Emotional and Contextual Influences in an Altruistic Decision-Making Task

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ABSTRACT

R. BRANDON IRVIN: Emotional and Contextual Influences in and Altruistic Decision-
Making Task
(Under the direction of Joseph Lowman)

Evidence suggests that the monetary offers in the Dictator Decision task are not

based solely on rational decision-making nor simply cognitive judgments about what is in

the participants' immediate self-interest. Priming studies have shown that participants

also use information that is not consciously available to help them make these decisions.

It is likely that the participants were engaging in emotionally-based reasoning when they

were primed with these non-conscious stimuli. It seems that emotional reasoning

becomes integrated with the cognitive information available about the Dictator Decision

task to influence participants' decisions; these decisions do not appear rational. This

study tested this assumption directly by inducing emotions, specifically gratitude and

indebtedness, and manipulating the relationship context of a hypothetical recipient in an

altruistic decision making task. It was hypothesized that the gratitude induction would

produce an increase in monetary offers in the Dictator Decision task compared to the

control and indebtedness conditions, but only when the participants were in the

appropriate relationship context for giving i.e. when they expected the person was open

to a new relationship. A secondary analysis using a manipulation of social distance was

also conducted. The pilot study indicated that participants were sensitive to the

manipulations. However, in the full study, no significant differences were found in the

amount offered in the Dictator Decision task for the emotion manipulation, and no

interaction was found between emotion induction and the manipulated relationship

context. However, the participants offered more in a hypothetical vignette in which a

fellow student was open to new relationships but not for a young professional.

Interpretations and directions of future research are discussed.

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Chapter 1: Introduction

Psychologists have had a long-standing interest in understanding and reducing the maladaptive effects of negative emotions. Despite the intense focus on the negative parts of the human psyche, depression and anxiety rates have continued to rise in Western nations (Easterbrook, 2003). To be sure, these rates are partly due to an increased understanding and awareness of these states, especially in the psychological and medical community. However, it is also possible that recovery from mental illness requires a broader understanding of emotional functioning. For example, Sullivan (1994) has called for an expanded definition of recovery, one that incorporates both management of mental illness and also increasing empowerment and self-directedness. This sentiment and the recent burgeoning of the Positive Psychology movement have inspired renewed research interest in positive emotions and virtues (Fredrickson, 1998; Seligman, 1999). It is important to continue research on positive emotions and behaviors to gain a more complete understanding of how they increase health and well-being.

To this point, no one refutes the idea that receiving love and care has important ramifications for health and well-being (e.g. Post, 2005; Ornish, 1999). Importantly, being generous to others and cultivating loving emotions has benefits as well (Post, 2004). For example, a study of older retirees found that those who gave their time volunteering scored significantly higher on measures of life satisfaction and will to live and had fewer symptoms of depression, anxiety, and somatization (Hunter & Lin, 1981).

The researchers maintained that it was the activity of volunteering that bestowed these benefits. Other studies have associated altruism with well-being and life satisfaction (Dulin & Hill, 2003; Liang, Krause, & Bennett, 2001), self-esteem and positive affect (Midlarsky, 1994), and self-efficacy (Midlarsky, 1991). In one study, giving help was more significantly associated with better mental health than receiving help (Schwartz, Meisenhelder, Ma, & Reed, 2003). Moreover, there are physical health benefits for those that are altruistic. People who regularly engage in altruistic behaviors (measured by volunteerism) have fewer major illnesses (Moen, Dempster-McCain, & Williams, 1993), increased longevity (Musick, Herzogg, & House, 1999; Oman, Thoresen, & McMahon, 1999), have better self-reported health (Krause, Ingersoll-Dayton, Liang, & Sugisawa, 1999), and engage in more healthy behaviors like exercise (Oman & Reed, 1998). While these studies do not represent experimental data, a strong association between giving and positive health outcomes has been established.

This means that engaging in virtuous behaviors may not just be a sign of healthy functioning, but that they can be agents of change toward health and well-being. These findings make the understanding of virtues, like altruism, and related positive emotions, like gratitude, of interest for both clinical and research purposes. In the experiment described here, I sought to extend this line of research to gain a greater understanding of how gratitude and a contrasting emotion, indebtedness, can affect peoples' engagement in virtuous behavior.

Chapter 2: Defining Gratitude

An understanding of the effect of gratitude on altruistic decision-making requires an elaboration of what gratitude means in this study. Gratitude is a positively valenced emotion that is typically experienced after an individual appraises others' actions as being intended to promote his or her well-being (Emmons & Shelton, 2002; Fredrickson, 2004; McCullough, Kilpatrick, Emmons, & Larson, 2001). Individuals can also experience gratitude if they appraise benefits bestowed upon them as coming from a causal agent such as God or fate. Individuals can even experience gratitude based on counterfactual thinking such as, "Things could have been worse" (McCullough et al., 2001). Furthermore, benefits that are interpreted as intentionally provided, costly to the benefactor, and valuable to the recipient, are all associated with increases in self-reported feelings of gratitude (Tesser, Gatewood, & Driver, 1968). People also tend to experience the most gratitude when the benefits are unexpected (Bar-Tal, Bar-Zohar, Greenberg, & Hermon, 1977). Lazarus and Lazarus (1994) suggested that experiencing gratitude requires the capacity for empathy, because beneficiaries only experience gratitude when they recognize that a benefactor has either expended effort or incurred cost to give them a gift.

Gratitude can be analyzed on levels ranging from a momentary emotional state to a long-term disposition (McCullough, Emmons, & Tsang, 2002). While dispositional gratitude has received some attention, most researchers conceptualize gratitude as a

temporary emotional state and seek to explore the immediate impact of this state on thought and behavior. This understanding of gratitude is consistent with the model of emotions articulated by Fredrickson (2004), which is discussed in more detail later in this paper, describing emotions as response tendencies that unfold over relatively short time spans.

Gratitude can be viewed as an intrinsically rewarding state (Emmons & Shelton, 2002) that also promotes an urge to behave prosocially, either toward a specific benefactor, others, or both (McCullough et al., 2001). McCullough et al. (2002) suggested that gratitude is a moral emotion because of the increased tendency to behave prosocially. Generally speaking, positive emotions like gratitude seem to prompt individuals to approach or continue to engage in environments or activities that are evolutionarily adaptive (Carver & Scheier, 1990; Frijda, 1994). More specifically, Fredrickson (2004a) conceptualized gratitude, like other positive emotions, as one that broadens thought and action tendencies and builds social resources. She postulated that gratitude likely causes individuals to become more creative in their response to a gift from others as opposed to repaying the benefactor in a specific tit-for-tat fashion. Indeed, Desteno, Bartlett, Bauman, Williams, and Dickens (2010) found that gratitude increased prosocial behavior and this was not strictly due to the norm of reciprocity. The participants in their study were inspired to be more altruistic in an economic decision-making task, even when they were asked to make a one-time monetary gift with participants that were completely anonymous, which eliminated simple reciprocation as a motive for increased generosity. While the evidence of gratitude specific cognitive and behavioral tendencies is still sparse, emerging evidence suggests that experiencing

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gratitude inspires individuals to engage in costly helping behaviors (Bartlett & DeSteno, 2010; DeSteno et al., 2006) that may have long-term benefits (DeSteno, 2009) and produce changes in cognitive appraisals of current relationships (Lambert et al., 2006).

Gratitude as a Distinct Positive Emotion

Since the experience of gratitude is similar to other positive emotions, discussion of its unique social benefits is predicated on the ability to distinguish gratitude from related emotional states. McCullough et al. (2002) suggested that gratitude is distinct from other emotions at both the state and trait level. Ellsworth and Smith (1988) found that undergraduates were able to distinguish among positive emotions, and also to determine which positive emotions were most similar to each other. Undergraduates in the Ellsworth and Smith (1988) study tended to cluster loving, grateful, friendly, and admiring, and this cluster was orthogonal to the happiness, elation, and contentment cluster (Ellsworth & Smith, 1988). Algoe and Haidt (2009) found that gratitude is part of a cluster of other praising emotions that is distinct from happiness. Importantly, they found that individuals can distinguish between individual emotions (e.g. gratitude) in the other praising emotions cluster (Algoe & Haidt, 2009). In other words, people tended to understand the similarities that gratitude shares with other- praising positive emotions, but are also able to reliably distinguish the experience of gratitude from these other closely related states.

One specific element that makes gratitude different from other emotions seems to be the cognitive attributions an individual makes and the particular action tendencies that follow. As described above, a person tends to experience gratitude when he or she appraises someone else's behavior as being intended to promote one's well-being.

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Regarding the cognitive attributions associated with gratitude, Weiner, Russell, and Lerman (1979) suggested that the attribution pattern for gratitude is distinct from other positive emotions such as happiness and contentment. These researchers suggest that happiness and contentment exist independently of specific attributional content, whereas gratitude is reliably produced when people attribute good fortune to others' efforts.

Gratitude also inspires people to promote the well-being of other people, but may not be limited to tit-for-tat reciprocation of goods or services (Fredrickson, 2004) as proposed by Trivers (1971). Trivers (1971) suggested that gratitude functioned as the mechanism by which animals, including humans, engaged in reciprocal altruism, which has been shown to be an adaptive response to the problem of sharing resources. Fredrickson (2004) argued that the tendency for positive emotions to promote prosocial behaviors may have evolved to serve a more complex set of adaptive functions, such as broadening our thought and action repertoire and building social resources. Furthermore, Fredrickson argued that the functions of positive emotions, possibly including gratitude, were adaptive to our ancestors. Thus, the genes that supported gratitude as a distinct emotion were likely selected throughout human evolution. The action tendencies described by Fredrickson may have evolved due to the selection pressures for generosity and helping. McCullough et al. (2001) added that gratitude is an emotion that has unique moral effects indicated by gratitude's ability to help humans identify moral activity in others, motivate people to act morally, and reinforce individuals for their own moral behavior. To illustrate this point, Lambert, Clark, Durtschi, Fincham, and Graham (2010) found that those who *expressed* gratitude to a partner increased their perception of the strength of the relationship. Taken together, these theories suggest that gratitude may

function as a social facilitator. Gratitude serves to increase social support and coping

resources because people tend to engage more actively with those who they think care

about them and are willing to invest in the relationship.

Some researchers may rightfully argue that gratitude is not unique in its ability to

inspire prosocial behavior. Other positive emotions, such as happiness, amusement,

inspiration, or elevation, can inspire prosocial behavior as well (McCullough, Kimeldorf,

& Cohen, 2008). However, gratitude can be distinguished from these other emotions in

two ways. First, as noted before, the subjective experience of gratitude can reliably be

identified as different from these other emotions. Second, while other positive emotions

increase helping behavior (Isen, 1970; Isen & Levin, 1972), gratitude uniquely inspires

helping behavior *even when it is costly to the helper* (Bartlett & DeSteno, 2006;

McCullough et al., 2008). Of note, helping others in spite of costs to the self is exactly

what inspires gratitude in others, which continues the cycle of gratitude and strengthens

social ties. This costly helping behavior is consistent with the altruistic giving that is

tested in the current study.

Indebtedness as Distinct from Gratitude

It should be noted that indebtedness and obligation can also increase the

likelihood that individuals will engage in helping behavior or gift giving. While the

behavior inspired from gratitude may look similar to the behavior inspired by

indebtedness, a number of factors distinguish the two emotions. Indebtedness can be

defined as "a state of obligation to repay another" that tends to arise from the norm of

reciprocity (Greenberg, 1980, p. 4).

