.95	.95	.06	.05
3	CM	.98	.97	.05	.06

Note. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error; SRMR = Standardized Root Mean Squared Residual

Table A8. Terms Used in Structural Equation Models

BPD = BPD traits as measured by the PAI-BOR

ai = affective instability
reck = recklessness
nr = negative relationships
ce = chronic emptiness

ED = Emotion Dysregulation as measured by the DERS

emo_clar = lack of emotional clarity
ltdacc = limited access to emotion regulation strategies
difficulty = difficulty engaging in goal-directed behavior
nonaccept = nonacceptance of emotional responses
impulse = impulse control difficulties

Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale

sex = sexual abuse
phypsy = both physical and psychological abuse
neg = neglect

Prosocial Behavior

Hours = number of volunteer hours
money = amount of money donated to charity from Amazon gift card
encourag = latent variable composed of the following indicators: 1) num_lett (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) letter_t (amount of time (in seconds) spent on writing encouraging letters).

Table A9. Fit Statistics for SEM Moderation Models

#	Model	AIC	BIC	SSABIC
4	BPD/CM/condition on letters w/2-way interaction	23450.10	23913.34	23494.91
5	ED/CM/condition on letters w/2-way interaction	29722.94	30291.46	29777.92
6	BPD/CM/condition on letters w/3-way interaction	23430.91	23430.17	23476.39
7	BPD/CM/condition on hours w/2-way interaction	18620.59	19059.26	18663.01
8	ED/CM/condition on hours	24893.25	25437.20	24945.86
9	BPD/CM/condition on hours w/3-way interaction	18624.32	19070.01	18667.42
10	BPD/CM/condition on money	18471.71	18906.87	18513.79
11	ED/CM/condition on money	24742.65	25283.10	24794.92
12	BPD/CM/condition on money w/3-way interaction	18471.75	18913.93	18514.51

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; SSABIC = Sample-size Adjusted BIC.

Table A10. Robust Maximum Likelihood Factor Loadings for Model 4

(BPD/CM/Condition on Letters)

Parameter	Unstandardized	SE	Standardized	SE	Est/SE	*p*-value
BPD Traits						
BPD→ affective instability	1.00	--	.83	.06	13.91	<.00
BPD→negative relationships	1.27	.24	.79	.06	12.75	<.00
BPD→chronic emptiness	1.62	.19	.83	.06	13.11	<.00
BPD→impulsivity	.72	.14	.58	.06	8.94	<.00
Childhood Maltreatment						
CM→ phypsy	1.000	--	.99	.06	16.24	<.00
CM→neg	.39	.11	.71	.06	12.49	<.00
CM→ sex	.31	.11	.30	.08	3.74	<.00
Encourag (Letters of Encouragement)						
n_let (number of letters)	1.00	--	.97	.02	55.52	<.00
Words (words in letters)	72.31	3.97	.97	.01	68.03	<.00
Let_t (time spent on letter)	271.84	18.50	.94	.02	54.43	<.00
Regression						
Encourag on condition	-.17	.14	-.08	.06	-1.46	.14
Encourag on BPD	-.69	.52	-.32	.22	-2.03	.14
Encourag on BPD*condition	.79	.55	.19	.12	1.60	.11
Encourag on CM	.68	.26	.49	.19	2.62	.01
Encourag on CM*condition	-.71	.38	-.26	.10	-2.61	.01

Terms Used in Models: **BPD = BPD traits as measured by the PAI-BOR;** ai = affective instability*;* imp = impulsivity*;* nr = negative relationships*;* ce = chronic emptiness **ED = emotion dysregulation as measured by the DERS***;* emo_clar = lack of emotional clarity*;* ltdacc = limited access to emotion regulation strategies*;* difficulty = difficulty engaging in goal-directed behavior; nonaccept = nonacceptance of emotional responses; impulse = impulse control difficulties; **CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale***;* sex = sexual abuse*;* phypsy = both physical and psychological abuse*;* neg = neglect*;* **Prosocial Behavior***:* Hours = number of volunteer hours*;* money = amount of money donated to charity from Amazon gift card*;* encourag = latent variable composed of the following indicators: 1) n_let (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) let_t (amount of time (in seconds) spent on writing encouraging letters).

Table A11. Robust Maximum Likelihood Factor Loadings for Model 5 (ED/CM/Condition on Letters)

Parameter	Unstandardized	SE	Standardized	SE	Est/SE	*p*-value
ED Traits						
ED→ nonacceptance	1.00	--	.83	.04	23.17	<.01
ED→difficulty	.93	.08	.72	.04	18.73	<.01
ED→impulse	.73	.09	.76	.04	20.94	<.01
ED→ltdacc	.40	.10	.99	.06	46.61	<.01
ED→emo_clar	.43	.07	.75	.05	16.20	<.01
Childhood Maltreatment						
CM→ phypsy	1.000	--	.97	.07	12.97	<.01
CM→neg	.40	.11	.72	.06	11.80	<.01
CM→ sex	.32	.11	.29	.08	3.57	<.01
Encourag (Letters of Encouragement)						
n_let (number of letters)	1.00	--	.97	.02	55.55	<.01
Words (words in letters)	72.31	3.98	.97	.01	68.01	<.01
Let_t (time spent on letter)	271.83	18.50	.94	.02	54.42	<.01
Regression						
Encourag on condition	-.20	.14	-.10	.06	-1.61	.11
Encourag on ED	-.34	.18	-.28	.13	-2.14	.03
Encourag on ED*condition	.34	.55	.14	.07	1.90	.06
Encourag on CM	.60	.27	.43	.12	3.56	<.01
Encourag on CM*condition	-.60	.28	-.21	.07	-3.22	<.01

Terms Used in Models: **BPD = BPD traits as measured by the PAI-BOR;** ai = affective instability*;* imp = impulsivity*;* nr = negative relationships*;* ce = chronic emptiness **ED = emotion dysregulation as measured by the DERS***;* emo_clar = lack of emotional clarity*;* ltdacc = limited access to emotion regulation strategies*;* difficulty = difficulty engaging in goal-directed behavior; nonaccept = nonacceptance of emotional responses; impulse = impulse control difficulties; **CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale***;* sex = sexual abuse*;* phypsy = both physical and psychological abuse*;* neg = neglect*;* **Prosocial Behavior***:* Hours = number of volunteer hours*;* money = amount of money donated to charity from Amazon gift card*;* encourag = latent variable composed of the following indicators: 1) n_let (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) let_t (amount of time (in seconds) spent on writing encouraging letters).

