

THE EFFECT OF STRESS ON PROSOCIAL SHARING BEHAVIOR
IN YOUNG ADULTS

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by

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University of Missouri-Kansas City, 2019

ABSTRACT

Prosocial behavior benefits both an individual and society. Sharing behavior is considered the most altruistic, due to individuals sacrificing time and resources without the expectation of reciprocation. A cost-benefit analysis may incorporate contextual factors influencing sharing behavior; thus, contexts where individuals may be asked to share should be considered. Stress is one contextual factor that has been considered but is understudied related to sharing behavior. Research has indicated stress enhances prosocial behaviors; however, stress may differentially influence prosocial behaviors depending on individual or contextual factors. This study investigated how acute psychological stress, via social rejection, may influence subsequent sharing behavior in young adults. Additionally, it investigated how an individual's emotional reactivity to stress and understanding of other's intentions may influence sharing decisions. Forty-six young adults were recruited and assigned to a stress group, where individuals experienced social rejection, or a neutral group. All participants completed computerized sharing tasks. Sharing tasks were binary choices with an anonymous partner who displayed prosocial and selfish intentions towards them. A preference parameter for altruistic acts generated an index for an individual's prosociality.

Participants reported perceived stress and overall mood at three times; before (T1) and after (T2) the social rejection manipulation, and following the sharing task (T3). Results indicated that socially rejected participants were more willing to share with an anonymous other, even when their initial payoff was lower than the other. The neutral group displayed different levels of sharing behavior depending on the initial payoff to themselves. Other's intentions did not significantly impact sharing behavior in either group. The social rejection manipulation did not elicit changes in perceived stress; however, overall mood was significantly decreased in the stress group (T1-T2). The stress group demonstrated a significant decrease in perceived stress after completing sharing tasks (T2-T3). These findings suggest that socially rejected individuals could display enhanced prosocial behaviors by sharing with others, even at a monetary cost, perhaps to gain social connection. Results are discussed related to the findings and their contribution to further understanding of mechanisms of prosocial sharing behavior in young adults. Future research and possible study limitations are also discussed.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the College of Arts and Sciences have examined a thesis titled “The Effect of Stress on Prosocial Sharing Behavior in Young Adults”, presented by Haley J. Killian, candidate for the Master of Arts degree, and certify that in their opinion it is worthy of acceptance.

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CONTENTS

ABSTRACT iii

LIST OF ILLUSTRATIONS viii

LIST OF TABLES ix

Chapter

1. OVERVIEW 1

 Purpose..... 2

2. REVIEW OF THE LITERATURE 4

 Prosocial Sharing Behavior..... 4

 Stress 5

 Affect..... 6

 Reciprocity Based on Others’ Intentions..... 7

 The Current Study..... 9

 Hypotheses 10

 Hypothesis One..... 10

 Hypothesis Two 10

3. METHODOLOGY 11

 Participants..... 11

 Procedure 11

 Social Rejection Manipulation..... 11

 Computerized Sharing Decision-Making Task..... 12

 Measures 17

Visual Analog Scale for Stress	18
Brief Mood Introspection Scale	18
4. RESULTS	19
Preliminary Analyses	19
Social Rejection Manipulation.....	19
Hypothesis One: Sharing Behavior.....	21
Hypothesis Two: Change in Mood/Affect.....	23
5. DISCUSSION.....	25
Limitations	27
Future Directions	28
REFERENCE LIST	30
VITA.....	34

ILLUSTRATIONS

Figures	Page
1. An example trial of the dictator game.....	14
2. An example trial of the positive reciprocity game (advantageous inequality)	15
3. An example trial of the negative reciprocity game (disadvantageous inequality).....	15
4. Timeline of procedure.....	18
5. Mood change between groups pre and post social rejection manipulation	20
6. Preferences for altruism by group in advantageous and disadvantageous inequality conditions	22
7. Change in perceived stress following sharing task	24

TABLES

Table	Page
1. Perceived stress rating.....	19
2. Overall mood rating	20
3. Preference parameters for prosocial sharing.....	23

CHAPTER 1

OVERVIEW

Prosocial behavior has been a growing topic of interest throughout many fields of research in the last decade. Prosocial behavior has adaptive qualities benefiting society, including donating money to a charity, as well as increasing community connection. It also has adaptive values for individuals by helping individuals to maintain interpersonal relationships across the lifespan (Eisenberg & Miller, 1987). Due to prosocial behavior having the intention of benefiting others with a low possibility of reciprocal rewards, it has been questioned whether prosociality is human nature (Tomasello & Vaish, 2013).

Prosociality is a complex construct consisting of subtypes of prosocial behaviors, including: helping, instrumental helping, comforting, cooperating, and sharing (Davidov, Vaish, Knafo-Noam, & Hastings, 2016). Among the subtypes of prosocial behavior, sharing is considered the most altruistic form because an individual chooses to share his or her resources with other individuals without an expectation of reciprocal reward at that point, or in the future (Malti, Ongley, Peplak, Chaparro, Buchmann, Zuffiano, & Cui, 2016). Thus, sharing decisions may require higher levels of social and cognitive understanding, such as the ability to take the perspective of others.

Not all human beings are willing to share their resources at any time. It has been questioned what individual characteristics or contexts would influence prosocial sharing behavior. More specifically, stress is one of contextual factors that has been considered to influence prosocial behaviors. Some findings have suggested that stress can increase exhibited social behaviors (Buchanan & Preston, 2014; von Dawans et al., 2012). However,

mechanisms of prosocial behaviors under stress have not been fully explored. In particular, it has been under-studied what factors motivate prosocial behaviors under stress. One study reported that individuals showed increased prosocial behaviors in social interactions after experiencing acute psychosocial stress (von Dawans, Fischbacher, Kirschbaum, Fehr, & Heinrichs, 2012). This finding suggests the benefit of gaining social interactions, which could mitigate negative stress responses, would motivate individuals to give up their resources and display increased prosocial behaviors. Moreover, it is unclear how individual characteristics, such as emotional reactivity and contexts, influence prosocial behaviors. Previous work demonstrated that individuals who were highly anxious displayed increased levels of egocentricity when exposed to acute stress (Todd, Forstmann, Durgmer, Brooks, & Galinsky, 2015). This finding suggests that stress could impact prosocial decisions depending on individuals' emotional responses, coping strategies for stress, and contexts. The goal of this study was to determine the mechanism of prosocial sharing decision-making when individuals are impacted by psychosocial stress. To achieve this goal, this study sought to investigate how individuals' emotional reactivity and coping strategies to psychosocial stress elicited by social rejection influenced prosocial sharing decisions in young adults.