One distinguishing factor between indebtedness and gratitude is the feeling or valence that each emotion engenders. Greenberg (1980) described indebtedness as being experienced as a negative state and can be accompanied by discomfort or uneasiness. McCullough and colleagues (2001) described indebtedness as a feeling of obligation that is negatively valenced, whereas gratitude is usually associated with contentment and well-being. According to self-report studies, an avoidance motivation often accompanies indebtedness, but gratitude is associated with prosocial motivation (Tsang, 2006). Also, gratitude and indebtedness tend to be inspired by different cognitive attributions of social situations. Tsang (2006) found that gratitude was sensitive to the intentions of a benefactor whereas indebtedness was not.

Subtle differences in the thoughts and behaviors are inspired by each emotion. For one, both gratitude and indebtedness can inspire us to repay a benefactor, but gratitude has been shown to be a better mediator of reciprocal gift giving behavior than indebtedness (Tsang, 2007). Also, indebtedness may inspire a person to repay a benefactor by giving something back that is of equal value (Greenberg, 1980). In contrast to this tit-for-tat approach to repayment, those that experience gratitude often feel this way despite being unable to repay their benefactors (Roberts, 1991). In fact, Watkins and colleagues (2006) evaluated Fredrickson's (2004) broaden-and-build theory with respect to gratitude. They found evidence that gratitude inspires a broader array of prosocial action tendencies to a perceived benefit than does indebtedness.

Furthermore, Watkins and colleagues (2006) found that they could experimentally manipulate how much a benefactor would expect to be repaid using hypothetical vignettes. They postulated that since different emotional states have distinct action

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tendencies (Frijda, 1986) then if gratitude and indebtedness are, in fact, distinct emotions then they should have distinguishable action tendencies. In their study, they cleverly manipulated the expectation that a benefactor would receive repayment. Not surprisingly, the participants felt more gratitude when the benefactor expected less repayment and more indebtedness when the benefactor expected more repayment. Furthermore, gratitude creates the urge to be near the benefactor. As the feelings of gratitude increased, so did desires to be close to the individual who inspired those feelings. On the other hand, as feelings of indebtedness increased so did distress and desire to avoid the individual to which they felt indebted (Watkins, Scheer, Ovnicek, & Kolts, 2006). Their study provides two important differences between gratitude and indebtedness. The first is that participants self-reported different emotional states and the second is the desire to behave in different ways as a function of those emotional states.

Further distinguishing gratitude and indebtedness, Mathews and Green (2010), showed that high self-focused attention, both dispositional and as manipulated by the use of a mirror, increased the feeling of indebtedness, but not gratitude, toward a benefactor. In addition, indebtedness is likely to be felt when participants are responding to the norm of reciprocity (Greenberg, 1980). Thus, the thoughts and contexts that cause gratitude and indebtedness differ as well.

In sum, indebtedness and gratitude can often look similar because both emotions inspire a desire to repay a benefactor. However, a more fine grained analysis of the emotions reveals that there are differences on multiple levels, which range from the subjective experience of the emotions, the attributions that cause the emotions, the attributions of a benefactor, and behaviors that are a result of the emotional states.

Therefore, since indebtedness and gratitude have different action tendencies, it is likely

that they inspire differences in altruistic behavior as measured by the dictator game,

which is the focus of the study reported here.

Chapter 3: The Ultimatum and Dictator Paradigm

The Dictator Decision task was used to test altruism in this study. The Dictator

Decision was originally described as the Dictator game in the literature. However, the

more precise term, Dictator Decision, will be used in this paper in order to emphasize that

participants are asked to make a one-time decision about how much money to share with

an unknown subject as opposed to a series of iterated trials with the same people.

For a broader understanding of the well-studied Dictator paradigm, the Ultimatum

game is explained first. The Ultimatum Game was created by researchers searching for a

paradigm in which to study rational and irrational motives in financial decision-making

(Guth, Schmittberger, & Schwarze, 1982). The game is played using two participants.

The first, the *Proposer*, is given an amount of money (say $10) that he or she is instructed

to split between him or her and an unknown second participant, the *Recipient*. The

Recipient also has no knowledge of who the *Proposer* is and is asked to either accept or

reject the offer. If the offer is rejected both players get nothing. If it is accepted then

each player gets the amount specified by the *Proposer*. Rational economic game theory

would predict that *Proposers* would offer the minimum possible and that *Recipients*

would accept any offer greater than zero. Since this game is typically played only once

and the *Proposer* and *Recipient's* identities are completely anonymous, there is no

reason, based on the information provided, that *Proposers* would offer anything greater

than the minimum possible. However, over many reported studies the modal offer is

almost always an even ($5) split and *Recipients* commonly reject offers of $3 or less (Oosterbeek, Sloof, & Van de Kuilen, 2004). The multiple variations of the Ultimatum game reported since the original study (Guth et al., 1982) have shown that people do not act solely on a rational analysis of the information available to them. Instead *Proposers* seem to consider multiple, sometimes conflicting, motives for offering the amount that they choose. For example, in the Ultimatum game, offers greater than the minimum possible (say $1) have been explained by either a concern that the *Recipient* will reject the offer (loss aversion) or motivated by the *Proposers'* internal sense of altruism or fairness (Falk, Fehr, & Fischbacher, 2003).

The Dictator Decision task was developed as a variant of the Ultimatum game to eliminate loss aversion as a possible motive for giving more than zero. The Dictator Decision task is played in exactly the same manner as the Ultimatum game, but in the Dictator Decision task the *Recipient* may not accept or reject the proposed split. The *Recipient* must accept the offer from the *Proposer* regardless of the value. Thus, the *Proposer* no longer needs a strategy for maximizing one's monetary gains and loss aversion can no longer be a motivator of behavior and altruism is all that remains. Thus, the Dictator Decision task was selected as a dependent measure of altruism for the purposes of this study because it is a test of altruism without loss aversion as a possible motivator for altruistic decision-making. The Dictator Decision task was also selected because it has been shown that information outside of conscious awareness can affect offers, much like a priming paradigm.

Chapter 4: Emotion and Decision-Making

Information need does not need to be consciously processed to influence decisions, which sets the stage for understanding how altruistic decisions are made. For one, the unconscious influence gives a way of understanding the seemingly perplexing results that humans act altruistically even when there appears to be no rational reason to do so. However, it does not fully explain why people make the same type of irrational errors consistently (Ariely, 2008). The missing piece of information in understanding these complex social decisions is how emotions impact reasoning.

Psychologists have long understood that thoughts can influence emotions (e.g. Beck, 1967, 1971; James, 1884), but more recently researchers have started to uncover the influence emotions have on cognition (Damasio, 1994). In this section, I highlight two major theories that explain how emotion can influence thought and behavior. The first is the Somatic Marker hypothesis, which explains how emotions are used to help humans decide which relevant information to consider (Damasio, 1994). The second is the Broaden-and-Build model, which explains how positive and negative emotions influence our thought and action tendencies differently (Fredrickson, 1998).

The Somatic Marker Hypothesis

The Somatic Marker hypothesis provides one way that rational thought and emotions can be integrated for the purpose of making good decisions (Damasio, 1994). Humans have cognitive limitations such that they cannot consider all possible pieces of information relevant to any decision. Human brains simply do not possess the working

memory or processing ability to make completely rational decisions at all times. Despite these considerations, Bechara and Damasio (2005) suggested that economic and psychology research has continued to underestimate the role of emotions in the decision-making process. These authors suggested that humans have an ability to predict possible future outcomes of various decisions. However, the number of possible outcomes that could be envisioned is almost limitless. Bechara and Damasio (2005) posited that people use emotions to quickly eliminate irrelevant pieces of information to narrow the options and more efficiently use the reasoning processes.

In a series of studies, Damasio and colleagues found that patients with brain damage that limited their ability to experience emotion caused major disruptions in real-life decision-making even though the participants had normal intelligence and were not impaired on other standard neuropsychological measures (e.g. Bechara et al., 1998; Bechara, Damasio, & Damasio, 2003; Eslinger & Damasio, 1985). In one study the researchers asked participants to play an economic game in which they were instructed to pick from one of four decks of cards. Each card represented either increases in play money or decreases in play money. Each deck had a predetermined reward structure such that two were long-term winners and two were long-term losers. Patients with damage in areas of the brain implicated in creating emotion, the VMPC and the amygdale, did not avoid the "bad" decks, but healthy controls were able to do so (Bechara, Tranel, Damasio, & Damasio, 1999). In the same study, Bechara and colleagues measured skin conductance while the participants were making their decisions. Interestingly, normal subjects generated skin conductance while they received a reward or punishment indicating the activity of a somatic state. As they became

experienced with the task they generated skin conductance *prior* to selecting a card. However, brain damaged patients did not show skin conductance prior to card selection. This suggests that healthy participants were able to use their anticipatory somatic and emotional states to help them decide which deck to choose (Bechara et al., 1999). Thus, the emotional parts of the brain are integral parts of the rational decision-making process.

Furthermore, conscious knowledge is not sufficient, or even required, in making many advantageous decisions. Bechara, Damasio, Tranel, and Damasio (1997) conducted a similar experiment in which they asked participants to declare what they knew about the gamblers task as they continued to select cards. Healthy control participants changed their card selection patterns before they could articulate why they were doing so. However, VMPC damage patients tended not to change their card selection patterns nor were they able to consciously discriminate between the decks.

Damasio (1994) suggested that a similar process is used for all decisions, especially ones that are more complex and social in nature. Our minds will "flash" images of possible future scenarios and we will use both positive and negative emotions to "mark" which of these possible outcomes to consider. The emotional valence that accompanies these flashed scenarios helps us trim information to consider and weigh positive versus negative options. This emotional information about possible future scenarios is integral for making advantageous decisions.

According to Anderson, Bechara, Damasio, Tranel, and Damasio (1999), VMPC and amygdale damaged patients can still make some decisions effectively, but they posited that social reasoning problems, in particular, require emotions to make advantageous decisions. Anderson and colleagues (1999) suggested that emotions bias

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social reasoning both overtly and covertly. Emotions enhance attention and working memory related to possible options of action and consequences of choices. The emotional response also qualifies these options in emotional terms. As seen in VMPC brain damage patients, if this information is unavailable then people fail to produce anticipatory emotional and somatic responses (Bechara et al., 1997; Bechara et al., 1996).

These anticipatory emotional and somatic responses that bias social reasoning are required for appropriate social behavior in both laboratory tasks and real-life decisions (Anderson et al., 1999). Gratitude is defined as an inherently social emotion (Tsang, 2006) and altruism has been discussed as a behavior based on social reasoning (e.g. Batson, 1991; Margolis, 1984). Thus, it stands to reason that emotion, gratitude in particular, would highly influence altruism-based decision-making.

Despite being necessary for making advantageous social decisions, Bechara and Damasio (2005) suggested that when the emotions are unrelated to the task at hand they can disrupt reasoning. This disruption may partially explain why people make irrational decisions in the Dictator Decision task. In the Dictator Decision task researchers may have unintentionally induced emotions, which in turn, influence reasoning. Since the impact of emotions on decisions in the Dictator Decision task is largely untested to date, it is important to test them more directly.