Table A12. Robust Maximum Likelihood Factor Loadings for Model 6

(BPD/CM/Condition on Encouraging Letters w/3-Way Interaction)

Parameter	Unstandardized	SE	[95% CI]+	IRR	*p*-value+
BPD Traits				--	
BPD→affective instability	1.00	--		--	--
BPD→negative relationships	1.38	.24		--	>.01
BPD→ chronic emptiness	1.58	.18		--	>.01
BPD→impulsivity	.73	.14		--	>.01
Childhood Maltreatment					
CM→ phypsy	1.00	--		--	--
CM→neg	.42	.11		--	>.01
CM→ sex	.33	.12		--	>.01
Encouraging Letters					
Encourag→n_let	1.0	--		--	--
Encourag→words	72.41	3.95		--	>.01
Encourag→let_t	272.27	18.67		--	>.01
Regression			[95% CI]+	IRR	
Outcome Variable					
Encourag on condition	-.47	.24	[-.87, -.07]	.63	.06
Encourag on BPD	-1.73	.71	[-2.90, -.56]	.18	.02
Encourag on BPD*condition	1.88	.76	[.63, 3.13]	6.56	.01
Encourag on CM	3.32	.45	[.57, 2.06]	3.73	>.01
Encourag on CM*condition	-1.36	.47	[-2.13, -.58]	.26	>.01
Encourag on CM*BPD	-2.12	1.18	[-4.07, -.18]	.12	.07
Encourag on CM*BPD*condition	1.94	1.19	[-.02, 3.90]	6.95	.10

Terms Used in Models: **BPD = BPD traits as measured by the PAI-BOR;** ai = affective instability*;* imp = impulsivity*;* nr = negative relationships*;* ce = chronic emptiness **ED = emotion dysregulation as measured by the DERS***;* emo_clar = lack of emotional clarity*;* ltdacc = limited access to emotion regulation strategies*;* difficulty = difficulty engaging in goal-directed behavior; nonaccept = nonacceptance of emotional responses; impulse = impulse control difficulties; **CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale***;* sex = sexual abuse*;* phypsy = both physical and psychological abuse*;* neg = neglect*;* **Prosocial Behavior***:* Hours = number of volunteer hours*;* money = amount of money donated to charity from Amazon gift card*;* encourag = latent variable composed of the following indicators: 1) n_let (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) let_t (amount of time (in seconds) spent on writing encouraging letters).

IRR = incident rate ratio (*p*-value is for unstandardized estimates)

+ -- *p*-value and confidence intervals are based upon unstandardized estimates

Table A13. Robust Maximum Likelihood Factor Loadings for Model 7

(BPD/CM/Condition on Hours)

Parameter	Unstandardized	SE	[95% CI]+	IRR	*p*-value+
BPD Traits				--	
BPD→affective instability	1.00	--		--	--
BPD→negative relationships	1.24	.23		--	>.01
BPD→ chronic emptiness	1.63	.19		--	>.01
BPD→impulsivity	.72	.14		--	>.01
Childhood Maltreatment					
CM→ phypsy	1.00	--		--	--
CM→neg	.43	.12		--	>.01
CM→ sex	.34	.12		--	.01
Regression			[95% CI]+	IRR	
Outcome Variable					
Hours on condition	-.43	.21	[-.77, -.09]	.65	.04
Hours on BPD	.10	.38	[-.53, .72]	1.10	.80
Hours on BPD*condition	-.38	.53	[-1.25, .49]	.69	.47
Hours on CM	.10	.21	[-.25, .44]	1.10	.65
Hours on CM*condition	-.20	.39	[-.83, .45]	.83	.62

Terms Used in Models: **BPD = BPD traits as measured by the PAI-BOR & DERS***;* ai = affective instability*;* reck = recklessness*;* nr = negative relationships*;* ce = chronic emptiness*;* emo_clar = lack of emotional clarity*;* ltdacc = limited access to emotion regulation strategies*;* difficulty = difficulty engaging in goal-directed behavior; nonaccept = nonacceptance of emotional responses*;* **CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale***;* sex = sexual abuse*;* phypsy = both physical and psychological abuse*;* neg = neglect*;* **Prosocial Behavior***:* Hours = number of volunteer hours*;* money = amount of money donated to charity from Amazon gift card*;* encourag = latent variable composed of the following indicators: 1) num_lett (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) letter_t (amount of time (in seconds) spent on writing encouraging letters).