Purpose

The current study sought to further the understanding of prosocial sharing behavior in relationship to acute social stress, via social rejection. An individual's ability to display various types of prosocial behavior has several important benefits—not only for the individual—for our society. Due to the number of stressors an individual may experience on a daily basis, it is important to understand how an individual's personal characteristics may influence prosocial sharing behavior.

The following literature review is structured to provide basic background information on prosocial behavior, with specific attention to sharing behavior, stress, and affect—both positive and negative. In order to understand the mechanisms of prosocial sharing behavior, it is important to understand both personal and emotional characteristics of the individual person.

CHAPTER 2

REVIEW OF THE LITERATURE

Prosocial Sharing Behavior

Prosocial behavior is seen as a behavior that increases the benefit of others, although the motivation to behave in a prosocial manner may include increasing self-benefits: prosocial behaviors are also motivated by satisfying intrinsic rewards or reducing negative arousal (Batson, 1987). Research suggests that prosocial decisions could be the result of a cost-benefit analysis meaning that an individual makes a prosocial decision because it is advantageous to either the individual or society (Penner, Dovidio, Piliavin, & Schroeder, 2005). These types of decisions would also be made when the benefits, such as gaining compliments, exceed the perceived costs. They will also be made when the decision to behave in a prosocial manner decreases the cost to the individual, such as reducing guilty feelings (Dovidio, Piliavin, Gaertner, Schroeder, & Clark, 1991). This raises the question of how individuals compute costs and benefits to make prosocial sharing decisions. From a cost-benefit analysis perspective, sharing could be more demanding than other types of prosocial behaviors due to the higher cost of sacrificing one's tangible resources with the possibility of never getting something in return (Malti, Ongley, Peplak, Chaparro, Buchmann, Zuffiano, & Cui, 2016). Moreover, a cost-benefit analysis of sharing decisions would incorporate contexts in which individuals would be willing to share. For example, people are more likely to share with close others, such as family and friends, than with anonymous others in that the benefits of behaving prosocially towards close others exceed the costs of sharing (Aron, Aron, Tudor, & Nelson, 1991). Additionally, the level of empathy displayed and concern for fairness are known to influence prosocial decisions (Eisenberg &

Miller, 1987; Fehr & Schmidt, 1999; Maner & Gailliot, 2007). One study suggested that individuals are more willing to share with others who behave generously towards them since sharing reduces feelings of treating others unequally (Morishima, Schunk, Bruhin, Ruff, & Fehr, 2012). These findings suggest that an individual's cost-benefit analysis could differ depending on contexts, in particular, the intention of others. This study sought to examine the mechanisms of prosocial sharing decisions by investigating cost-benefit computations of those decisions when an individual is asked to share with an anonymous other who displays advantageous (i.e., positive reciprocity) and disadvantageous (i.e., negative reciprocity) intentions towards the individual after experiencing social stress via social rejection.

Stress

Social or environmental acute stress is prevalent in society and the effect of stress on human behavior is complex (Buchanan & Preston, 2014). Research has demonstrated that individuals make different behavioral decisions under stress, such as choosing the correct answer on an exam, participating in risky behavior, and deciding what to do in an emergency (Starcke & Brand, 2012; Pabst, Brand, & Wolf, 2013). Exposure to acute social stress increased an individual's decision-making competence, which suggests that acute stress may have a positive impact on decision-making abilities (Shields, Lam, Trainor, & Yonelinas, 2016).

As stress pertains to prosocial behavior, much of the previous literature has examined acts of helping or assisting someone in need (Buchanan & Preston, 2014). However, there are additional types of prosocial behavior, with varying levels of altruistic tendencies required from the individual, that have not been thoroughly understood in previous research. Previous literature has demonstrated a positive effect from stress on prosocial decisions in actual

social interactions with a partner after an individual was exposed to acute psychosocial stress elicited by social evaluation (e.g., public speaking) and cognitive load (e.g., mental-arithmetic and attention tasks) manipulations (von Dawans et al., 2012). Individuals demonstrated increases in their overall level of trustworthiness and sharing in economic games (von Dawans, Fischbacher, Kirschbaum, Fehr, & Heinrichs, 2012). In contrast, Twenge and colleagues (2007) reported a negative effect of stress on prosocial behaviors in terms of donating money, helping, and cooperation after an individual was exposed to acute psychosocial stress elicited by social evaluation and exclusion manipulations (i.e., being evaluated for personality and told he or she would be socially isolated later in life) (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). It was reported that expected social exclusion later in life decreased individuals' emotional reactivity, specifically empathic concerns, which lead to reduced prosocial behaviors. However, if the value of social inclusion (benefits) would be increased due to experienced social rejection, an individual may be more willing to share resources (i.e. time or money) with others (costs) to regain possible social interaction and/or a good reputation. The current study sought to better understand how acute stress elicited by social rejection and individuals' emotional reactivity to stress impact an individual's decisions to share with an anonymous other.

Affect

It has been found that an individual's personal characteristics and emotional state are related to demonstration of prosocial behaviors. Previous research has demonstrated that positive emotional state increased prosocial behaviors including spending money on others (Hill & Howell, 2014) and volunteering (Piliavin & Siegl, 2007). Schacter and Margolin (2018) found that adolescents who were behaving prosocially on a daily basis showed a

decrease of overall depressive symptoms and reported increased positive mood on the days in which they displayed an increased number of prosocial behaviors (Schacter & Margolin, 2018). Additional research findings suggested that spending money on others would be related to an individual's subjective well-being (Hill & Howell, 2014). Raposa and colleagues (2016) found that prosocial behavior mitigated the impact of negative affect that stress had on an individual. It was suggested that individuals who displayed higher than typical levels of prosocial behavior on a daily basis would have lower levels of negative affect and higher overall mental health ratings than individuals who displayed less prosocial behavior (Raposa, Laws, & Ansell, 2016). These findings suggest that prosocial behavior could alleviate the negative effects of stress, such as negative feelings associated with stress. From the perspective of a cost-benefit analysis, prosocial decisions would be made when the probability of benefits (e.g., increased positive affect, or reduced feelings of guilt for not helping) exceed costs (e.g., time or resources) (Dovidio, Piliavin, Gaertner, Schroeder, & Clark, 1991). Thus, individuals could engage in prosocial behaviors by sharing with another individual (costs) to reduce the negative effects that stress has on an individual (benefits). The current study investigated whether individuals' affect states would be involved in sharing behavior decision-making.

Reciprocity Based on Others' Intentions

Much of the previous literature suggests that an individual's decision to behave in a prosocial way is related to an individual's empathy level (Penner, Dovidio, Piliavin, & Schroeder, 2005; Eisenberg & Miller, 1987). It also requires an individual to have an affective response to another individual, the ability to take the perspective of another

individual, and the ability to maintain an understanding of self-versus-other feelings (Lamm, Batson, & Decety, 2007).