The Somatic Marker Hypothesis shows how linking emotions to our ability to engage in hypothetical thinking is used to narrow the information to which people attend when making decisions. However, Damasio and others have not tested directly the impact of pre-existing emotional states on reasoning. Bechara and Damasio (2005) suggested that evidence exists to support the idea that background (or pre-existing)

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somatic states can bias one's expectations of future events. For example, Loewenstein, Weber, Welch (2001) argued that decision-making can be influenced by "hot" and "cold" states. In "hot" states decisions are driven by affect and in "cold" states decisions are driven by cognition. An example of decisions being influenced by a hot state would be buying too much food when one is hungry. The somatic state of hunger overrides the knowledge that one will not need that much food.

Emotion Specific Approach

Damasio (1994) did not discuss the effects of specific emotions on reasoning. He only suggested that emotional valence and intensity aids in the reasoning process. Lerner and Keltner (2000) took the influence of emotion on reasoning one step farther. These researchers suggested that affective reasoning goes beyond the valence of the emotions and that each distinct emotion influences reasoning in a different way.

Lerner and Keltner (2000) suggested that each specific emotion is created by equally specific cognitive appraisals. These emotions then function to influence perceptions of events and objects such that they remain consistent with one's original cognitive appraisal. This emotional stability can be found for emotions that are unrelated to the task at hand as well. Lerner and Keltner (2000) called these types of emotions "incidental" emotions. Therefore, once an appraisal has been made that inspires one to feel gratitude, he or she will be likely to act in a manner that is consistent with that emotion. This is likely to occur with participants in the Dictator Decision task *even if the Dictator Decision task is unrelated to the origin of the affect*. The effect of gratitude should remain until a new appraisal of the situation is made which inspires a different emotion.

In sum, reasoning requires emotions to operate effectively. Each emotion serves to bias our reasoning in specific ways. More specifically, gratitude functions to bias us toward creatively paying others back and inspires us to be generous in a "pay it forward" fashion (McCullough et al., 2001). These biases may be functional and serve to provide appropriate action in a variety of contexts. For example, gratitude can help build financial resources through instigation and maintenance of reciprocal altruism (Trivers, 1971). Evidence suggests that reciprocal altruism can be beneficial for human and non-human primates (de Waal, 1997; de Waal & Berger, 2000). Roberts (2004) posited that in situations in which gratitude cannot be reciprocated, the grateful individual can experience a strong sense of appreciation and also a willingness to remain a part of the institution or entity that inspired the emotion. These institutions or entities are a part of what Duckworth, Steen, and Seligman (2005) termed the meaningful life and can provide resources for the individual to be called forth later. In short, gratitude, like other positive emotions, broadens human thought and action repertoires and builds social resources by inspiring generosity even when an individual may not be able to logically deduce the future benefit.

Broaden-and-Build Model

The broaden-and-build model also assumes that emotion-specific effects influence decision-making. Fredrickson's (1998, 2001) model postulated that positive emotions have a different effect on human behavior than negative ones and that each were both evolutionarily selected to serve adaptive functions. Negative emotions tend to narrow a person's thought-action repertoire, which allows for fast and decisive action that usually has a direct benefit. In other words, when someone experiences a negative

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emotion, the likely number of thoughts or behaviors that immediately follow that emotional experience is greatly reduced. For example, when one experiences fear, the urge to escape is activated (Fredrickson, 2001). If a fire erupted then one would most likely try to escape and his or her thoughts would likely circle around ways to achieve that end. The impulse to escape when fear is present is what most likely worked best in keeping our human ancestors alive. Other negative emotions also focus individuals' thoughts and behaviors to specific targets, which served to protect us in other life-or-death situations in our evolutionary past (Tooby & Cosmides, 1990). Other examples include anger (associated with the urge to attack) and disgust (associated with the urge to expel) (Fredrickson, 2001).

Positive emotions, on the other hand, serve a much different function. While negative emotions narrow a person's thought and behavior repertoire, positive emotions broaden the range of thoughts and actions that individuals are likely to engage in (Fredrickson, 2001). When people experience contentment, for example, they are more likely to savor current life experiences. They then tend to use these experiences to create new ideas about themselves and the environment around them (Izard, 1977). Experiencing joy inspires people to be more creative and pushes individuals to establish broader limits in social, interpersonal, intellectual, and artistic endeavors (Frijda, 1986). Importantly, these urges are non-specific and also creative. They also allow individuals to expand their ways of thinking (Fredrickson, 2001).

While the function of negative emotions is to provide a direct and immediate benefit, many of the gains of positive emotions are indirect and long-term. Behaviors that are associated with positive emotions often increase resources to be called forth later.

When people experience joy they often have the urge to engage in physical play, which can increase physical resources (Boulton & Smith, 1992). Social play can build social resources by building bonds and attachments (Aron, Norman, Aron, McKenna, & Heyman, 2000). While the emotional states that people experience are fleeting, the resources gained from the emotions are durable and long-lasting. Not coincidentally, the benefits that accompany altruism are also long-term and not immediate (Post, 2005).

If gratitude conforms to this model then experiencing it will broaden habitual modes of thinking and build social resources (Fredrickson, 2004). As described previously, gratitude tends to be experienced when a person receives a perceived intentional benefit from another person. One urge associated with the emotion is to pay back the benefactor. Fredrickson (2004) posited that this could be a non-specific action tendency because people could be motivated to repay these benefits in a creative way. They seem to consider a wide range of ways of expressing their gratitude instead of repaying their benefactor in a simplistic tit-for-tat manner. Gratitude also inspires most people to promote the well-being of others around them who were not the original benefactor. Thus, experiencing gratitude could be one mechanism that people use to find new relationships and strengthen old ones. This approach behavior would be evolutionarily adaptive if the long-term benefits of those new relationships outweigh the immediate costs of the generosity.

Chapter 5: The Role of Gratitude in Altruism

Evidence suggests that gratitude influences thought and behavior in altruistic decision-making (e.g. McCullough et al., 2001; Trivers, 1971). McCullough and colleagues (2008) posited that gratitude may have evolved specifically to fuel human altruism because of its unique ability to reinforce *and* motivate prosocial behavior. Despite these recent studies, gratitude has yet to be tested directly in the Dictator Decision task.

Evidence also suggests that emotional states other than gratitude can influence decisions in the Dictator Decision task (Andrade & Ariely, 2009; Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010). Andrade and Ariely (2009) found that transient emotions, such as anger, affected decisions in both the Ultimatum and Dictator formats. Gummerum and colleagues (2010) found that, in children three to five years of age, understanding how one would feel after making an offer is a strong predictor of generosity in the Dictator Decision task. Thus, it is likely that gratitude will also affect decisions in the Dictator Decision task.

Although limited evidence is available on the emotional impact on decisions using the Dictator Decision task, a few more studies correlate emotion with decision-making in the Ultimatum game (the game from which the Dictator Decision task was adapted). As reported earlier, in the Ultimatum game, approximately sixty percent of individuals reject monetary offers of less than thirty percent of the amount available to

the participants (Camerer, 2003). The rejection of offers by the Recipient in the Ultimatum game has been correlated to feelings of anger (Pillutla & Murnighan, 1996), increased skin conductance responses (van't Wout, Kahn, Sanfey, & Aleman, 2006), and activation of the insula, which is a brain area associated with negative emotion (Sanfey, Rillig, Aronson, Nystrom, & Cohen, 2003).

Fehr and colleagues (e.g. Fehr, Fischbacher, & Gachter, 2002; Fehr & Henrich, 2003) have called rejecting offers in the Ultimatum game strong reciprocity. They stated that strong reciprocity is non-selfish behavior for the purpose of upholding social norms. In this sense rejecting the *Proposer's* offer is altruistic because it is costly to punish those that act unfairly in this format. Also, the participants will not receive any immediate or future benefit for punishing the *Proposers*. In sum, evidence suggests that multiple emotions may play a role in altruistic decision-making. The fundamental goal of the current study is to help illuminate gratitude's role in these types of decisions.

Gratitude research is still in its early stages (Emmons & Shelton, 2002; McCullough et al., 2008) and no studies have been published using the Dictator Decision task to test the effect of gratitude directly. Nonetheless, multiple studies have provided evidence that gratitude functions to increase altruism in a number of other contexts (e.g. McCullough et al., 2001; McCullough et al., 2008). Tsang (2006) described gratitude as a prosocial emotion and multiple researchers have described gratitude's social nature (Ellsworth & Smith, 1988; Overwalle et al., 1995; Weiner, Russell, & Lerman, 1979; Zaleski,1988).

Recent experimental tests have supported the hypothesis that gratitude is a social emotion (e.g. Bartlett & DeSteno, 2006; Tsang, 2006). Tsang (2006) found that people

who received a benefit due to a "favor" as opposed to by chance were more likely to give money in an economic trading game. Bartlett and DeSteno (2006) also tested gratitude using a costly giving paradigm. The participants that were induced to feel gratitude were more likely to help a benefactor. Importantly, they were also more likely to help a stranger meaning they were not generous in merely a tit-for-tat fashion. DeSteno, Bartlett, Baumann, Williams, and Dickens (2010) found that gratitude inductions directly mediated increased monetary giving in a communal economic game. The grateful participants were more likely than control participants to sacrifice their own monetary gains in order to increase the communal profit. This behavior held true even when the other participants were completely anonymous. These results indicate that reciprocity alone is not the motivation and that gratitude engenders a broader and more creative way of increasing generosity. These findings support Fredrickson's (1998) Broaden-and-Build model for gratitude. Moreover, in both these studies the increases in prosocial behavior were unique to gratitude and were not found in participants induced with other positive emotions. This finding also supports the Broaden-and-Build model in that gratitude seems to have a specific function of increasing prosocial behavior. More specifically, DeSteno and colleagues (2010) suggested that gratitude functions to inhibit short-term motivations by motivating actions that are centered on communal benefit. Furthermore, Bartlett and DeSteno (2006) also posited that gratitude, and not solely social norms, increases peoples' ability to overlook short-term costs in order to obtain long-term, rewarding relationships.

Chapter 6: Altruism and Evolution

If gratitude inspires altruistic behavior then altruism should, in turn, have an adaptive function. In economic decision-making games, people tend to give non-zero offers relatively often (Engel, 2010). Predictions that people would be selfish based on "rational" self-interest were shown to be inaccurate. People still tend to give away resources when there are no measurable, immediate benefits for doing so. Evolutionary theorists have suggested that this seemingly irrational behavior can reflect dispositions that were selected because they were adaptive in the long-run.

Brown (1975) defined altruism in an evolutionary context as the giving of aid in the form of arbitrarily defined goods or services to individuals of the same species who are not offspring or direct descendants of the donor and without direct or immediate benefit to the donor or its mate. A superficial understanding of evolution would suggest that altruists would be at a disadvantage in relation to purely self-interested individuals because altruism leads one to give away valuable resources. However, evidence suggests that humans have predispositions toward altruism. Thus, benefits of altruism must exist and be biologically advantageous or, according to the principles of natural or sexual selection, the altruistic behavior would not have survived (Hamilton, 1964; Trivers, 1971).

To solve this paradox where giving away resources is a genetic advantage, Hamilton (1964) introduced the concept of inclusive fitness (also known as kin selection

or kin altruism). Previous to Hamilton's model, evolution was understood only in terms of an individual's direct survival and reproductive success. Inclusive fitness simply posits that if an individual aids relatives then that individual is helping those who share a portion of the individual's genes and thus, is promoting the survival of genes that he or she possess.