IRR = incident rate ratio (*p*-value is for unstandardized estimates)

+ -- *p*-value and confidence intervals are based upon unstandardized estimates

Table A14. Robust Maximum Likelihood Factor Loadings for Model 8 (ED/CM/Condition on Hours)

Parameter	Unstandardized	SE	[95% CI]+	IRR	*p*-value
ED Traits					
ED→ nonacceptance	1.00	--			--
ED→difficulty	.93	.09			.00
ED→impulse	.73	.09			.11
ED→ltdacc	1.40	.10			.00
ED→emo_clar	.43	.07			.00
Childhood Maltreatment					
CM→ phypsy	1.000	--			--
CM→neg	.45	.13			.00
CM→ sex	.35	.14			.00
Outcome Variable					
Hours on ED	.07	.22	[-.30, .43]	1.07	.76
Hours on condition	-.45	.22	[-.81, -.10]	.64	.04
Hours on ED*condition	-.30	.30	[-.78, .19]	.74	.32
Hours on CM	.10	.21	[-.26, .45]	1.10	.65
Hours on CM*condition	-.18	.39	[-.82, .46]	.84	.65

Terms Used in Models: **BPD = BPD traits as measured by the PAI-BOR & DERS***;* ai = affective instability*;* reck = recklessness*;* nr = negative relationships*;* ce = chronic emptiness*;* emo_clar = lack of emotional clarity*;* ltdacc = limited access to emotion regulation strategies*;* difficulty = difficulty engaging in goal-directed behavior; nonaccept = nonacceptance of emotional responses*;* **CM = Childhood Maltreatment as Measured by selected items from Comprehensive Childhood Maltreatment Scale***;* sex = sexual abuse*;* phypsy = both physical and psychological abuse*;* neg = neglect*;* **Prosocial Behavior***:* Hours = number of volunteer hours*;* money = amount of money donated to charity from Amazon gift card*;* encourag = latent variable composed of the following indicators: 1) num_lett (number of encouraging letters sent to people who are struggling); 2) words (number of words in encouraging letters); and 3) letter_t (amount of time (in seconds) spent on writing encouraging letters).

IRR = incident rate ratio (*p*-value is for unstandardized estimates)

+ -- *p*-value and confidence intervals are based upon unstandardized estimates

Table A15. Robust Maximum Likelihood Factor Loadings for Model 9

(BPD/CM/Condition on Hours w/3-Way Interaction)

Parameter	Unstandardized	SE	[95% CI]+	IRR	*p*-value+
BPD Traits				--	
BPD→affective instability	1.00	--		--	--
BPD→negative relationships	1.24			--	<.01
BPD→ chronic emptiness	1.63			--	<.01
BPD→impulsivity	.72			--	<.01
Childhood Maltreatment					
CM→ phypsy	1.00	--		--	--
CM→neg	.42	.12		--	<.01
CM→ sex	.33	.12		--	.01
Regression			[95% CI]+	IRR	
Outcome Variable					
Hours on condition	-.34	.24	[-.73, .06]	.71	.16
Hours on BPD	.12	.38	[-.49, .74]	1.13	.74
Hours on BPD*condition	-.41	.52	[-1.27, .45]	.67	.44
Hours on CM	.05	.22	[-.32, .42]	1.05	.83
Hours on CM*condition	-.14	.39	[-.79, .51]	.87	.72
Hours on CM*BPD	.31	.43	[-.39, 1.01]	.67	.47
Hours on CM*BPD*condition	-.42	.54	[-1.30, .47]	.66	.43

Table A16. Robust Maximum Likelihood Factor Loadings for Model 10

(BPD/CM/Condition on Money)

Parameter	Unstandardized	SE	[95% CI]+	IRR	*p*-value+
BPD Traits				--	
BPD→affective instability	1.00	--		--	--
BPD→negative relationships	1.23	.22		--	<.01
BPD→ chronic emptiness	1.63	.20		--	<.01
BPD→impulsivity	.72	.14		--	<.01
Childhood Maltreatment					
CM→ phypsy	1.00	--		--	--
CM→neg	.43	.12		--	<.01
CM→ sex	.34	.12		--	<.01
Regression			[95% CI]+	IRR	
Outcome Variable					
Money on condition	<.01	.07	[-.12, .12]	1.00	.98
Money on BPD	-.20	.18	[-.49, .10]	.82	.27
Money on BPD*condition	.08	.24	[-.32, .47]	1.08	.75
Money on CM	.12	.11	[-.06, .31]	1.13	.28
Money on CM*condition	.04	.15	[-.20, .29]	1.04	.77

Table A17. Robust Maximum Likelihood Factor Loadings for Model 11

(ED/CM/Condition on Money)

Parameter	Unstandardized	SE	[95% CI]+	IRR	*p*-value+
ED Traits				--	
ED→ nonacceptance	1.00	--		--	--
ED→difficulty	.93	.08		--	<.01
ED→impulse	.73	.09		--	<.01
ED→ltdacc	1.40	.10		--	<.01
ED→emo_clar	.43	.06			
Childhood Maltreatment					
CM→ phypsy	1.00	--		--	--
CM→neg	.46	.13		--	<.01
CM→ sex	.35	.13		--	<.01
Regression Outcome Variable			[95% CI]+	IRR	
Money on condition	-.01	.07	[-.13, .11]	.99	.85
Money on ED	-.13	.08	[-.25, .00]	.88	.10
Money on ED*condition	.04	.11	[-.14, .25]	1.04	.72
Money on CM	.12	.09	[-.03, .28]	1.13	.19
Money on CM*condition	.05	.13	[-.17, .27]	1.05	.70