Both empathy and prosocial behavior stem from the ability to take the perspective of another person (Eisenberg, 1991). Perspective taking is a multifaceted construct consisting of three different components: affective, cognitive, and perceptual perspective taking (Oswald, 1996). Prosocial behavior may interact with each of these constructs; however, affective, the ability to recognize and understand how another is feeling, and cognitive, the ability to understand what another is thinking, perspective taking abilities are important for the purposes of sharing behavior (Oswald, 1996). Research has shown that high perspective taking ability in the affective domain is related to greater empathic and altruistic behavior than the other forms of perspective taking abilities (Oswald, 1996). Furthermore, individuals who demonstrate the ability to take the perspective of others may be more understanding of others' intentions and be more willing to make altruistic or prosocial decisions based on those intentions.

Previous research has suggested that individuals are concerned with improving the payoff of all participants and they may show a tendency to give up their own earnings to increase earnings of all people (Charness & Rabin, 2002). When considering the intentions of others, individuals may display reciprocity towards other individuals and withdraw payoff to another person to increase a fair outcome and may even punish unfair behavior (Charness & Rabin, 2002). Additionally, an individual's decision to behave in a prosocial way may be motivated by a concern for fairness. Research conducted by Morishima and colleagues (2012) found that an individual may be more willing to share with others if sharing would decrease inequality specifically in situations where he or she has a higher payoff

(advantageous reciprocity). Individuals increased payoff for the other person if he or she displayed altruistic behavior and the individual would decrease payoff for the other person if he or she displayed a selfish intention (Morishima et al., 2012). These findings suggest that an individual's ability to understand others' intentions in situations where he or she has varying levels of earning in comparison to the other person may influence a decision to reward for altruistic behavior or punish for selfish behavior. The current study sought to examine this pattern in individuals who had been socially rejected by another person prior to being asked to make sharing decisions.

The Current Study

This current study evaluated the mechanisms underlying prosocial sharing decisions in young adults under acute stress. Given that previous research has evaluated prosocial behavior more generally, this study sought to investigate the impact of acute stress by social rejection, on an individual's subsequent sharing behavior. Individuals may be more willing to engage in sharing behavior in order to alleviate the negative impacts of social rejection and increase their own affective states and psychological well-being. This study examined mechanisms of sharing decisions in the aspect of mitigating affective responses after experiencing acute social stress.

Previous findings suggest that prosocial behavior may buffer the negative effect from stress (Raposa et al., 2016). Individuals would be more willing to share following exposure to acute stress if they perceive potential benefits (i.e., alleviating stress and negative mood by sharing) outweigh the potential costs they would incur (i.e., resources shared with another). If prosocial sharing decisions are related to gain potential benefits of alleviating stress and

negative mood, individuals who experienced acute social stress will be more likely to make prosocial decisions along with improved mood status.

Hypotheses

The current study aimed to better understand how acute social stress, via social rejection, influences an individual's prosocial sharing behavior.

Hypothesis One

H1: Individuals who experience acute social stress (i.e., stress group, social rejection) will show higher levels of sharing decisions than those individuals who do not experience social stress (i.e., neutral group). In order to address this hypothesis, individual's preference parameters, depending on the anonymous other's intention for reciprocity, for prosocial sharing behavior were estimated using the equation from a model of social preferences (see *Model 1 on page 17*; Morishima et al., 2012).

H1a. Individuals who were subjected to social rejection would show higher levels of prosocial sharing behavior, regardless of the intention for reciprocity of the anonymous other.

Hypothesis Two

H2: Individuals exposed to acute social stress will be more willing to make prosocial decisions (i.e., costs) to mitigate negative affect due to stress (i.e. benefits). It is expected that individuals who experienced acute social stress via social rejection will demonstrate increased positive affect after completing sharing decision-making tasks (T2-T3), but this pattern would not hold for individuals in the neutral group.

CHAPTER 3

METHODOLOGY

Participants

Participants were 46 young adults (35 females) recruited from the University of Missouri—Kansas City, Department of Psychology undergraduate research pool. Four additional participants were excluded from analyses due to making the same choice on every sharing decision and therefore being unable to calculate preference parameters for altruism. All participants were between the ages of 18 and 24 ($M=20.15$, $SD=1.74$). Participants were expected to be in good physical health and speak English as their primary language. Exclusionary criteria for the study included inability to speak English and data was excluded from data who did not demonstrate understanding of the sharing task. The majority of the participants were Caucasian (54.3%; Black=13.0%, Multiracial=13.0%, Asian=10.9%, Hispanic=4.3%, Other=4.3%) All participants were consented and completed all activities. This data set was collected in part of a larger project.

Once approval from the Institutional Review Board at the University of Missouri-Kansas City was granted, all data was collected from voluntary research participants on campus. For the purposes of this current study, the measures central to the current study will be described. Entire research procedure took approximately two and a half hours. All participants were compensated up to \$11 and 2.5 credits.

Procedure

Social Rejection Manipulation

Participants came into the laboratory individually and were told that they would be completing the study while interacting with an anonymous, same-sex potential partner who was

not really there to participate. To ensure participants believed there was another person with whom they were interacting, they were told that the potential partner would be in another room down the hall to minimize the chance that they saw the potential partner prior to interacting with them for the second half of the experiment. Each participant was randomly assigned to either the stress (i.e., social rejection) or neutral (i.e., irrelevant-departure) group (Maner, DeWall, Baumeister, & Schaller, 2007). Participants were told that the anonymous partner would evaluate self-introduction videos created by participants and make the decisions of whether to work with participants for the sharing task. Participants were asked to wait in the experiment room while the researcher went to collect a self-introduction video from the potential partner. The participants were instructed to watch the video of the potential partner, and to create their own self-introduction videos for about three minutes. The researcher then left to get the evaluation from the potential partner and returned after five minutes with the response. Participants in the stress group were told that the potential partner saw the video and chose not to work with the participant. In the neutral group, participants were told that the potential partner wanted to work with them but had to leave suddenly for a family emergency. Participants were told that they could work on their own for the following sharing task.

Computerized Sharing Decision-Making Task

Following the stress or neutral manipulation, a participant completed computerized binary sharing decision-making tasks (Morishima, Schuk, Bruhin, Ruff, & Fehr, 2012) (see Figure 1, Figure 2, and Figure 3). In order to confirm that the participant understood the task, as it was explained, they completed a short six question quiz asking if the anonymous other had selfish or altruistic intentions. When the participant made correct answers on all six questions, he or she was asked to complete the computerized sharing decision-making task.