Trivers (1971) later extended these ideas about kin altruism to cover altruistic behavior outside of the family unit that would also be influenced by genes but not passed along via inclusive fitness. He stated that if altruism were directed at those who are willing to reciprocate that altruism, it is possible that the cost of providing help now is outweighed by a benefit will be received at a later date, assuming those who are helped also share a gene for altruism. Therefore, members of the reciprocal relationship will have survival advantages not available to them if they acted without cooperation. Trivers defined reciprocal altruism as involving (a) a cost to the altruist, (b) a benefit to the recipient and (c) a significant delay between the original act and the time the recipient repays the altruist.

Theorists have also suggested indirect ways that altruism could be beneficial to the altruist. Acts of altruism can help establish a positive reputation. This reputation could then increase the number of people who are willing to become a reciprocal trade partner with the altruist. These partnerships can then be more valuable than the resources expended in the long-run (Alexander, 1987). More recently, Nowak and Sigmund (2005) have shown that altruism can be in one's genetic self-interest when there are possible benefits to one's reputation (indirect altruism), even when there is no expectation of a future interaction with the recipient of the altruism. Indirect reciprocity theory suggests

that other group members reward altruists even when they do not benefit personally. Furthermore, costly signaling theory states that when people behave altruistically it can act as a signal for potential mates that the altruist has beneficial genetic traits as evidenced by the ability to accrue resources that can be used to help raise potential future offspring (Gintis, Smith & Bowles, 2001; Zahavi & Zahavi, 1997).

In addition to the aforementioned advantages that altruism offers the individual, multilevel selection theory states that prosocial behavior can also be an evolutionary adaptation at the group level (O'Gorman, Sheldon, & Wilson, 2008; Wilson, Van Vugt, & O'Gorman, 2008; Wilson & Wilson, 2007). As the name suggests, multilevel selection theory states that evolution can operate at multiple levels (Wilson et al, 2008). In addition to Dawkins' "gene's eye view" (Dawkins, 1976), and the traditional view of the evolutionary unit being the individual, behaviors such as altruism can also provide genetic advantages to a group of individuals. For example, Sheldon and McGregor (2000) showed in a communal economic trading game with limited resources, that the groups that were "nice" that were more self-restrained performed better than their self-interested counterparts. This simply illustrates how group-centric behaviors, like altruism, can provide yet another genetic advantage. Importantly, this strategy was vulnerable to cheaters. Therefore, having a way of identifying like-minded altruists would also be an advantage. As described above, gratitude could be one way of identifying those that share this group mentality or those that have our best interests at heart.

These various types of altruism likely developed because acting in a strictly self-interested manner in all situations could be a disadvantage. It is likely that humans

developed a mechanism that allows an individual to ignore immediate interests and make decisions based on future benefit. Bartlett and Desteno (2006) have suggested that gratitude can, in fact, drive helping behavior. Furthermore, Desteno, Bartlett, Bauman, Williams, and Dickens (2010) have continued to support this view. They found that gratitude, as a social emotion, functioned to create more prosocial behavior in an economic exchange game, even when this was costly to the participant. DeSteno (2009) found that prosocial emotions, such as gratitude, could reorient people to the value of long-term benefits when involved in relationships that can be costly in the short-term. The positive emotion gratitude, and its influence on behavior, may have evolved as a mechanism that increases trust to encourage humans to enter a partnership even when it is costly in the short term (Baumeister, Stillwell, & Heatherton, 1994; Desteno et al., 2010; Gonzaga, Keltner, Londahl, & Smith, 2001). I posit that experiencing gratitude is one way in which our decisions can be influenced to increase altruistic behavior, especially in contexts in which it will be advantageous to do so and designed a specific study here to reflect relationship contexts in which altruism would be more likely to be adaptive.

Evolutionary research suggests that expressing altruistic behavior can, in fact, be an evolutionary stable strategy because the long-term benefits outweigh the short-term losses (e.g. Hamilton, 1964; Trivers, 1971). These findings illustrate how it is possible to behave altruistically and still act according to one's long-term genetic self-interest. Importantly though, expressing altruism only seems to be effective in certain circumstances. Indiscriminately altruistic behavior may have no long-term or genetic benefit and might not be an advantageous evolutionary strategy. How, then, can an

individual discriminate between a situation where being altruistic is advantageous and a situation in which it is not?

Chapter 7: Find, Bind, and Remind

In this study, I posit that gratitude is a "smart" emotion, in that, the behavioral consequences of experiencing the emotion will be most prevalent when the prosocial behavior is most likely to produce a long-term benefit. In the previous section, it is discussed how altruism can be beneficial to the benefactor by increasing long-term resources. Much of the evidence about the functions of gratitude and altruism has rested on the repayment or reciprocation of a benefit in line with Trivers (1971) view of the function of gratitude (Algoe, 2012).

For the current study, the find-bind-and-remind model can help describe the mechanism for altruism between strangers that is not solely based on an exchange of resources. While experiencing gratitude likely functions to facilitate social exchange similar to Trivers' (1971) conceptualization, Algoe (2012) argues that gratitude also functions to help people to find quality relationships that are intimate and based on genuine care for the other individual. Furthermore, Algoe (2012) argues these types of relationships are likely rarer and may be more beneficial in the long-run.

An important aspect to this model is the research by Clark and Mills (1979) that describes two different types of human relationships: exchange and communal relationships. Exchange relationships were described as ones in which it is appropriate to be generous to each other based on previous goods and services that have been shared. However, in communal relationships, people respond to a partner based on need and not a

tally of previously shared benefits. Communal relationship norms are more likely to be found in interdependent relationships such as family or romantic relationships (Mills, Clark, Ford, & Johnson, 2004). Importantly, these types of relationships can be established between strangers in a one-time lab interaction (Clark & Mills, 1979). For example, Clark, Mills and Powell (1986) found that participants are likely to keep track of others' needs depending on whether the relationship was a communal or exchange relationship. They defined an exchange relationship as one that is often between business partners or acquaintances, but communal relationships are usually friendships, romantic relationships, and family relationships. Clark and colleagues (1986) found that when we have an obligation to be concerned about another person's welfare (communal relationship) participants are less likely to consider whether or not they will interact with the other person when deciding whether or not to be generous. However, in a more business-like exchange participants are more likely to consider the prospect of future interaction when considering the needs of others. This finding is especially important to this study, because in the Dictator Decision the expectation of the participants is that the game is completely anonymous.

The find-bind-and-remind model suggests that gratitude may be particularly useful in helping people identify the value of communal relationships. Therefore, gratitude may help people find potential communal relationship partners, which could, in turn, increase their altruism toward these potential partners. This should especially be true in the context of this experiment when the participant has identified the Recipient as being in an in-group where having a communal relationship would be more likely. If there is an interaction between gratitude and the social distance, this would help explain

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the DeSteno and colleagues (2010) conclusions that gratitude has a specific social function.

　　To help support this point, other evidence suggests that gratitude has specific social functions for humans beyond that of reciprocity (Algoe, Gable, & Maisel, 2010; Algoe, Haidt, & Gable, 2008). Much of the evidence to this point has focused on gratitude in the contexts of already established relationships. For example, in the context of romantic relationships, Algoe, Gable, and Maisel (2010) found that gratitude felt on one day was able to predict positive feelings in the relationship the next day. Specifically, they found that women experienced increased satisfaction in the relationship and men experienced both feelings of connection and satisfaction in the relationship as predicted by experiences of gratitude. This study describes how gratitude could serve to remind people of the value of the relationship and then help to bind them together. Important to the current study is the fact that gratitude may function as a facilitator to relationship formation.

　　Furthermore, Algoe et al. (2008) posited that gratitude may help build interpersonal connections. They found that in a sample of newly initiated sorority sisters, gratitude was able to predict ratings of interactions one month later. This provides evidence that gratitude may start a cycle of future relationship-building. Gratitude may have been a cue that the new relationship would be worthwhile in the long-run. These studies are new and the evidence about gratitude's ability to help form new relationships is relatively scarce, but if gratitude and altruism are effective social facilitators and relationship builders they should be expressed in a context in which people are open to new relationships and are relatively close in social distance.

In sum, the find-bind-and-remind theory posits that gratitude functions to help humans identify high-quality relationship partners and then helps to bind the recipient of the gratitude closer to the benefactor. Therefore, when participants experience gratitude they should be more likely to be altruistic to hypothetical recipients that are open to their generosity (open to new relationships) and available for a potential future relationship (social distance).

Chapter 8: Social Distance as a Variable in the Dictator Decision Task

Several researchers have manipulated the contextual variable of social distance in the Dictator Decision task (Burnham, 2003; Hoffman, McCabe, Sachat, & Smith, 1996). Social distance has been defined as the *information known about another individual*. For example, to decrease social distance researchers have shown pictures of the *Recipient* to the *Proposer* (Burnham, 2003) and have given demographic information, such as a last name, about the *Recipient* to the *Proposer* (Charness and Gneezy, 2008; Hoffman, McCabe, Shachat, & Smith, 1996). These decreases in social distance tend to increase offers in the Dictator Decision task (Burnham, 2003; Hoffman, McCabe, & Smith, 1996). Alternatively, researchers have demonstrated that increasing anonymity will reduce monetary offers significantly (Burnham, 2003). Thus, participants appear to act more selfishly when given little information and are more generous the more they know about the *Recipient*.

The primary aims of the current study are to investigate the influence of gratitude and relationship context on altruism. Because the previous studies demonstrate that social distance may play a crucial role when people choose to be generous, the current study will investigate the differences in altruism when social distance is varied. A preliminary data analysis of emotion and social distance was conducted.

Chapter 9: Automatic Processing in the Ultimatum Game and Dictator Decision

Task

Some studies have shown that implicit cues that are not consciously available to the participants can cause changes in offers in the Dictator Decision task as well. This is true even when the experiment is completely anonymous (social distance is at a maximum). To illustrate how these automatic processes can influence altruistic decisions Haley and Fessler (2005) used a computer interface to implement the Dictator Decision task. In one condition they had stylized eyes as the background of the screen used for the experiment. In the control condition the background of the screen was blank. Participants in the "watching eyes" condition were significantly more generous than the control condition.

Rigdon and colleagues (2009) replicated this experiment but used a more abstract experimental condition. Their "watching eyes" condition was simply three dots arranged with two on top and one below in the same proportion as eyes and a nose. This stimulus was not recognized as a face or eyes per se, but it still activated the fusiform face area of the brain. The control condition was the same three-dot arrangement but inverted so as not to activate the fusiform face area of the brain. The two stimuli used in this experiment can be found in Appendix A. The participants in the "watching eyes" condition were, again, significantly more generous than in the control condition. These experiments provide an important piece in understanding of altruistic decision-making.

In opposition to the earlier economic models, it seems that humans use information that is outside of their conscious awareness. In the previous two experiments the sense of being watched was not consciously available, but it affected altruistic decision-making nonetheless. Thus, pure reason based only on information that is consciously available is not the only way people tend to make altruistic decisions.