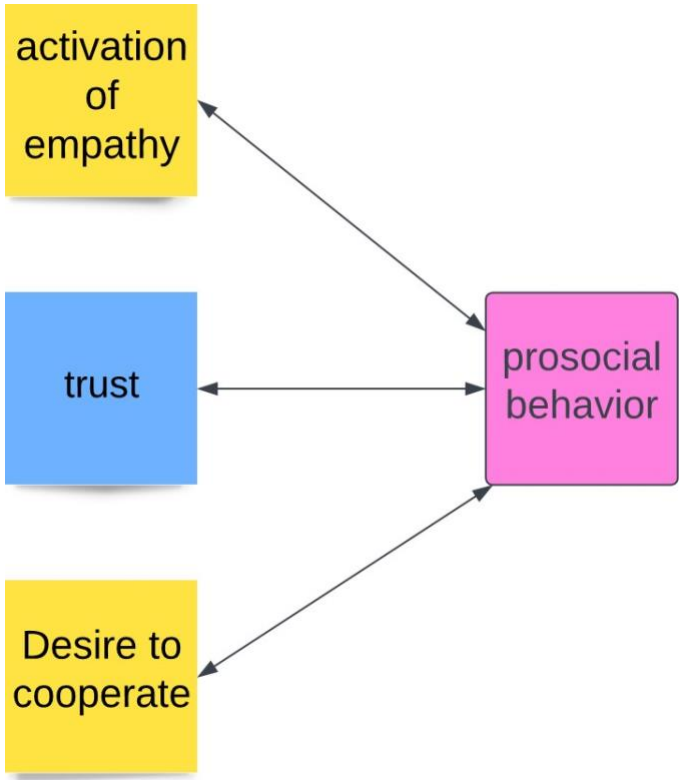
Table A18. Robust Maximum Likelihood Factor Loadings for Model 12

(BPD/CM/Condition on Money Donated w/3-Way Interaction)

Parameter	Unstandardized	SE	[95% CI]+	IRR	*p*-value+
BPD Traits				--	
BPD→affective instability	1.00	--		--	--
BPD→negative relationships	1.24	.23		--	<.01
BPD→ chronic emptiness	1.63	.20		--	<.01
BPD→impulsivity	.72	.14		--	<.01
Childhood Maltreatment					
CM→ phypsy	1.00	--		--	--
CM→neg	.42	.12		--	<.01
CM→ sex	.33	.12		--	<.01
Regression			[95% CI]+	IRR	
Outcome Variable					
Money on condition	.09	.09	[-.06, .25]	1.10	.33
Money on BPD	-.17	.19	[-.46, .14]	.84	.37
Money on BPD*condition	-.07	.26	[-.36, .49]	1.07	.79
Money on CM	.08	.13	[-.13, .29]	1.08	.53
Money on CM*condition	.10	.16	[-.16, .36]	1.11	.53
Money on CM*BPD	.29	.12	[.10, .50]	1.34	.02
Money on CM*BPD*condition	-.43	.30	[-.92, .06]	.65	.15