The task consists of two types of computerized economic games, i.e., the dictator and reciprocity games, developed by Morishima and his colleagues (2012). A participant was asked to share resources between themselves and another individual, who remained anonymous. Participants were told that they should think of the computerized sharing task as a game they were playing with the other individual, even though the person chose not to work with them or had to leave, and the other individual made a couple of decisions so that researchers were able to model the choices that the other individual would make for the rest of the task. Participants had the opportunity to earn up to \$11 dollars in cash (range=3-5, $M=3.87$, $SD=.54$).

Overall prosociality was evaluated using these binary decision-making tasks. The participant was shown the initial instruction screen for binary sharing choices (“Choose between X or Y”), then they were given 10 seconds to make a choice before the screen changed to show a fixation cross for 5 seconds. In the dictator games, which consisted of sixty-one trials, a participant made a binary sharing choice allocating money (dollars) to self (You (A)) vs. an anonymous partner (Person B) between (1) the option where a participant received a higher payoff at a lower cost (e.g., Option X, 1010 vs. 190) and (2) the option where a participant received a lower payoff at a higher cost (e.g., Option Y, 730 vs. 470) (see Figure 1). The screen displayed two graphs representing binary sharing choices (options X and Y) side-by-side to visualize the relative amount of money distributed to a participant and a partner. In the dictator games, a participant’s choices were regarded as prosocial when he or she gave the higher payoff to the anonymous other (Person B) between two options (Option X and Option Y). A participant’s choices were regarded as selfish when he or she gave the lower payoff to the anonymous other (Person B) between the two options.

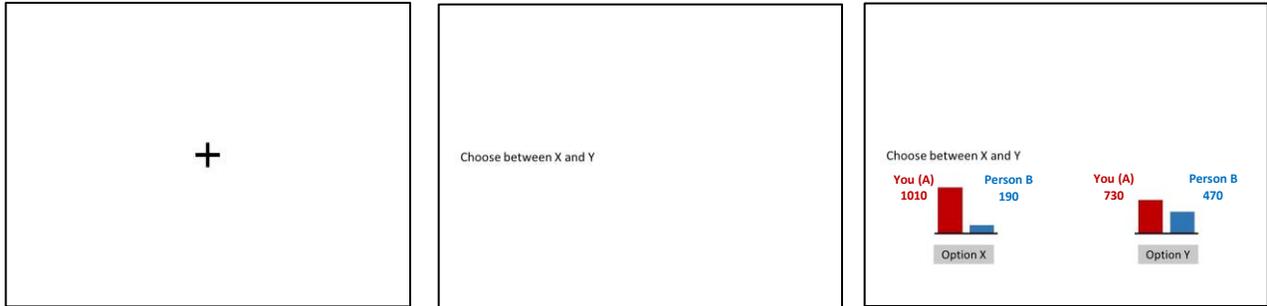


Figure 1. An example trial of the dictator game.

The reciprocity game consisted of 122 trials during which a participant was told that the anonymous partner gave up a chance to make a choice (Option Z) and let the participant make own choice between option X and option Y. On the screen, participants were first presented with option Z, and then were asked to make a binary choice between option X and Y when the anonymous partner (person B) gave up option Z. The reciprocity game provided two conditions—anonymous partner with altruistic intentions toward a participant (i.e., positive reciprocity game) and anonymous partner with selfish intentions towards a participant (i.e., negative reciprocity game). In the positive reciprocity game, a participant could earn more in both options X and Y than in option Z, which implied that the anonymous partner (Person B)’s decision of giving up option Z was beneficial toward the participant. For example, as shown in Figure 2, the anonymous partner gave up option Z [550 vs. 530] and let the participant choose between option X [1050 vs. 270] and option Y [690 vs. 390] so that the participant could earn larger benefits (e.g., person A’s earning: 550 (Z) < 1050 (X) and 690 (Y)). If the participant would prefer to reward a generous act of the partner, he or she would choose option Y even if the amount of earning (e.g., 690) in option Y was smaller than that in option X (e.g., 1050) to increase the partner’s earning (e.g., person B’s earning: 270 (X) < 390 (Y)).



Figure 2. An example trial of the positive reciprocity game (advantageous inequality).

In the negative reciprocity game, a participant could earn less in both options X and Y than in option Z, which implied that the anonymous partner (Person B)'s decision of giving up option Z was selfish toward the participant. For example, as shown in Figure 3, the anonymous partner gave up option Z [590 vs. 880] and let the participant choose between option X [450 vs. 1020] and option Y [210 vs. 720] so that the participant could earn smaller benefits (e.g., person A's earning: 590 (Z) > 450 (X) and 210 (Y)). If the participant would prefer to punish a selfish act of the partner, he or she would choose option Y even if the amount of earning (e.g., 210) in option Y was smaller than that in option X (e.g., 450) to decrease the partner's earning (e.g., person B's earning: 1020 (X) > 880 (Y)).



Figure 3. An example trial of the negative reciprocity game (disadvantageous inequality).

To evaluate participant's prosociality, a model of social preferences by Morishima and colleagues (2012) was used (see the model 1). The model was used to estimate preferences for prosocial behavior parameters for each individual. Estimations of preference parameters for prosocial behavior (i.e., β and α) depended on whether the participant was in a situation of advantageous inequality (i.e., r) where the participant had a larger benefit than an anonymous partner (Player B), or in a situation of disadvantageous inequality (i.e., s) where the participant had a lower benefit than Player B. In order to incorporate a participant's willingness to retaliate or reciprocate selfish or prosocial intention, the model included the prosocial (i.e., q) or selfish intention (i.e., v) of player B. To incorporate a participant's preference for reciprocity intentions, a participant's preference for positive reciprocity (i.e., θ ; a preference for rewarding the altruistic behavior of player B) and a preference for negative reciprocity (i.e., δ , a preference for punishing selfish behavior of player B) were included. Finally, in the model, prosociality was measured by two preference parameters, i.e., β and α . β represented an individual's preference for prosociality in the domain of advantageous inequality, meaning that an individual would sacrifice money to increase the partner's payoff when the individual received larger benefits than the partner. α represented the preference for prosociality in the domain of disadvantageous inequality, meaning that an individual would sacrifice money to increase the partner's payoff even when the individual received smaller benefits than the partner. Given an individual's preference parameters, a positive value indicated that the person displayed higher levels of sharing behavior (i.e., prosocial choice) and a negative value indicated that a person displayed lower levels of sharing behavior (i.e., selfish choice) (Morishima et al., 2012). The statistical software R was utilized to run the model estimation.

$$U_A(\pi_A, \pi_B) = (1 - \beta r - \alpha s - \theta q + \delta v)\pi_A + (\beta r + \alpha s + \theta q - \delta v)\pi_B$$

(Model 1. Preference Parameter for Altruistic Acts)

U_A represents the participant's utility.