Rigdon and colleagues (2009) posited that priming activated the fusiform face area of the brain which then activates the schema that one is being watched. Importantly, these schema do not need to be activated within our conscious awareness. Neely (1977) argued that priming studies work because they can separately activate the System 1 and System 2 reasoning systems as defined by Stanovich and West (2000). Evans (2003) described System 1 at old in evolutionary terms and a system of reasoning that we share with other animals. This system is rapid, parallel, and automatic, and the conclusion of the reasoning system is the only part that the organism has access to in conscious awareness. While this learning system can be used across many domains, it is thought that the use of the system can be domain specific with the use of associative neural networks (Evans, 2003). On the other hand, System 2 is thought to be uniquely human. This system is much slower but allows for abstract and hypothetical thought. These two reasoning systems were likely used in the experiment conducted by Rigdon and colleagues (2009). The participants were given time to think about their decisions (System 1) but the conclusion to be more altruistic in the Dictator Decision task was in the participant's awareness *even without* knowing that the neural mechanism for facial recognition was activated. I suggest that emotions can have a similar impact on the

reasoning system. Specifically, I posit that gratitude, even though it may not be related to the task at hand, can influence the decision-making process in the Dictator Decision task.

Chapter 10: Linking Gratitude and Relationship Context

As DeSteno and colleagues (2010) suggested, gratitude may increase our ability to see long-term benefit, but how, specifically, is this adaptive? Gratitude appears to serve the important function of rewarding people for being altruistic and motivating them for being more generous towards others (McCullough et al, 2008). However, certain contexts may inhibit altruistic behavior. In their third study, Bartlett and DeSteno (2006) found in their economic game that if they made the participants aware of the cause of their gratitude, the effect of increased communal giving dissipated. The researchers induced gratitude by having a benefactor help them with a problem on a computer. They found that this experimental manipulation produced increases in gratitude. However, if they said, "Was it the other participant who figured out what was wrong with your computer?" then the increases in altruism to a stranger due to gratitude dissipated. In other words, the subjects' increases in gratitude did not make them more generous when their attributions about the gratitude changed. It is also possible that by drawing the participants' awareness to the source of the gratitude, they actually were bringing into awareness the fact that the stranger did not help them, hence changing the attribution about the stranger.

This finding suggests that people do not indiscriminately act upon their emotions, but rather use their emotions to inform, and potentially influence, advantageous social decisions. This conclusion is in line with the broader emotion literature (e.g. Dolan,

2002; Naqvi, Shiv, & Bechara, 2006; Pfister & Bohm, 1992), and as discussed in an earlier section, conforms to the Somatic Marker hypothesis in that emotion is one aspect of proper reasoning. It also conforms to the Broaden-and-Build model in that emotion can influence our thought and action tendencies, but does not necessitate a specific action in a stimulus/response fashion.

Leider, Mobius, Rosenblat, and Do (2009) conducted a study investigating how generosity could be affected by the prospect of future relationships. They used a real world social network and quantified the prospect future interaction with other members of the social network. They found that participants were more generous when there was a prospect of future interaction, as measured by social distance (social distance was defined by the relative closeness of the *Recipient's* peer group). Of course, social distance might not be the only factor in this study. Leider and colleagues (2009) did not measure the type of relationship in which participants were most generous. However, evidence supported that participants were more generous in friendships compared to strangers. They also concluded that social distance is an important determinant of generosity. Thus, it is important to replicate and extend the new findings of Leider and colleages (2009) that participants are sensitive to whether a relationship is possible in the future in an experimental setting where openness to new relationships is conducted within the context of the in-group versus the out-group.

Chapter 11: Current Study

As discussed, emotions clearly influence cognition and decision-making. Also, positive emotions tend to influence thinking and behavior in a different way than negative emotions. Additionally, relationship context has also been shown to influence decision-making. However, to date, researchers have not investigated the combined effects of emotion and these two relationship context variables, openness to new relationships and social distance, on altruistic decision-making. The current study serves to fill this gap in the literature.

Given that there are multiple factors involved in this investigation, I will now provide an overview of the study design. Using the monetary offers in the Dictator Decision task as the dependent variable that measures altruism, I tested the hypothesis that altruism varies as a consequence of two separate manipulated variables; emotion and two forms of relationship context. For the emotion variable, participants were in one of three groups; *gratitude*, *indebtedness* or a *control* condition. In the gratitude condition participants completed a letter writing task shown to induce the positive emotion gratitude. A similar task was used to induce the contrasting negative emotion indebtedness. A neutral letter-writing task was used in the control condition so that participants' emotional state remained neutral. The participants then received three hypothetical vignettes and then completed the Dictator Decision task for each vignette. All participants received the first vignette, but the other two varied in ways that will be described below.

The second variable, relationship context, was manipulated in two separate ways. The primary manipulation, openness of the hypothetical *Recipient* to new relationships, was created to test the hypothesis that participants will be more altruistic when they perceive the beneficiary is open to new relationships. The purpose of this between subjects design was keep the participants blind when rating identical vignettes that varied only on this condition. Thus, the participants either received Decision Sheet A or Decision Sheet B containing distinct versions of the openness vignettes.

Additionally, relationship context was manipulated in a second way in order to account for social distance. This was done as a within subjects design that included an anonymous vignette (giving money to an anonymous stranger), an out-group vignette (giving money to a young professional in the area, a person in the participants' extended community), and an in-group vignette (giving money to a fellow UNC student). The anonymous vignette was constant across Decision Sheet A and Decision Sheet B. However, the openness to new relationships factor was embedded within the in-group and the out-group vignettes that were also used for the social distance variable.

Hypothesis 1: It is hypothesized that participants will offer more in the Dictator Decision task when they are induced with the emotion gratitude as compared to the indebtedness condition or the control condition. Hypothesis 2: It is hypothesized that participants will offer more in the Dictator Decision task when they are in the open to new relationships condition compared to the not open to new relationships condition. Hypothesis 3: It is hypothesized that there will be an interaction between the emotion condition and the open to new relationships condition such that participants who wrote the gratitude letter and received the open to new relationships condition would offer

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significantly more in the Dictator Decision task than all other conditions. Hypothesis 4: It is hypothesized that participants will offer more in the Dictator Decision task for the in-group vignette as compared to the out-group vignette or the anonymous vignette.

Hypothesis 5: It is hypothesized that there will be an interaction between social distance and the emotion condition such that participants who wrote the gratitude letter would offer the most in the Dictator Decision task when reading the in-group vignette as compared all other conditions.

Chapter 12: Method

Participants

All students (58 for the preliminary pilot study and 130 for the full study) were from a large southeastern public university. Pilot participants completed the same tasks and measures as those in the full study. In addition, the pilot subjects were asked to complete two manipulation check measures that tested the validity of the emotion induction and the openness to new relationships manipulated variable. For the full study, the 130 participants matched the gender distribution of the university; 83 were female and 47 were male. All participants were recruited from a pool of introductory psychology students partially fulfilling a research participation requirement.

Measures

Three total measures were used in the pilot study, two of which were designed to evaluate the effectiveness of the manipulations, and the third was the measure that contained the Dictator Decision task. The first measure was a *Post-writing Report* that can be found in Appendix B. This measure included a list of 24 emotions and participants were asked to rate how much they were experiencing them on a scale from zero to six. These emotion ratings were used in the manipulation check of the emotion condition by looking at differences in self-reported experiences of gratitude and indebtedness. Gratitude and indebtedness were also correlated with other negative and positive emotions as a secondary manipulation check. The full measure can be found in Appendix B.

The second measure, the *Openness Rating Form*, was a manipulation check for the first relationship context variable that manipulated the extent that the hypothetical *Recipient* was open to new relationships. For each vignette two questions were asked. The first was, "To what extent did you think the 'other person' in the experiment was open and/or interested in new relationships?" Subjects rated this on a Likert scale from one to seven. There was no manipulation check measure for the second relationship context variable of social distance even though this was manipulated as this was considered a secondary analysis. The full measure can be found in Appendix B.

The third measure, the *Decision Sheet*, was the offer sheet where the participants made their hypothetical monetary offers after reading each of the three vignettes. The monetary offer was the only dependent variable in this study and the purpose of collecting data in the pilot study was to see if the predicted effect of emotion induction was found using the initial procedures. In the pilot study and the full study, participants used the same form to complete their offers. They filled in the blanks labeled "Amount you offer" and "Amount you keep" to ensure that the total was out of $100 as is shown in Appendix D. Each participant made three total offers as the Decision Sheet had three separate hypothetical vignettes that varied by social distance. The first hypothetical *Recipient* was anonymous. All participants received this vignette and this vignette was not used in the openness to new relationships analysis. In effect, offers made in this anonymous condition would have reflected the effects of the emotion manipulation alone. The second was a young professional (out-group) and the third was a UNC student (in-group). Each of these two vignettes had two versions; one that was open and one that was not open to new relationships. There were two forms of the Decision Sheet,

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Decision Sheet A and Decision Sheet B. In order to separate the groups for the relationship context variable openness to new relationships, participants were randomly assigned to receive Decision Sheet A or Decision Sheet B. In Decision Sheet A, the participants received a vignette that had the young professional (out-group) who was not open to new relationships and the UNC student (in-group) who was open to new relationships. In Decision Sheet B, the participants received a vignette that had the young professional (out-group) who was open to new relationships and the UNC student (in-group) who was not open to new relationships.

Note that this design does not create completely orthogonal groups when comparing social distance (in-group vs. out-group vs. anonymous) with the analysis of openness to new relationships and gratitude in the same statistical model. This measure was designed to be analyzed as three distinct vignettes for the emotion and the openness relationship context variables only. A secondary and separate analysis was conducted using social distance as a variable and compared this with the emotion variable as well. This design was selected to limit the number of participants needed to test the hypotheses and test for an interaction between two different relationship context variables.

Procedure

Participants gathered in a classroom in groups of approximately ten to fifteen individuals. Once informed consent to participate in the study was received they were read instructions to the writing exercise. A copy of the instructions that were read aloud to all participants is as follows:

> Now, we would like you to take 10-15 minutes to do a writing exercise. The purpose of the writing exercise will not be to judge your writing *abilities* – as part of our research, we just want to get natural samples of real stories that people tell about someone they see every day. We have a number of topics that we are asking

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people to tell us about, and you'll just be asked to write about just one, selected at random. Writing *for the entire time* about the particular topic we give you will be more important than double-checking spelling or grammar.

Instructions for the writing exercise can be found on the next page. Please read the instructions carefully before advancing to the page that contains the space necessary for the writing exercise.

Depending on which experimental condition they were randomly assigned to they were then asked to read more detailed instructions for their specific emotion induction. Since the emotion variable was between subjects, approximately one third of the participants were asked to write a letter that was intended to induce *gratitude*, a third were asked to write an *indebtedness* letter, and a third were placed in a *control* condition where the participants were asked to write a letter about when a person they knew did something unusual. The scripts that each group read can be found in Appendix C. Each participant had 10 minutes to write their respective letters. Once the time elapsed, the researcher told them to put the letter aside and that they would have more time to finish their letters at the end of the experiment. After the time elapsed the experimental manipulation of emotion, the primary focus of this study, was concluded.