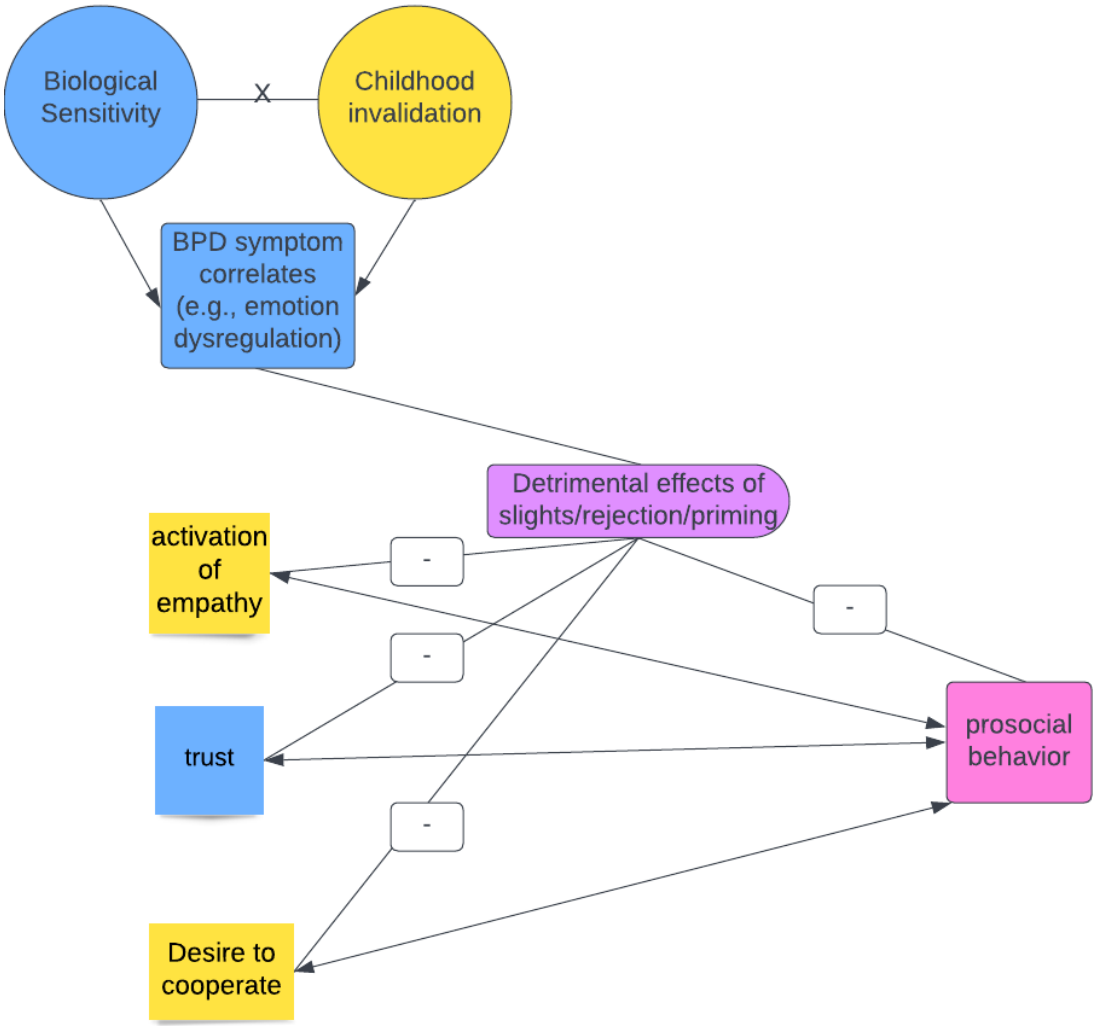
APPENDIX B: FIGURES

Figure B1. Model of Prosocial Behavior



Note. Model of Prosocial Behavior for typical individuals showing how empathy, trust and cooperation facilitate prosocial behavior. This expands on the empathy-altruism hypothesis in that prosocial behavior includes cooperative behavior for the benefit of others in addition to charitable acts; prosocial behavior is more limited than altruism in that it only includes behavior, rather than thoughts and feelings. The relationship between empathy and prosocial behavior is bidirectional in that empathy makes prosocial behavior more likely and engaging in prosocial behavior activates a "helper's high" or "warm glow." Because prosocial behavior is reinforcing, it is conceptualized that empathy, trust and cooperation lead to prosocial behavior and the reverse is true as well.

Figure B2. Model of Prosocial Behavior



Note. Model of Prosocial Behavior showing hypothesized influence of BPD and situational factors (e.g., rejection, priming) on prosocial behavior. Interpersonal dysfunction and emotion dysregulation create intense reactions to rejection and petty slights, which in turn makes them more likely to occur in the future due to poor interpersonal skills and poor quality relationships. This bidirectional relationship was hypothesized to make prosocial behavior less likely in certain situations when compared to typical individuals.