Π_A represents the monetary payoff of the participant.

Π_B represents the monetary payoff of the anonymous other.

β represents the participant's preference for prosocial behavior in the advantageous inequality condition.

α represents the participant's preference for prosocial behavior in the disadvantageous inequality condition.

θ represents the participant's preference for positive reciprocity.

δ represents the participant's preference for negative reciprocity.

r represents advantageous inequality: $r=1$ if $\Pi_A > \Pi_B$, and $r = 0$ otherwise

s represents disadvantageous inequality: $s=1$ if $\Pi_A < \Pi_B$, and $s = 0$ otherwise

q represents positive reciprocity: $q=1$ if player B behaved altruistically towards A, and $q=0$ otherwise.

v represents negative reciprocity: $v=1$ if player B behaved selfishly towards A, and $v=0$, otherwise.

Stimuli presentation and response recordings were performed using Presentation[®] software (Version 20, Neurobehavioral Systems, Inc., Berkley, CA). To ensure a participant's motivation to make real decisions as much as possible, participants were told that they would receive a monetary reward by random selection of six choices he or she made during the tasks. The reward was .001 times the average of the 6 choices and the maximum award the participants could have earned was \$11 dollars.

Measures

To examine if prosocial decisions increase positive affect after stress as well as to examine if participants demonstrated changes in affect or stress following social rejection manipulation, participants completed surveys before (T1) and after the social exclusion manipulation (T2) and following the sharing tasks (T3) to examine stress level (Visual Analog

Scale; Lesage, Berjot, & Deschamps, 2012) and mood (Brief Mood Introspection Scale; Mayer & Gaschke, 1988) (see figure 4).

Visual Analog Scale for Stress (Lesage, Berjot, & Deschamps, 2012)

This scale was designed to be a brief measure of current level of perceived stress. It was comprised of one visual analog eleven-point scale ranged from 0 to 10 scores. Participants were asked to mark their perceived stress level using a vertical line on a 100-mm scale anchored with the words on each ending, “None” on the left-hand side and “As bad as it could be” on the right-hand side. Each 10mm was equivalent to an index of 1.

The Brief Mood Introspection Scale (Mayer & Gaschke, 1988)

This scale consisted of 16 adjectives, all of which were associated with mood states of an individual. There were two adjectives selected that were closely associated with the following eight mood states: (a) happy, (b) loving, (c) calm, (d) energetic, (e) fearful/anxious, (f) angry, (g) tired, and (h) sad. Individuals were asked to rate each adjective on a 4-point Likert scale ranging from, “definitely do not feel” to “definitely feel.”

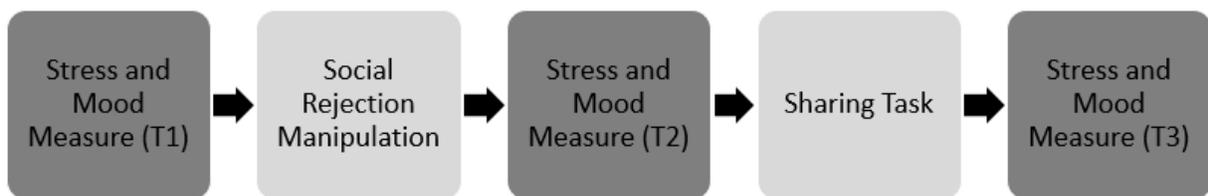


Figure 4. Timeline of procedure.

CHAPTER 4

RESULTS

Preliminary Analyses

Social Rejection Manipulation

The social rejection manipulation was utilized to elicit stress in the social rejection group. Independent samples *t*-tests were conducted to evaluate possible group differences (e.g., social rejection group vs. neutral group), prior to the social rejection manipulation. There was no difference in reported stress at baseline between social rejection and neutral groups ($T1; t(44)=1.69, p=.098$).

Paired samples *t*-tests were conducted to evaluate if the social rejection manipulation elicited changes in perceived stress in each group. Results indicated that perceived stress scores before ($T1; M=3.65, SD=2.73$) and after ($T2; M=3.39, SD=2.68$) social rejection manipulation were not significantly changed in the social rejection group ($t(23)=-1.48, p=.15$). There was also no significant change before ($T1; M=2.35, SD=2.47$) and after ($T2; M=2.03, SD=2.48$) manipulation in perceived stress in the neutral group ($t(21)=-1.46, p=.16$) (see Table 1).

Table 1

<i>Perceived stress rating</i>			
Group	T1	T2	T3
Stress	3.65 (2.73)	3.39 (2.68)	2.81 (2.46)
Neutral	2.35 (2.47)	2.03 (2.48)	2.14 (2.51)

Further analyses were conducted to examine if the social rejection manipulation elicited changes in overall mood. Paired sample *t*-tests were conducted to compare overall mood before and after the social rejection manipulation in each group. The current analyses utilized 44

participants due to incomplete survey responses. There was a significant difference in overall mood before (T1; $M=7.14$, $SD=2.93$) and after (T2; $M=6.68$, $SD=2.77$) social rejection manipulation ($t(21) = 2.89$, $p=.009$). There was no significant change in overall mood before (T1; $M=6.59$, $SD=4.43$) and after (T2; $M=6.82$, $SD=4.29$) the neutral condition manipulation ($t(21) = -1.56$, $p=.14$) (see Table 2; see Figure 5). These findings suggested that individuals who were subjected to social rejection showed a decreased overall mood following the social rejection manipulation. Individuals who were in the neutral condition did not show a significant change in overall mood.

Table 2

Overall mood rating

Group	T1	T2	T3
Stress	7.14 (2.93)	6.63 (2.80)	6.50 (2.60)
Neutral	6.59 (4.43)	6.82 (4.30)	6.41 (4.42)

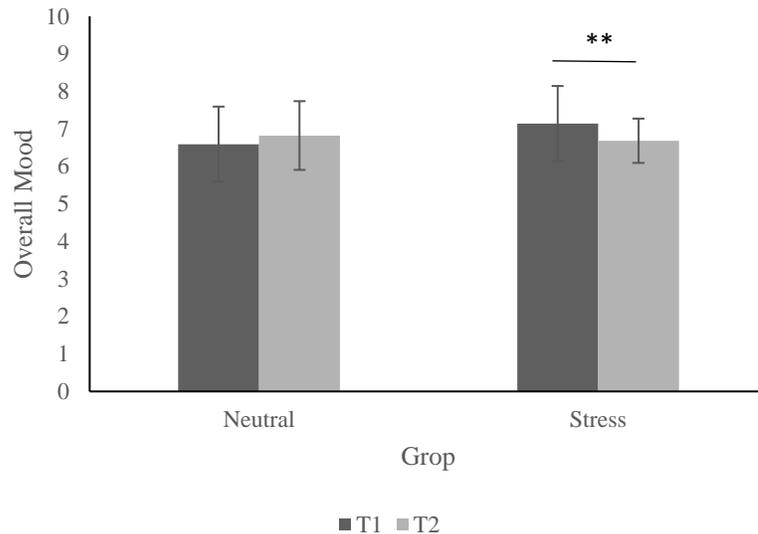


Figure 5. Mood change between groups pre (T1) and post (T2) social rejection manipulation.