They then were asked to complete a series of questions using the Dictator Decision task. This common form of the Dictator Decision task was tested among a homeless population previously (Irvin, 2007), which is based on the double-anonymous Dictator Decision task used in Hoffman, McCabe, Shachat, and Smith (1996). The Dictator Decision task used in the current study used a college student population instead of homeless individuals. Also, an imaginary vignette was used instead of real money in the Dictator Decision task. Since no money is actually changing hands, there is no need to have any participants play the role of the *Recipient*. All participants were given the

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instructions of the *Proposer*. A previous study indicated that a Dictator Decision task

played with a hypothetical situation, instead of real money, was not significantly different

despite having no money exchange hands in the hypothetical vignette (Ben-Ner, Kramer,

& Levy, 2005). The study conducted by Ben-Ner and colleagues did not test multiple

manipulations; thus, it is still uncertain if the hypothetical vignettes allow the same level

of sensitivity to the emotion and relationship context variables as compared to using real

money.

The participants both the pilot study and the full study were then read the

following general instructions:

> For this next task you will be asked questions about how you would split up a sum
> of money in a series of imaginary scenarios. For this exercise, pretend a
> researcher in a psychological study has given you $100 and asked that you split
> that money between you and another person. You will have complete autonomy
> in deciding how to split the money between you and the other participant.
> Regardless of the split you propose the other person must accept your offer.

Then they read the hypothetical vignettes that gave information about the person with

whom they are sharing the money. Below each vignette was a blank that allowed them to

write how much they would give that person if they were playing the Dictator Decision

task. A copy of the offer sheet can be found in Appendix D.

Monetary offers were collected under three separate vignettes as described above.

The first was when the person receiving the offer was completely anonymous. Since the

relationship context variable was not measured for this vignette, there is only one version

that all participants received. The script for this vignette is as follows:

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[Scenario 1] Imagine that the other person in this experiment is completely anonymous to you. Imagine that they are in the other room and will see your offer. Importantly they will never know your identity or anything about you.

The second vignette was a hypothetical *Recipient* that was a young professional, someone in a different social circle than the college student participants. The participants received one of two vignettes based on their between-subjects random assignment. They were as follows:

[Scenario 2 – Open] The other person is a 22-year-old female who has recently attended a university in the south, but out of state. She recently moved to town to take a job as a human resources consultant. She signed up for this experiment because she saw an advertisement online and was hoping to meet new people.

[Scenario 2 – Not Open] The other person is a 22-year-old female who has recently attended a local university in the research triangle area and will soon take a job as a human resources consultant in another state.

In the third vignette the person in the hypothetical vignette was a UNC student. Those scripts were as follows:

[Scenario 3 – Open] The other person in this experiment is a 20-year-old Junior who attends now attends UNC. She recently transferred here from another university and is currently conducting this experiment for course credit but is hoping it would be a way to meet new people.

[Scenario 3 – Not Open] The other person in this experiment is a 20-year-old Junior who now attends UNC. She has attended UNC continuously since her freshman year and is currently conducting this experiment for course credit. She was encouraged to do the experiment by her close friends that she has known since freshman year.

In both the pilot study and the full study the participants were debriefed after all tasks were completed. They were informed as to the purpose of the experiment, thanked

for their time, and asked not tell anyone else about the deception until we had finished running all the subjects.

Statistical Procedure

This experiment did not compare all three of these variables in the same model because of the lack of a full orthogonal design in data collection and a three-way ANOVA could not be conducted. This experiment was treated as a 3x2 design representing Emotion (gratitude, indebtedness, and control) X Openness to New Relationships (open, not open). This design was run once for the in-group and once for the out-group social distance groups. The anonymous condition was analyzed only using the emotion induction variable as a one-way ANOVA.

A secondary analysis of the second relationship context variable was also conducted (anonymous vs. in-group vs. out-group). This was to see if these concepts held true for hypothetical in-group partners only or if they also generalized to hypothetical out-group *Recipients* as well. Thus, this was a 3x3 mixed model ANOVA that compared Social Distance (anonymous, out-group, and in-group) X Emotion (gratitude, indebtedness, and control).

Given that the distribution of offers in the Dictator Decision task is often bimodal and not normally distributed, non-parametric tests were also conducted to ensure that the assumptions of the ANOVA have not been violated in the primary analyses. Specifically, a Mann-Whitney U test was conducted for the openness to new relationships variable. A Kruskal-Wallace test was conducted for the main effects of emotion as it has three levels and a Mann-Whitney U can only be conducted with a variable that has two levels. Finally, a logistical regression was used to test the interaction effects. A logistical

regression has to be dichotomized and Dictator Decision task literature indicates that meaningful splits are at $0 and $30. These splits were chosen based on previous research that indicates that altruism can be defined at offers greater than 30% (Gintis, Bowles, Boyd & Fehr, 2003) or offers greater than zero (Camerer, 2003, Haley & Fessler, 2005). It was expected that the non-parametric analyses would find similar results to the ANOVAs as typical distributions in the Dictator Decision task are not usually non-normal enough to violate the assumptions of an ANOVA. However, they were conducted to ensure the robustness and confidence of the findings.

Chapter 13: Results

Pilot Analyses

Three distinct tests were conducted using the pilot sample of 58 subjects. First, the manipulation checks were conducted to see if the emotion induction produced the self-reported differences in the emotions of gratitude and indebtedness that were expected. Second, a manipulation check of the variable openness to new relationships was made to ensure the participants could distinguish which level of the variable was perceived to have the highest openness to new relationships. Finally, a preliminary analysis of the monetary offers in the Dictator Decision task was conducted. This analysis was simply to ensure that there would be variance in the responses in the Dictator Decision task of the kind that was predicted. These pilot data are presented in Table 1 (Note: all tables can be found in Appendix E and all figures can be found in Appendix F).

Two ANOVAs were conducted to test for differences in the participants' self-reported experience of the emotions gratitude and indebtedness. For the first ANOVA, as was expected, significant differences in self-reported gratitude due to the induction were found (F(2,55)=26.09, p<.000). Specific means for the experience of gratitude were as follows: gratitude condition = 5.00, indebtedness condition = 4.07, control condition = 1.57. Surprisingly, the post-hoc analysis revealed that the gratitude and indebtedness conditions were statistically distinct from the control group, but were not statistically distinct from each other. However, when the control condition was taken out of the

model there were significant differences in the experience of gratitude between the gratitude and indebtedness conditions such that the gratitude condition was significantly higher than the indebtedness condition ($F(33)=4.29$, $p=.046$). It should also be noted that these significant differences were obtained with small samples in the experimental groups (20 participants in the gratitude condition, 15 participants in the indebtedness condition, and 23 participants in the control condition).

An ANOVA was also used to evaluate the indebtedness ratings. There were significant differences in self-reported indebtedness due to the induction ($F(2,55)=23.95$, $p<.000$) with means as follows: gratitude condition $= 2.20$, indebtedness condition $= 3.73$, control condition $= 0.30$. The post-hoc analysis revealed three distinct subsets that were all significantly different from each other. Thus, the experience of indebtedness was reported as different depending on the emotion induction.

A secondary analysis of the self-reported ratings of emotion was conducted to ensure that those who wrote the gratitude letter were, in fact, experiencing a positive emotion, and those that wrote the indebtedness letter were experiencing a negative emotion. As described earlier, the pilot subjects rated themselves on a list of 24 emotions. For this analysis gratitude was correlated with ratings of positive emotions (loving, appreciative, open, and inspired) and indebtedness was correlated to negative emotions (guilty, resentful, embarrassed, and ashamed). Gratitude was significantly, positively correlated with loving ($r=0.549$, $p<0.000$), appreciative ($r=0.880$, $p<0.000$), and inspired ($r=0.498$, $p<0.000$), but was not significantly correlated with open ($r=0.101$, $p=0.451$). On the other hand, gratitude was only positively significantly correlated with embarrassed ($p=0.289$, $r=0.028$) amongst the negative emotions. It was not significantly

correlated with guilty (r=0.246, p=0.062), resentful (r=0.078, p=0.559), or ashamed (r=0.124, p=0.354). Conversely, indebtedness was positively and significantly correlated with guilty (r=0.600, p<0.000), embarrassed (r=0.499, p=0.000), and ashamed (r=0.483, p<0.000), but not resentful (r=0.254, p=0.055). Importantly, indebtedness was not significantly correlated with loving (r=0.256, p=0.053), open (r=-0.125, p=0.351), or inspired (r=0.204, p=0.125), but was significantly and positively correlated with appreciative (r=0.564, p<0.000). Thus, a simple correlation analysis of the ratings supported the findings that the manipulations seemed to produce the desired effects.

Additionally, a comparison of all the emotions was conducted in two multivariate ANOVAs when the emotion condition was used as an independent variable. The first MANOVA included positive emotions in the model, which were lovingness, openness, appreciativeness, and inspiration. The second MANOVA included negative emotions in the model, which were guilty, resentful, embarrassed, and ashamed. The MANOVAs revealed that those that wrote the gratitude letter endorsed more positive emotions as a whole (F(8, 106)=8.819, p<0.000), and those that wrote the indebtedness letter endorsed more negative emotions as a whole (F(8, 106)=4.820, p<0.000). More specifically, post hoc analyses those that wrote the gratitude letter endorsed that they felt significantly more loving (F(2, 55)=5.557, p<0.000) and inspired (F(2, 55)=17.901, p<0.000) than either of the other two emotion conditions. Participants in both the gratitude and indebtedness conditions endorsed that they felt significantly more appreciative (F(2, 55)=20.490, p<0.000) than control. However, there were no significant differences in how much the three groups endorsed openness (F(2, 55)=2.541, p=0.088). Regarding the negative emotions, post-hoc analyses revealed that participants in the indebtedness

condition were endorsed that they felt significantly more guilt ($F(2, 55)=26.183$, $p<0.000$) and embarrassment ($F(2, 55)=7.551$, $p=0.001$). There were no significant differences for the endorsement of resentfulness ($F(2, 55)=2.387$, $p=0.101$) or the feeling of being ashamed ($F(2, 55)=3.316$, $p=0.044$) ($p=0.053$ when using Tukey's HSD). Thus, the multivariate analysis supported the conclusion drawn from the analysis of simple correlation that the induction of gratitude and indebtedness had produced the desired kinds of positive and negative emotions.

A preliminary analysis of the monetary offers in the pilot study Dictator Decision task (the same dependent variable used in the full study) was conducted and the mean offers are presented in Table 2. The ANOVA, which compared means for the main effects of the emotion induction variable and the relationship context variable, revealed no significant main effects. The data from the ANOVA for the main effect of the emotion condition was as follows: anonymous vignette $F(2, 52)=2.099$, $p=0.133$; young professional $F(2, 52)=1.118$, $p=0.335$; UNC student $F(2, 52)=0.550$, $p=0.580$. The data from the ANOVA for the main effect of the openness relationship context condition was as follows: young professional $F(1, 52)=0.878$, $p=0.0.353$; UNC student $F(1, 52)=0.133$, $p=0. 717$. This was not surprising as the sample size of the pilot analysis did not produce enough power to show significance except in the case of an unexpectedly strong effect size. However, a look at the means revealed some interesting patterns.

The offers seemed to be sensitive to the emotion induction and the relationship context variable openness to new relationships as shown in Figure 1 and 2. The means for the gratitude condition, offers were higher than the control condition as expected. Offers for the indebtedness group were also elevated, however. An interesting finding

was that, for the UNC student (in-group) only, the means for the interaction effect were significant and also in the expected direction (F(2, 52)=4.53, p=0.015). This represents an effect size of d=.268. Even for this small group of pilot participants, the *gratitude* condition produced more altruism only when the person in the UNC student vignette was in the *open to new relationships* condition. Also, participants in the indebtedness condition were more altruistic than the gratitude or control condition when in the *closed to new relationships* condition, which was unexpected. The interaction effect for the vignette with the hypothetical young professional was not significant (F(2, 52)=2.047, p=0.139). Thus, for the relationship context variable openness to new relationships there appeared to be an interaction of the emotion induction for the monetary offers in the Dictator Decision task.