Figure B3. Flowchart of Proposed Experiment, as Used in Pilot Study

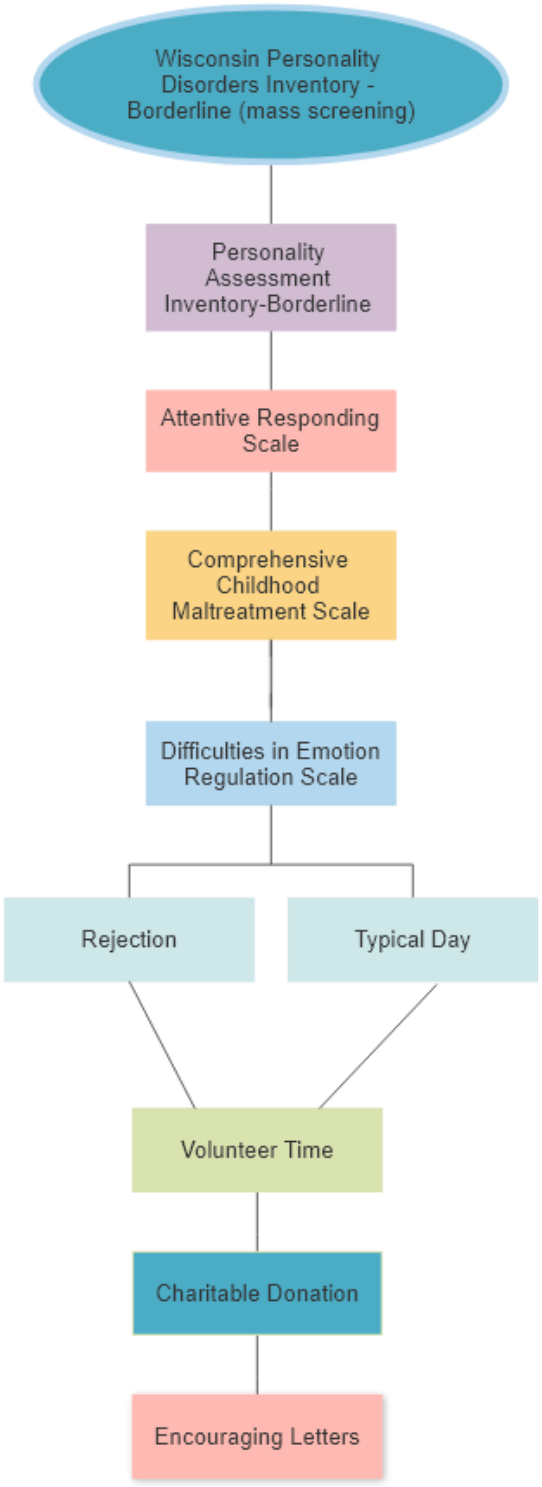


Figure B4. Method Flowchart, as Used in Study

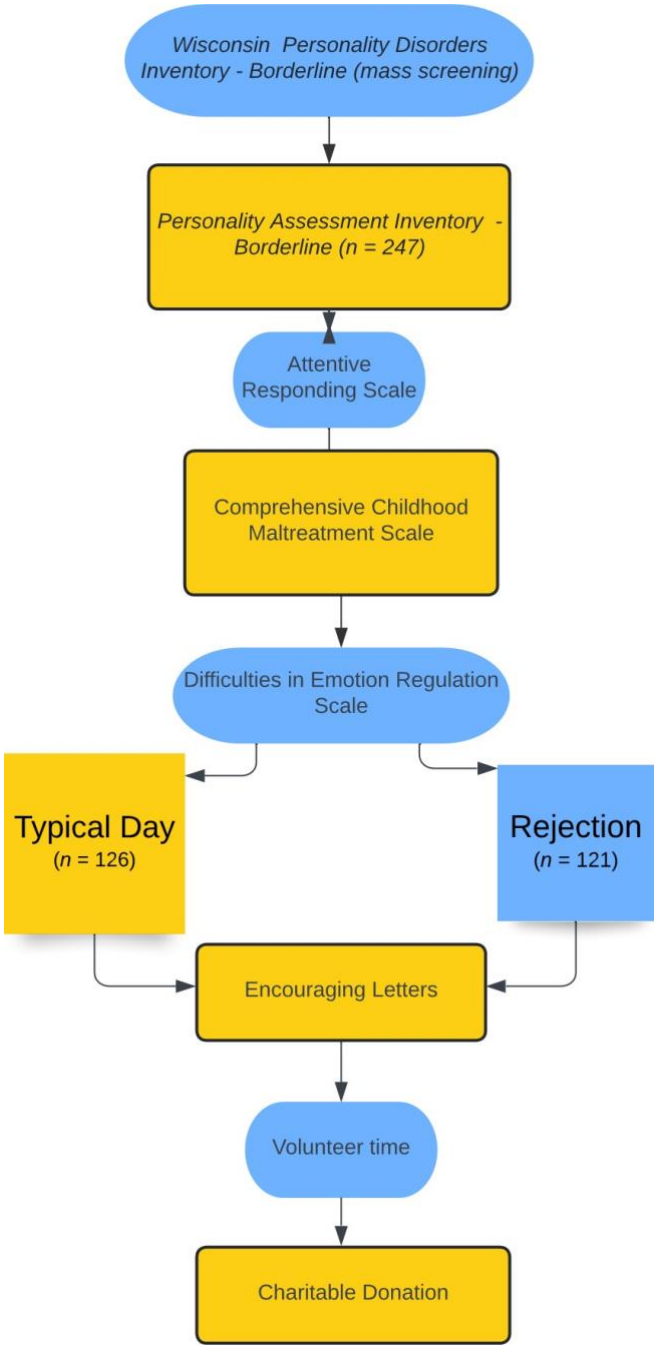


Figure B5. Morey's (1991) Four-Factor Model

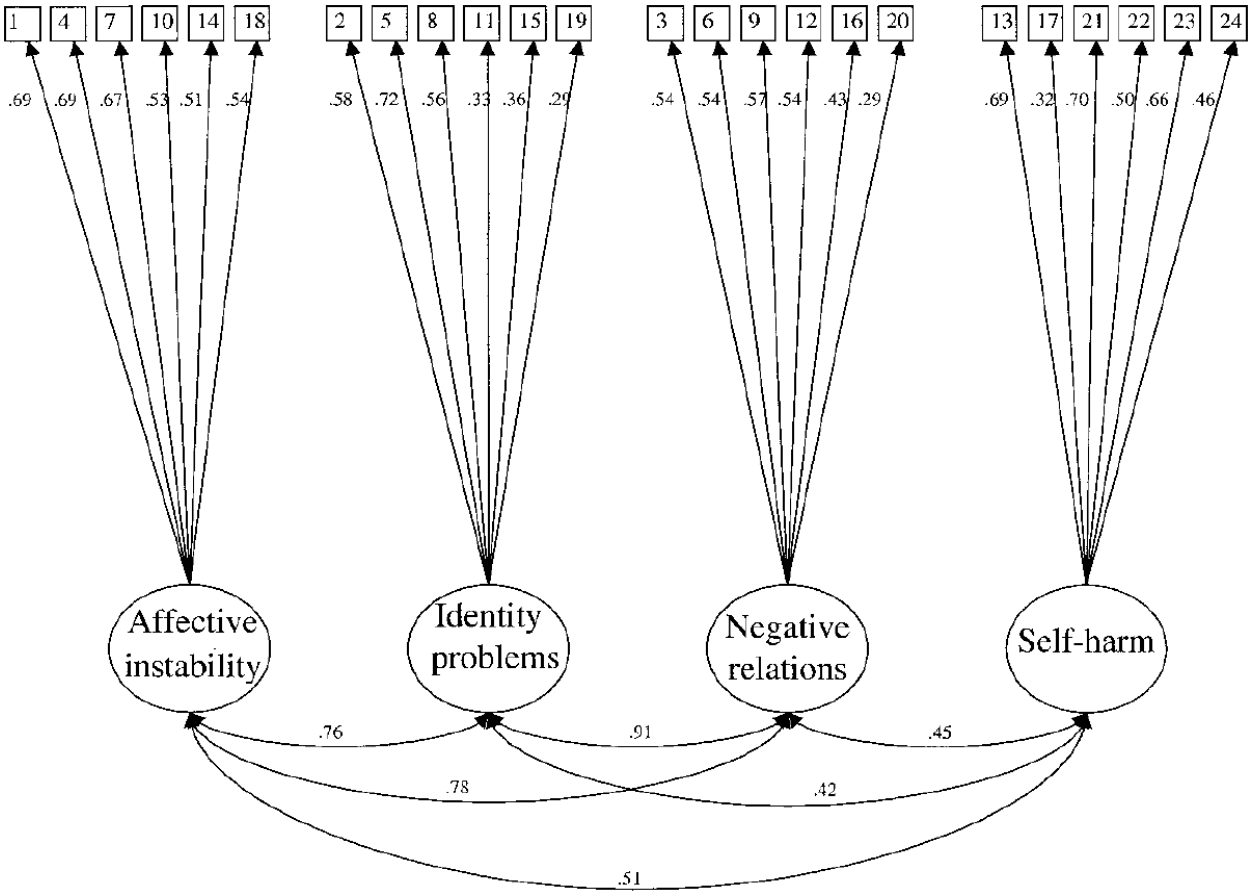
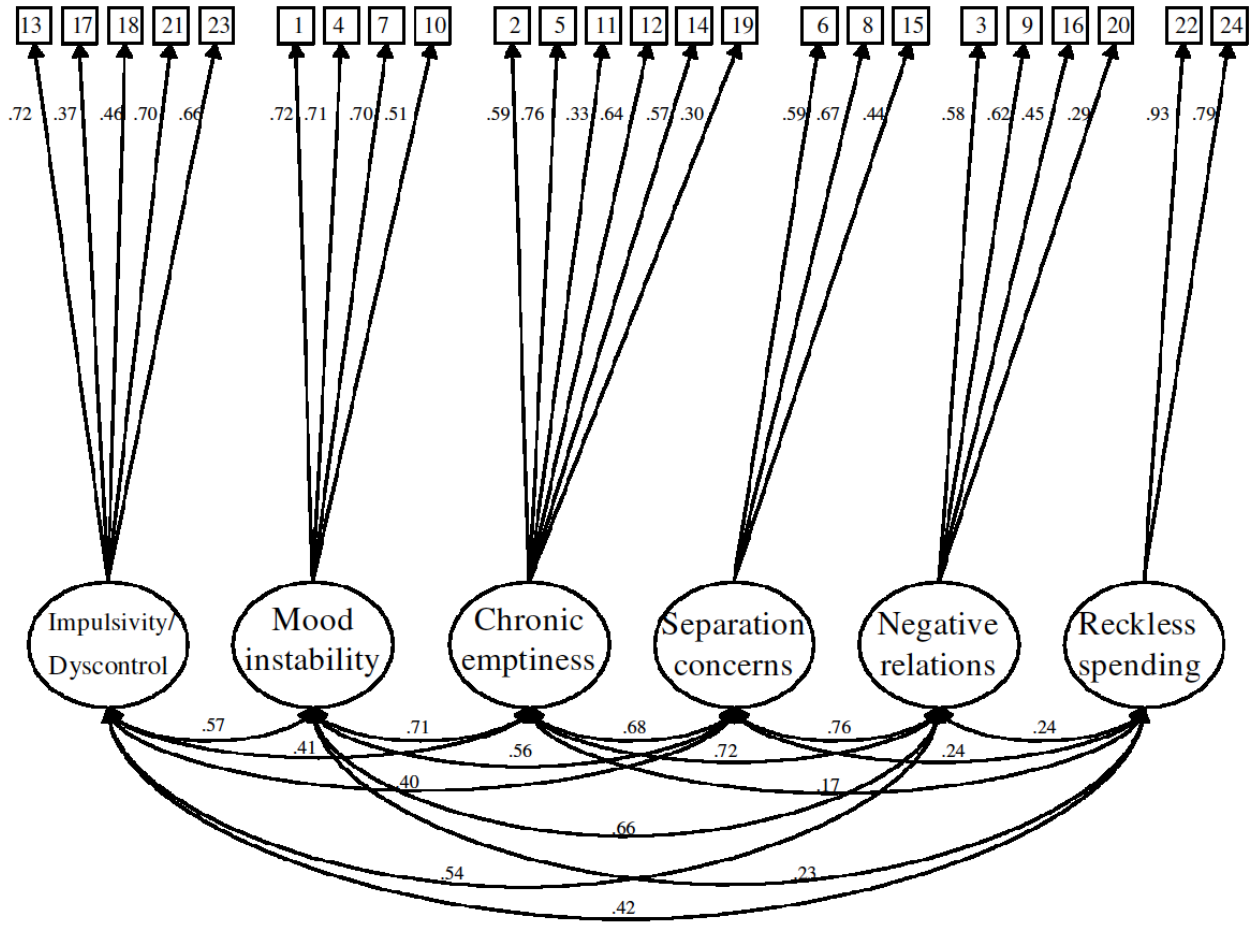