Hypothesis One: Sharing Behavior

Independent-samples t-tests were conducted to compare whether individuals in the social rejection group would show higher levels of sharing behavior than those in the neutral group based on a preference for positive and negative reciprocity. Results indicated that there was no significant difference in θ , preference for positive reciprocity, across groups ($t(44) = -.88, p = .38$). There was no significant difference in δ , preference for negative reciprocity, across groups ($t(44) = -.85, p = .40$). These results suggested that unlike the hypothesis 1, social stress induced by social rejection did not influence participants' prosocial sharing decisions depending on intentions of reciprocity of others.

Paired-samples t-tests were conducted to examine the differences in sharing behavior depending on advantageous and disadvantageous inequality in each group. In the neutral group, β , i.e., preference for prosocial sharing behaviors in the domain of disadvantageous inequality ($M = -2.19, SD = 4.08$) and α , i.e., preference for prosocial sharing behaviors in the domain of advantageous inequality ($M = -.88, SD = 3.71$) were significantly different ($t(21) = 3.54, p = .002$). Both parameters were positively correlated with one another ($r = .90, p > .001$). These results suggested that participants in the neutral group made prosocial sharing decisions differently depending on the cost to self, specifically, they made less prosocial sharing decisions when there was a cost to themselves (disadvantageous inequality). In contrast, in the social rejection group, β ($M = -.25, SD = 1.95$) and α ($M = -.76, SD = 3.19$) were not significantly different ($t(23) = -.64, p = .53$) (see Table 3; see Figure 6). The parameters in the social rejection group were not significantly correlated ($r = -.14, p = .52$). These results suggested that participants in the social rejection group did not make prosocial sharing decisions differently depending on the cost to

self, specifically, they made similar prosocial sharing decisions between when there was a benefit (advantageous inequality) and a cost to themselves (disadvantageous inequality).

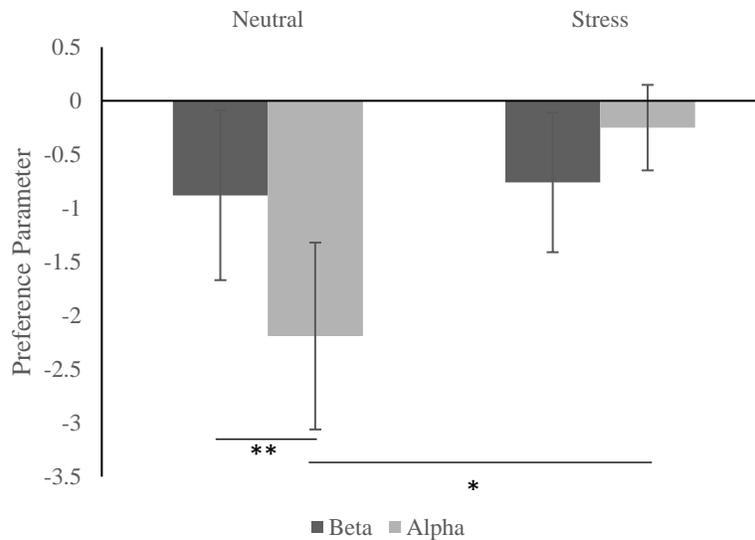


Figure 6. Preferences for altruism by group in advantageous and disadvantageous inequality conditions.

Independent-sample t-tests were conducted to compare whether individuals in the social rejection group would show higher levels of prosocial sharing decisions than individuals in the neutral group. Results indicated that there was no significant difference in β across groups ($t(44) = -.11, p = .911$). There was a significant difference in α between the two groups ($t(44) = 2.09, p = .04$) (see Table 3). These results suggested that individuals in the social rejection group made higher levels of prosocial sharing decisions in the domain of disadvantageous inequality, which implied that participants in the social rejection group were willing to sacrifice their own earnings to give a greater payoff to the other participant (disadvantageous inequality).

Table 3

Preference parameters for prosocial sharing

Group	Beta	Alpha	Theta	Delta
Stress	-.76 (3.19)	-.25 (1.95)	-.21 (.64)	-.07 (.99)
Neutral	-.88 (3.71)	-2.19 (4.08)	-.49 (1.39)	-.29 (.81)

Hypothesis Two: Change in Mood/Affect

The second hypothesis suggested that individuals who experienced acute social stress via social rejection, would demonstrate increased positive affect after completing sharing decision-making tasks, but this pattern would not hold for individuals in the neutral group. In order to evaluate the hypothesis, a paired samples *t*-test was conducted on participants' overall mood levels that were reported following the social rejection manipulation (T2) and after completing the sharing task (T3). Results indicated no significant increase in overall mood in the social rejection group following the sharing task (T2-T3; $t(23) = .68, p = .50$) (see Table 2). Analyses in the neutral group revealed no significant increase in overall mood following the sharing task (T2-T3; $t(21) = 1.57, p = .13$) (see Table 2).

In further analyses, a paired-samples *t*-test was conducted on participants' perceived stress levels that were reported following the social rejection manipulation and after completing the sharing task. Results indicated that there was a significant decrease in perceived stress in the social rejection group before (T2; $M = 3.39, SD = 2.68$) and after (T3; $M = 2.81, SD = 2.46$) participants completed the sharing task ($t(23) = -3.01, p = .006$) (see Table 1). There was no significant difference in perceived stress level in the neutral group before (T2; $M = 2.03, SD = 2.48$) and after (T3; $M = 2.14, SD = 2.51$) the sharing task ($t(21) = .64, p = .53$) (see Table 1; see Figure 7). These results suggested that perceived stress levels were decreased after completing

sharing tasks following exposure to social rejection, which pattern was not found in the neutral group.