A preliminary analysis of the offers in the Dictator Decision task for the second relationship context variable, social distance, was not conducted. The purpose of this pilot was to confirm that the manipulations were effective and the offers in the Dictator Decision task produced variability based on the main manipulation, emotion.

For the manipulation check of the relationship context variables, a one-way ANOVA was conducted. The participants were receptive to the manipulation, in that they rated the hypothetical participant as being significantly more open to new relationships when in the open to new relationships condition (F(1, 57)=24.80, p<0.00 for the young professional, F(1, 57)=80.71, p<0.00 for the UNC Student). Thus, the participants the manipulation for the relationship context variable openness to new relationships was effective for the young professional and UNC student vignettes. Means for the openness variable are presented in Table 3 and shown in Figure 3 and 4.

Thus, the preliminary analysis revealed three primary findings. First, the emotion induction was effective in producing the exected gratitude and indebtedness. Second, the participants were also responsive to the openness relationship context variable. Finally, the means of the pilot study produced higher offers for *gratitude* compared to *control* and a significant interaction for the UNC student vignette. The means for this interaction were in the expected direction for *gratitude* versus *control*, but participants who received the *indebtedness* letter and were in the *closed to new relationships* condition had the highest offers. Most of the patterns among the means were as predicted although some of the interaction patterns and specific effects for each of the two contextual variables were not expected and will need to be examined in the larger set of data collected in the full study.

Full study

Overall, similar means were found in the full study compared to the pilot study. However, as shown in Table 4 some of the patterns of data were not the same. A one-way ANOVAs tested for the emotion main effect alone for the anonymous scenario (Hypotheses 1). Two two-way ANOVAs were conducted to separately test the main and interaction effects of the emotion manipulation and the openness to new relationships for the young professional (out-group) and the UNC student (in-group) vignettes (Hypotheses 1, 2, and 3).

In addition to the ANOVAs, non-parametric analyses were also used because of possible problems with the sample due to potential non-normality of the distribution of the monetary offers. Thus, all analyses using monetary offers were conducted twice to see if the skewed distribution of the monetary offers affected the obtained effects.

Finally, an analysis of Hypothesis 4 that tested the differences in social distance (anonymous vs. in-group vs. out-group) was also conducted using a single one-way ANOVA. Hypothesis 5 was tested using a two-way ANOVA, which tested the interaction between this social distance and the emotion induction.

Analyses of main effects.

The mean offers for the three different vignettes under the different emotion conditions are presented in Table 4. The first hypothesis was that there would be a main effect for the emotion variable for each of the three vignettes. The three separate ANOVAs were run and none of these ANOVAs reached significance for the emotion condition main effect, even though some of the means varied in the predicted directions. The comparison in the anonymous vignette is a pure test of the effect of the emotion condition on generosity. Even though, as expected, the gratitude condition had the highest mean for the anonymous vignette, this did not represent a significant difference $(F(2, 124)=1.082, p=0.342)$. For the young professional (out-group), the indebtedness condition had the highest mean offers $(F(2, 124)=0.316, p=0.729)$, but the difference was not statistically significant. Mean offers in the gratitude condition were higher for the UNC student (in-group), but even here there were no significant differences between offers for each of the emotion conditions $(F(2, 124)=0.486, p=0.616)$. These ANOVAs showed the mean offers were not significantly different for any of the predicted main effects for the emotion conditions for any of the three vignettes when compared individually.

The second hypothesis was that the first relationship context variable (openness to new relationships) would produce significantly different offers such that those in the open

to new relationships condition would be the most generous for both the hypothetical young professional and the hypothetical UNC student. The relationship context variable openness to new relationships showed significant differences for only the UNC student (in-group) ($F(1, 124)=4.21$, $p=.042$) and not the young professional (out-group) ($F(1, 124)=0.37$, $p=0.847$) as shown in Figure 5 and 6. As predicted, the difference for the UNC student was in the expected direction such that the hypothetical UNC student who was open to new relationships received the highest monetary offers in the Dictator Decision task in this study.

A statistical assumption of the ANOVAs is that the monetary offer data are is normally distributed. However, for the offers collected from this sample there appeared to be a slight skew and offers for each of the vignettes resembled a bimodal distribution. These problems were likely not so severe that the assumptions of the ANOVA would be violated. However, to ensure that the data were not a statistical anomaly due to an irregular sample, several non-parametric analyses of the same data were conducted to see if similar patterns of significance results were obtained. A Kruskal-Wallace test was conducted for the main effects of the emotion variable only. As this is a non-parametric analysis, there are no assumptions of normality. The Kruskal-Wallace revealed similar results in that there were no significant findings for the emotion induction across all three vignettes (Anonymous – $X2(2)=2.898$, $p=0.235$; Young Professional – $X2(2)=0.380$, $p=0.827$; UNC Student – $X2(2)=1.846$, $p=0.397$). While the Kruskal-Wallace test can test the effects of more than two levels of an independent variable, it is unable to test for interaction effects. Thus, the lack of significant findings for the emotion manipulations were confirmed when the same data were tested using with non-parameteric analyses.

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A different nonparametric statistic, a Mann-Whitney U analysis, was conducted to confirm the openness to new relationships main effect. The Mann-Whitney U analysis was used here because there are only two levels of this relationship context variable (open versus not open) and the Mann-Whitney U is a more robust analysis than the Kruskal-Wallace. Again, a similar lack of significant results were found except for a significant effect of the relationship context variable for the hypothetical UNC student only (in-group) (Z=-2.071, p=0.038). As with the ANOVAs, subjects appeared to be more generous in their offers when the *Recipient* was also a college student as seen as open to new relationships. This result confirms that the significant findings for this main effect were not due to a statistical anomaly generated from a non-normal distribution of the monetary offers. Regarding the Young Professional (out-group) the finding was, again, non-significant (Z=-0.224, p=0.823). Again, non-parametric analysis revealed similar results to the ANOVA conducted for the relationship context variable.

Analyses of interaction effects. Two separate two-way ANOVAs were run to test for interaction effects of the relationship context variable (openness to new relationships) and the emotion variable; once for the vignette with the hypothetical young professional (out-group) and once for the vignette with the hypothetical UNC student (in-group). There were no significant findings: young professional (out-group) (F(2, 124)=0.009, p=0.991), UNC student (in-group) (F(2, 124)=0.674, p=0.512).

Finally, a generalized linear model (binary logistic) was run to test for interaction effects of a non-parametric sample. The generalized linear model uses binary data so the continuous dependent variable (monetary offers between $0 and $100) had to be split into "high" or "low" offers. This analysis was run twice, once with the data split at $30 and

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higher and once with the data split at $2 and higher. One participant offered $1 of $100

and this participant was considered selfish for the purpose of this analysis, which is why

the logistic regression was defined at $2 or higher. At the $30 split, again, the same

outcome was revealed. Again, a significant main effect for the relationship context

variable, openness to new relationships, for the hypothetical UNC student was found

(X2(1)=6.27, p=0.012), but there were no other significant interactions or main effects.

The non-significant finding for the logistic regression at the $2 split is likely due to

highly uneven numbers of participants in each split. It is believed that this split is a not

an accurate way of identifying generous versus non-generous offers. The $30 split is

likely a more effective split of the data in this study. Again, non-parametric analyses

confirmed the original ANOVA findings. The results from the logistical regression are

described in Tables 5 and 6.

Analyses of the social distance variable. An exploratory analysis of the

differences in offers based on social distance variable alone (anonymous vs. in-group vs.

out-group) was also conducted. The mean offer for the anonymous condition was 34.39

(SD=21.08). The mean offer for the young professional (out-group) was 35.63

(SD=21.18). The mean offer for the UNC student (in-group) was 41.35 (SD=19.83).

Using a one-way ANOVA it was revealed that the offers for the UNC student were

significantly higher than the other two offers (F(2, 254)=13.16, p<.000). In other words,

as social distance decreased, the participants tended to offer more money in the Dictator

Decision task in the full study. When the emotion variable was added to the model, it

yielded some interesting results. The 3x3 mixed model ANOVA revealed a non-

significant interaction effect (F(4, 254)=2.35, p=.055). However, the means show the

highest offer for the UNC student was when the participant also wrote the gratitude letter. The means can be found in Table 7 and shown in Figure 7.

This analysis was a two-tailed ANOVA. However, as the means were in the expected direction it could be argued that a one-tailed ANOVA is appropriate. If a one-tailed ANOVA was used the p value would be 0.028. As such, a post hoc analysis was conducted. Looking at the social distance by emotion plot, it appears that the gratitude condition showed a different slope across the three levels of social distance compared to the indebtedness and control groups. Furthermore, when the control condition was taken out of the model and gratitude and indebtedness were the only emotion variables in the interaction, the interaction effect between emotion and social distance was significant $(F(2,176)=3.56, p=.031)$. When the indebtedness condition was taken out of the model and gratitude and control were the only emotion variables in the interaction, the interaction effect between emotion and social distance neared significance $(F(2,168)=3.04, p=.051)$. When the gratitude condition was taken out of the model and control and indebtedness were the only emotion variables in the interaction, the interaction effect between emotion and social distance was not significant $(F(2,164)=.26, p=.774)$. Thus, the gratitude group showed a significantly different pattern of giving for each of the social distance variables than the indebtedness group and that pattern approached significance when compared to the control group. However, the indebtedness and control conditions were very similar.

In sum, the analysis of the data collected in the full study revealed only one significant finding. Significantly higher offers were made in the Dictator Decision task when the person in the hypothetical vignette was open to new relationships, but only for

the hypothetical UNC student (minimum social distance). The non-parametric tests

confirmed these findings and show that they are consistent despite the non-normality of

the offers. The differences in the means of the manipulated emotion variable were in the

expected direction, but the differences were not significant. When social distance (peer

group) was added to the model and treated as a within subjects independent variable, a

main effect for social distance was revealed and an interaction effect that was in the

predicted direction, but failed to reach significance was also revealed.

Chapter 14: Discussion

Prosocial decision-making has been examined through the lens of two different types of variables: an emotion variable and two relationship context variables. The methods were designed to test the role of gratitude on altruism using hypothetical vignettes under experimentally manipulated conditions of induced emotion. Based on the broaden-and-build theory of positive emotions (Fredrickson, 2001), the somatic marker hypothesis (Bechara & Damasio, 2005), and the emotion literature specific to gratitude (Algoe, 2012); it was hypothesized that gratitude would influence participants to be more generous than those in the indebtedness condition or the control condition, even to anonymous strangers. Furthermore, it was hypothesized that the gratitude would interact with the relationship context by increasing altruism more when the people in the vignettes were open to new relationships and seen as in a similar peer group. This was based on the idea that gratitude is an adaptive emotion that helps people find lucrative new relationships (Algoe, 2012; Algoe, Haidt, & Gable, 2008). Finally, gratitude was predicted to increase altruism above and beyond that of indebtedness since gratitude would inspire participants to be more creative with their "repayment" and behave in a "pay it forward" manner similar to McCullough and colleagues (2001).