Figure B6. Jackson and Trull's (2001) 6-Factor Model



APPENDIX C: MATERIALS

Wisconsin Personality Disorders Inventory – IV (WISPI-IV), BPD scale items

(Klein et al., 1993)

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.

PAI-BOR
(selected items)

Instructions: Read each statement and decide if it is an accurate statement about you. We are interested in studying the interaction between personality and relationships.

If the statement is FALSE, NOT AT ALL TRUE, select False
If the statement is SLIGHTLY TRUE, select Slightly True.
If the statement is MAINLY TRUE, select Mainly True.
If the statement is VERY TRUE, select Very True.

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)
4)
5) Sometimes I feel terribly empty inside.
6) I want to let certain people know how much they're hurt me.
7)
8)
9) People once close to me have let me down.
10) I have little control over my anger.
11) I often wonder what I should do with my life.
12)
13) I sometimes do things so impulsively that I get into trouble.
14) I've always been a pretty happy person.
15) I can't handle separation from those close to me very well.
16) I've made some real mistakes in the people I've picked as friends.
17) When I'm upset, I typically do something to hurt myself.
18) I've had times when I was too mad I couldn't do enough to express all my anger.
19)
20) Once someone is my friend, we stay friends.
21) I'm too impulsive for my own good.
22)
23) I'm a reckless person.
24)