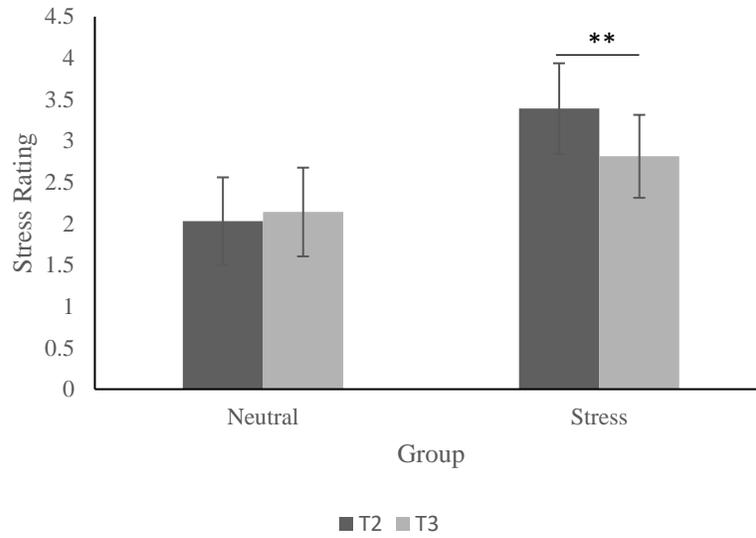


Figure 7. Change in perceived stress following sharing task

CHAPTER 5

DISCUSSION

Understanding the impact of stress, as induced by social rejection in the current study, on sharing behavior is important due to the value of prosocial behavior benefitting society as a whole. Past research investigating the relationship of prosocial behavior and stress has shown mixed results, with some research indicating an increase in prosocial behavior and others showing a decrease in prosocial behavior following stress exposure, particularly in social exclusion (Buchanan & Preston, 2014; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007; von Dawans et al., 2012).

To determine how different contexts and emotional reactivity to different stressors would influence prosocial behaviors, the current study examined the relationship between social rejection and prosocial sharing behaviors in a young adult population. Specifically, the current study focused on stress elicited by social rejection, which was reported to decrease prosocial behaviors without an expectation for an actual social interaction (von Dawans et al., 2012). To better understand the impact of social rejection on prosocial behaviors in social settings, the current study used social rejection following evaluation by another person with the expectation that there would be future social interaction with that person. Additionally, the current study examined if individuals' sharing behaviors would change depending on the intentions of another person's sharing acts. Previously, it was reported that individuals were more likely to behave less prosocially when they had smaller payoffs due to others' selfish acts (Morishima et al., 2012). Thus, our study sought to address a key gap in the literature in examining how individuals would make prosocial sharing decisions depending on the intention of anonymous others toward the individuals who have experienced social rejection.

Unlike the hypothesis, findings in this study showed that stress induced by social stress did not influence individuals' sharing decisions depending on others' positive and negative reciprocity intentions. However, interestingly, findings in this study showed that stress induced by social stress influenced individuals' sharing decisions depending on their relative earning. Individuals who were not subjected to social rejection took into account their own payoff when making these sharing decisions, i.e. the individual would be more likely to share more money when they earn more than the other (i.e., advantageous inequality), but would be more likely to share less money when they earn less than the other (i.e., disadvantageous inequality). In contrast, individuals who were subjected to social rejection did not take into account their own payoff when making sharing decisions. These individuals demonstrated similar levels of preferences for prosocial decisions in between the domain of disadvantageous inequality and the domain of advantageous inequality, which showed their willingness to share with the other even if this decision could make them less money than the other. Individuals who experienced social rejection showed a higher level of preference for prosocial decisions than individuals who did not experience social rejection. Previous research has indicated that individuals who are excluded may have a strong desire to form new relationships (Maner, DeWall, Baumesiter, & Schaller, 2007). Thus, this finding could imply that individuals who experienced social rejection make more prosocial decisions to gain possible social interactions and compensate for the negative evaluation (i.e., benefits) even when there was a monetary cost to themselves. Previously, it was suggested that individuals who were socially excluded would show an interest in building relationships with others but would be reluctant do so in order to protect themselves from getting hurt (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). It may be that the individuals in the current

study did not see a risk in trying to provide monetary reward to the other person because the person remained anonymous.

Additionally, results indicated that participants who experienced social rejection had a reduction in perceived stress following engaging in sharing decisions in this study. This change was not found in participants who did not experience social rejection. These findings suggest that individuals who were subjected to social rejection would want to make themselves more relieved by sharing with another person, even when that meant sacrificing total earnings. This finding was similar to previous research suggesting that individuals showed increased prosocial behaviors following exposure to acute social stress (von Dawans, et al., 2012). In line with previous research on the stress buffering effects of prosocial behavior (Raposa et al., 2016),

Unexpectedly, the stress manipulation did not elicit self-reported changes in stress in the current study, however, it did indicate an overall change in mood. Previous research by Twenge and his colleagues (2007) discussed that social exclusion could cause a temporary absence of emotional response (Twenge, 2007), which may help to explain the lack of change seen in perceived stress. However, it would be possible that experiencing social rejection is more likely to be linked with negative mood or an affective response (Buckley, Winkel, & Leary, 2004). It could be that these individuals were trying to overcome the negative emotional reactivity elicited by social rejection by displaying altruistic acts, regardless of the other person's intention to display reciprocity.

Limitations

There are several limitations to the current study. Most notably is the small sample size, increasing our risk of type II error. The sample was predominantly female and

conducted on a university campus, limiting the generalizability of the findings. Future studies should explore how different types of psychosocial stress including social rejection influence sharing behavior. Future studies should examine how cultural factors like socioeconomic status and race may influence sharing behaviors, particularly those that are monetary in nature. According to the Reverse Capacity Model, individuals with various personal and social factors, including race and SES, may influence the emotional and physical responses to stress (Gallo, Bogart, Vranceanu, & Matthews, 2005); therefore, these factors would be an important avenue for future research. Despite the limitations of this study, the study provided important information on possible mechanisms linked to sharing behavior and how it may be influenced by social rejection.

Future Directions

Although the social rejection manipulation did not produce a change in self-reported stress level, it does provide important information into understanding how social interactions may influence an individual's prosocial sharing behavior. Future research should investigate whether the impact of social rejection produces a general stress reaction or whether it is specific to social evaluation resulting in reductions in mood. It may be helpful to consider individual's personal factors that may be associated to their overall reactions to stress and subsequent affect following social rejection. Social evaluation is a frequent experience in day-to-day life, so it is important to fully understand the impact that it has on individuals.

A core feature of social anxiety disorder is the perception of a negative evaluation by others (DSM; American Psychiatric Association, 2013). Future research should seek to examine if individuals with a clinical diagnosis of social anxiety disorder lead to differing levels of sharing behavior or sharing in different contexts, such as disadvantageous

inequality. Due to the benefits of prosocial behavior, such as building and maintaining interpersonal relationships, it may be beneficial to understand if individuals with social anxiety disorder would show different patterns of sharing behavior following actual social rejection.