Selected Items from the Comprehensive Child Maltreatment Scale

Item and Item wording	Scoring key
Before the age of 13, how frequently did *you* experience any of the following behaviours? Please rate the frequency with which the behaviours were directed toward *you* by *your* mother, *your* father, and other adults or older adolescents. Physically punished for wrongdoing (e.g., smacking, grabbing, shaking); Other use of violence (e.g., hitting, punching, kicking); Severely hurt *you* (requiring medical attention).	0=never or almost never; 1=occasionally; 2=sometimes; 3=frequently; 4=very frequently
How frequently do you believe *you* witnessed any of the behaviours listed above directed towards <u>others</u> in the family?	(as above)
Before the age of 13, how frequently did *you* experience any of the following behaviours? Please rate the frequency with which the behaviours were directed toward *you* by *your* mother, *your* father, and other adults or older adolescents. Yelled at *you*; Ridiculed, embarrassed, used sarcasm (made *you* feel guilty, silly or ashamed); Provoked, made *you* afraid, used cruelty	(as above)
Before the age of 13, how frequently did *you* experience any of the following behaviours? Please rate the frequency with which the behaviours were directed toward *you* by *your* mother, *your* father, and other adults or older adolescents. Not given *you* regular meals or baths, clean clothes, or needed medical attention; Shut *you* in a room alone for an extended period of time; Ignored *your r*equests for attention; did not speak to *you* for an extended period of time	(as above)
Before the age of 13, how frequently did *you* experience any of the following behaviours? Please rate the frequency with which the behaviours were directed toward *you* by *your* mother, *your* father, and other adults or older adolescents. Many people report having had childhood sexual experiences with other children or with older people. The following questions relate only to sexual activities with <u>older people</u>. These 'older people' include someone who at the time was either an adolescent (at least 5 years older than *you*; or an adult (18 years of age or over). <u>Before *you* turned 13</u>, did an older person engage in any of the following types of sexual activity with *you*? Requested *you* to do something sexual; Forced *you* to watch others having sex; Showed *you* his erect penis; Touched *your* penis, vagina, or breasts; Made *you t*ouch his penis/her vagina or breasts; Put his/her mouth on *your* penis or vagina; Made *you* put *your* mouth on his penis/her vagina; Put his penis in *your* vagina or anus; Put a finger in *your* vagina or anus;	0=never; 1=once; 2=twice; 3=3–6 times; 4=7–20 times; 5=more than 20 times ‡

Put other object in *your* vagina or anus;

Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

1----------2----------3----------4----------5

almost never	sometimes	about half the time	most of the time	almost always
(0-10%)	(11-35%)	(36-65%)	(66-90%)	(91-100%)

_____ 1) I am clear about my feelings.
_____ 2) I pay attention to how I feel.
_____ 3) I experience my emotions as overwhelming and out of control.
_____ 4) I have no idea how I am feeling.
_____ 5) I have difficulty making sense out of my feelings.
_____ 6) I am attentive to my feelings.
_____ 7) I know exactly how I am feeling.
_____ 8) I care about what I am feeling.
_____ 9) I am confused about how I feel.
_____ 10) When I'm upset, I acknowledge my emotions.
_____ 11) When I'm upset, I become angry with myself for feeling that way.
_____ 12) When I'm upset, I become embarrassed for feeling that way.
_____ 13) When I'm upset, I have difficulty getting work done.
_____ 14) When I'm upset, I become out of control.
_____ 15) When I'm upset, I believe that I will remain that way for a long time.
_____ 16) When I'm upset, I believe that I will end up feeling very depressed.
_____ 17) When I'm upset, I believe that my feelings are valid and important.
_____ 18) When I'm upset, I have difficulty focusing on other things.
_____ 19) When I'm upset, I feel out of control.
_____ 20) When I'm upset, I can still get things done.
_____ 21) When I'm upset, I feel ashamed at myself for feeling that way.
_____ 22) When I'm upset, I know that I can find a way to eventually feel better.
_____ 23) When I'm upset, I feel like I am weak.
_____ 24) When I'm upset, I feel like I can remain in control of my behaviors.
_____ 25) When I'm upset, I feel guilty for feeling that way.
_____ 26) When I'm upset, I have difficulty concentrating.
_____ 27) When I'm upset, I have difficulty controlling my behaviors.
_____ 28) When I'm upset, I believe there is nothing I can do to make myself feel better.
_____ 29) When I'm upset, I become irritated at myself for feeling that way.
_____ 30) When I'm upset, I start to feel very bad about myself.
_____ 31) When I'm upset, I believe that wallowing in it is all I can do.
_____ 32) When I'm upset, I lose control over my behavior.
_____ 33) When I'm upset, I have difficulty thinking about anything else.
_____ 34) When I'm upset I take time to figure out what I'm really feeling.
_____ 35) When I'm upset, it takes me a long time to feel better.
_____ 36) When I'm upset, my emotions feel overwhelming.

Reverse-scored items (place a subtraction sign in front of them) are numbered 1, 2, 6, 7, 8, 10, 17, 20, 22, 24 and 34.

Calculate total score by adding everything up. Higher scores suggest greater problems with emotion regulation.

SUBSCALE SCORING:** The measure yields a total score (SUM) as well as scores on six sub-scales:

1. Nonacceptance of emotional responses (NONACCEPT): 11, 12, 21, 23, 25, 29
2. Difficulty engaging in Goal-directed behavior (GOALS): 13, 18, 20R, 26, 33
3. Impulse control difficulties (IMPULSE): 3, 14, 19, 24R, 27, 32
4. Lack of emotional awareness (AWARENESS): 2R, 6R, 8R, 10R, 17R, 34R
5. Limited access to emotion regulation strategies (STRATEGIES): 15, 16, 22R, 28, 30, 31, 35, 36
6. Lack of emotional clarity (CLARITY): 1R, 4, 5, 7R, 9

Total score: sum of all subscales

**"R" indicates reverse scored item

REFERENCE:

Gratz, K. L. & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26,* 41-54.

Attentive Responding Scale

Instructions: Please rate how true each statement is for you using this subscale:
0 = Not at all true; 5 = Very true

Attentive Scale Paired Items
[Presented at the beginning of the study]

1) I am an active person
2) I enjoy the company of my friends
3) I enjoy relaxing in my free time.
4) I am a very energetic person
5) It frustrates me when people keep me waiting
6) I spend most of my time worrying

[Presented at the end of the study]

1) I have an active lifestyle
2) I like to spend time with my friends
3) In my time off I like to relax
4) I have a lot of energy
5) It's annoying when people are late.
6) I worry about things a lot

Infrequency Items

1. I don't like getting speeding tickets. (R)
2. It feels good to be appreciated. (R)
3. I'd rather be hated than loved.
4. I enjoy the music of Marlene Sandersfield.
5. My favorite subject is agronomy.
6. I don't like being ridiculed or humiliated. (R)