References

- American Psychiatric Association. (2013). Anxiety Disorders. In *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Aron, A., Aron, E. N., Tudor, M., & Nelson, G. (1991). Close relationships as including other in the self. *Journal of Personality and Social Psychology*, *60*(2), 241-253.
- Batson, C. D. (1987). Prosocial motivation: Is it ever truly altruistic? *Advances in Experimental Social Psychology*, *20*, 65-122.
- Buchanan, T. W., & Preston, S. D. (2014). Stress leads to prosocial action in immediate need situations. *Frontiers in Behavioral Neuroscience*, *8*, 5.
- Buckley, K. E., Winkel, R. E., & Leary, M. R. (2004). Reactions to acceptance and rejection: Effects of level and sequence of relational evaluation. *Journal of Experimental Social Psychology*, *40*(1), 14-28.
- Charness, G., & Rabin, M. (2002). Understanding social preferences with simple tests. *The Quarterly Journal of Economics*, *117*(3), 817-869.
- Davidov, M., Vaish, A., Knafo-Noam, A., & Hastings, P. D. (2016). The motivational foundations of prosocial behavior from a developmental perspective—evolutionary roots and key psychological mechanisms: Introduction to the special section. *Child Development*, *87*(6), 1655-1667.
- Dovidio, J. F., Piliavin, J. A., Gaertner, S. L., Schroeder, D. A., & Clark III, R. D. (1991). The arousal: Cost-reward model and the process of intervention: A review of the evidence. In MS Clark (Ed.), *Review of personality and social psychology*, Vol. 12. Prosocial behavior (pp. 86-118). Thousand Oaks, CA, US: Sage Publications, Inc.

- Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, 91-119.
- Eisenberg, N. (1991). Meta-analytic contributions to the literature on prosocial behavior. *Personality and Social Psychology Bulletin*, 17(3), 273-282.
- Fehr, E., & Schmidt, K. M. (1999). A Theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3), 817-868.
- Gallo, L. C., Bogart, L. M., Vranceanu, A. M., & Matthews, K. A. (2005). Socioeconomic status, resources, psychological experiences, and emotional responses: A test of the reserve capacity model. *Journal of Personality and Social Psychology*, 88(2), 386-399.
- Hill, G., & Howell, R. T. (2014). Moderators and mediators of pro-social spending and well-being: The influence of values and psychological need satisfaction. *Personality and Individual Differences*, 69, 69-74.
- Ho, S. S., Konrath, S., Brown, S., & Swain, J. E. (2014). Empathy and stress related neural responses in maternal decision making. *Frontiers in Neuroscience*, 8, 1-9.
- Lamm, C., Batson, C. D., & Decety, J. (2007). The neural substrate of human empathy: effects of perspective-taking and cognitive appraisal. *Journal of Cognitive Neuroscience*, 19(1), 42-58.
- Lesage, F. X., Berjot, S., & Deschamps, F. (2012). Clinical stress assessment using a visual analogue scale. *Occupational Medicine*, 62(8), 600-605.
- Malti, T., Ongley, S. F., Peplak, J., Chaparro, M. P., Buchmann, M., Zuffiano, A., & Cui, L. (2016). Children's sympathy, guilt, and moral reasoning in helping, cooperation, and sharing: A 6-year longitudinal study. *Child Development*, 87(6), 1783-1795.

- Maner, J. K., DeWall, C. N., Baumeister, R. F., & Schaller, M. (2007). Does social exclusion motivate interpersonal reconnection? Resolving the "porcupine problem.". *Journal of Personality and Social Psychology*, *92*(1), 42-55.
- Maner, J. K., & Gailliot, M. T. (2007). Altruism and egoism: Prosocial motivations for helping depend on relationship context. *European Journal of Social Psychology*, *37*(2), 347-358.
- Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology*, *55*, 102-111.
- Morishima, Y., Schunk, D., Bruhin, A., Ruff, C. C., & Fehr, E. (2012). Linking brain structure and activation in temporoparietal junction to explain the neurobiology of human altruism. *Neuron*, *75*(1), 73-79.
- Oswald, P. A. (1996). The effects of cognitive and affective perspective taking on empathic concern and altruistic helping. *The Journal of Social Psychology*, *136*(5), 613-623.
- Pabst, S., Brand, M., & Wolf, O. T. (2013). Stress and decision making: a few minutes make all the difference. *Behavioural Brain Research*, *250*, 39-45.
- Penner, L. A., Dovidio, J. F., Piliavin, J. A., & Schroeder, D. A. (2005). Prosocial behavior: multilevel perspectives. *Annual Review of Psychology*, *56*, 365-392.
- Piliavin, J. A., & Siegl, E. (2007). Health benefits of volunteering in the Wisconsin longitudinal study. *Journal of Health and Social Behavior*, *48*(4), 450-464.
- Raposa, E. B., Laws, H. B., & Ansell, E. B. (2016). Prosocial behavior mitigates the negative effects of stress in everyday life. *Clinical Psychological Science*, *4*(4), 691-698.

- Sarlo, M., Lotto, L., Rumiati, R., & Palomba, D. (2014). If it makes you feel bad, don't do it! Egoistic rather than altruistic empathy modulates neural and behavioral responses in moral dilemmas. *Physiology & Behavior*, *130*, 127-134.
- Schacter, H. L., & Margolin, G. (2018). When it feels good to give: Depressive symptoms, daily prosocial behavior, and adolescent mood. *Emotion*. Advance online publication. doi:10.1037/emo0000494
- Shields, G. S., Lam, J. C., Trainor, B. C., & Yonelinas, A. P. (2016). Exposure to acute stress enhances decision-making competence: Evidence for the role of DHEA. *Psychoneuroendocrinology*, *67*, 51-60.
- Starcke, K., & Brand, M. (2012). Decision making under stress: A selective review. *Neuroscience & Biobehavioral Reviews*, *36*(4), 1228-1248.
- Todd, A. R., Forstmann, M., Burgmer, P., Brooks, A. W., & Galinsky, A. D. (2015). Anxious and egocentric: How specific emotions influence perspective taking. *Journal of Experimental Psychology: General*, *144*(2), 374.
- Tomasello, M., & Vaish, A. (2013). Origins of human cooperation and morality. *Annual Review of Psychology*, *64*, 231-255.
- Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Bartels, J. M. (2007). Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology*, *92*(1), 56-66.
- von Dawans, B., Fischbacher, U., Kirschbaum, C., Fehr, E., & Heinrichs, M. (2012). The social dimension of stress reactivity: Acute stress increases prosocial behavior in humans. *Psychological Science*, *23*(6), 651-660.

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