Even though, no significant main effect was found in the amount offered in the Dictator Decision task depending on which emotion letter the participants were asked to write, experimental data collected showed a significant effect in the relationship context

variable of open to new relationships, but only in the vignette with the UNC student. The participants who received the vignette of the UNC student who was open to new relationships offered significantly more ($44.77) than those that received the vignette of the UNC student that was not open to new relationships ($37.94). However, this significant effect was not dependent on which emotion condition the participant was in. Interestingly, this same effect was not found for the vignette with the hypothetical young professional. Also, no interaction effect was found between emotion variable and the openness to new relationships variable.

Regarding the significant effect for the openness to new relationships variable (for the hypothetical UNC student only), it seems that participants are taking into account openness to new relationships, but only for possible future relationships with a peer, as opposed to an anonymous stranger that they would not be as likely to meet. This manipulation of the relationship context seems to have been an effective in identifying differences in prosocial behavior dependent on the possibility of a real relationship actually occurring. The participants were aware of the openness to new relationships for the individuals in the hypothetical vignettes when being generous might have a positive effect on a possible future relationship. This finding is a replication of the Leider et al. (2009) findings that giving is sensitive to the prospect of future relationships. It is also an extension of these findings as it shows that this effect is stronger for in-group members whom one would be more likely to encounter and potentially form a new relationship.

Also, analysis revealed that there were significantly higher offers for the UNC student (in-group) as compared to either the young professional (out-group) or the anonymous condition. This indicates that the participants were more generous to

individuals within their own group. This alone is an important finding and deserves more attention in future research. Taken with the openness to new relationships significant finding, it seems that participants were sensitive to the relationships context when deciding to be generous. While the interaction between social distance and emotion condition was not significant the means suggested a possible relationship between increased generosity for in-group members when gratitude was experienced. This finding supports the find-bind-and-remind model (Algoe, 2012) that was described earlier in this paper. Specifically, when the control condition was taken out of the model, there was an interaction effect between emotion and social distance such that the group that wrote the gratitude letter were significantly more generous to the in-group than the group that wrote the indebtedness letter. This suggests that experiencing gratitude may be serving as a mechanism to identify the most important relationships that have the best chance of becoming relationships that we can count on every day. In this case, gratitude may help to *find* a person that may be a high-quality relationship partner. The findings in this study provide some preliminary support for the find-bind-and-remind model (Algoe, 2012), but in the future, the relationship between gratitude and social distance should be investigated in more detail. Furthermore, the methods of this study did not allow a joint comparison in one model of how social distance, emotion, and openness to new relationships all might play a part in the Dictator Decision task. In the future, a fully counter-balanced study would be able to tease apart the nature of this possible relationship.

Multiple explanations for the inability to reject the primary null hypotheses can be offered. The pilot data indicated that the induction was effective with a small group of subjects; however, this finding did not have the expected effect on generosity in the full

study. It is possible that the full study did not actually increase the emotions of gratitude and indebtedness in the same way that the pilot study did. The manipulation check used in the pilot study, which was collected before the monetary offers were made, may have actually served to crystallize the emotion felt in conscious awareness. The full study did not ask the participants to rate their emotional experience because it was thought that asking them to rate their emotions would reduce their experience of the emotion. However, the opposite may have happened. Filling out the emotion rating form may have intensified the feelings of gratitude and indebtedness and increased the effects of the induction.

Of course, it is also possible that the sought effects in the main study were not powerful enough because the use of hypothetical vignettes is simply not as realistic as real money Dictator Decision tasks. A previous study has indicated that participants, on average, behave similarly in hypothetical vignettes compared to real money vignettes (Ben-Ner, Kramer, & Levy, 2005). Also, the means from the pilot sample implied that the method was effective in identifying behavioral differences in behavior based on the two manipulations. However, the pilot sample was small and the study conducted by Ben-Ner and colleagues (2005) was the only study in the literature to use a hypothetical vignette. No previous studies have manipulated emotion and measured generosity in the Dictator Decision task. More research is needed on the effectiveness of using hypothetical vignettes for approximating how people may make real money decisions.

One methodological change that could have potentially increased the realism of hypothetical vignettes is to have a real participant or confederate actually play the part of the *Recipient*. By having the *Proposer* see the *Recipients* enter a different room (as in

Irvin, 2007), rather than just imagining another person on the other end of a hypothetical offer, might have produced a more powerful effect. If altruism and gratitude are social facilitators as hypothesized in this study, then increasing the social realism should increase the effects of the manipulations used in experimental studies of these relationships. Even when using imagined money, this change in realism alone might have produced an increase in the effect sizes for the main effects and interaction effect because an enhanced social setting would call for a richer sense of the social relationships involved.

Finally, the sample size of 130 participants may not have provided enough power to detect significant differences in this study. Previous studies of similar design have obtained effect sizes of $r = .425$ (Andrade & Ariely, 2009), $r = .235$ (Haley & Fessler, 2005), and $r = .337$ (Gummerum et al., 2010). An effect size of $r = .335$ was assumed here and that would have yielded power greater than .80 in this study. According to the post hoc power analysis, a sample size of 561 participants would have been necessary for the emotion variable to have been significant for the anonymous vignette; for the hypothetical UNC student vignette, a sample size of greater than 1200 would have been necessary. Because these huge increases in sample size are unrealistic in the context of this experimental study using student volunteers, it is reasonable to conclude that simple lack of power alone could not account for the failure to obtain significant results on the primary hypotheses.

Also, Keltner, Locke, and Audrain (1993) found that if the participants attribute their feelings to a source that is irrelevant to the task, the influence on decisions is nullified. In their experiment, they simply informed the participants of the origin of their

emotion induction and that the effect of emotion was no longer significant. While the participants in this study were not specifically informed about the origin of the gratitude they experienced, the emotion induction was such that the origin of the gratitude was not hidden as it was in the Keltner et al. experiments (1993). The methodology may have allowed the participants to attribute the gratitude to a source unrelated to the task at hand, thus, creating a context in which gratitude would not be adaptive. This finding may indicate that gratitude is, in fact, a "smart" emotion in that it does not prompt the individual to be generous when it is unlikely to have long-term benefits.

Despite the pilot study showing differences in the means that were in the expected direction, the full study did not show the same pattern. This difference could be due to the potential problems with emotion induction discussed above as well as the link between the emotion induction and the hypothetical vignettes. However, the finding is interesting in its own right. It is possible that the induction actually worked more effectively when the participants were asked to rate their emotions causing them to call the emotion into consciousness, and thus, act upon it even in the hypothetical vignette. This would mean that either the participants are aware of the effect of gratitude and that they can predict how it might influence their decision-making or that the emotion induction was actually more effective once the emotion was rated. Of course, this hypothesis would require increased testing to see if this can be supported by the evidence.

Regarding the differences between gratitude and indebtedness, another interesting finding in the pilot study is that asking participants who wrote a gratitude letter had increased ratings of indebtedness and participants who wrote an indebtedness letter had increased ratings of gratitude. While both letters were more effective at increasing the

desired emotion as compared to the incidental emotions, the findings call into question the ability of participants to effectively disentangle these two states. Even when the directions were both clear and descriptive about the type of emotion that should be felt, the induction did not elevate only one emotion to the exclusion of the other. The increases in emotions that are not intentionally induced could be due to the nature of the emotions, but it could also be due to the lack of effectiveness of the induction exercise.

The letter writing exercise was perhaps more complex than envisioned and elicited a number of thoughts and feelings that were related to the events that the participants described and may have affected their generosity on the subsequent Dictator Decision task. However, this complexity of thought and emotion is likely similar to what is experienced in real and complex relationships. Future emotion induction studies should be keenly aware of the complexity of inducing emotions in this way. More research on the emotion inductions in and of themselves is necessary to narrow range of the target emotions and to understand the consequences of experiencing mixed emotions in complex relationships. Importantly, when induced with gratitude, participants were more likely to report experiencing other positive emotions as well. When induced with indebtedness, participants were more likely to report experiencing other negative emotions as well. This provides evidence that gratitude and indebtedness are distinct, oppositely-valenced emotional experiences.

Methodological recommendations such as those discussed above provide a necessary next step in understanding the intersection of emotion and relationship contexts in altruistic decision-making. These methodological recommendations may lead program of research that would increase our understanding of this feature of generosity, one of the

positive aspects of human functioning. Given that research on altruism and gratitude is relatively new, integration of multiple lines of research is essential if we are to understand the complexities of how people integrate positive emotions with information about relationships. Despite the limitations of this study and the lack of significant findings in the primary hypotheses, the theoretical basis of this study is believed to hold potential for making an important contribution to the field of positive psychology.

Appendix A – "Watching Eyes" from Rigdon et al. (2009)
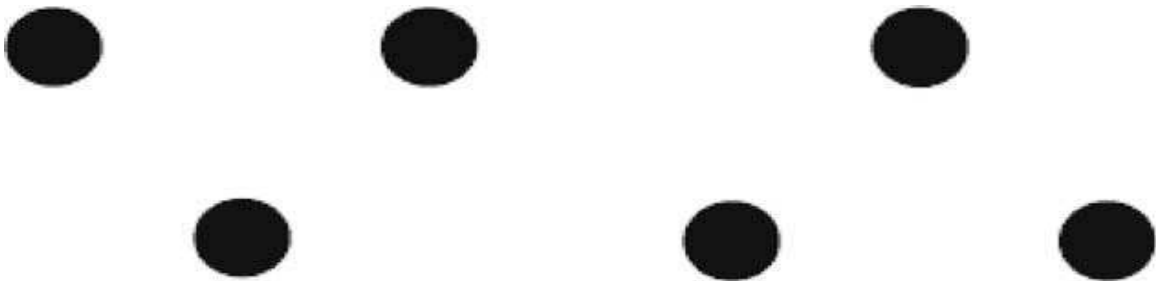
The watching eyes condition on the left and the control condition on the right.

Historically speaking, individuals' automatic, and often irrational, altruistic behavior became apparent during the 1980's through an economic trading game called the Ultimatum Game (Guth, Schmittberger, & Scwarze, 1982). The Ultimatum Game is played using two participants. The first, the Proposer, is given an amount of money (say $10) that he must split between himself and the second participant, the Recipient. The Recipient is given the choice to either accept or reject the offer. If the offer is rejected both players get nothing. Rational economic game theory would predict that Proposers would offer the minimum and that all Recipients would accept any offer greater than zero.

Appendix B – Pilot questionnaires

→ POST-WRITING REPORTS:

Please indicate how you felt during or as a result of writing the story by placing a number in each blank.

not at all   0   1   2   3   4   5   6   very much

___ satisfied   ___ guilty   ___ frustrated   ___ ashamed
___ disgusted   ___ appreciative   ___ amused   ___ proud
___ rejected   ___ admiring   ___ sad   ___ indebted
___ loving   ___ resentful   ___ grateful   ___ inspired
___ angry   ___ peaceful   ___ embarrassed   ___ misunderstood
___warm   ___open   ___ suspicious   ___contemptuous

1. How easy or difficult was it to come up with an example to write about?

   very difficult   -3   -2   -1   0   1   2   3   *very easy*

2. How easy or difficult was it to write for the full time allotted on this topic?

   very difficult   -3   -2   -1   0   1   2   3   *very easy*

3. Please indicate, in a word or phrase, the type of story you were asked to write about:
_____

"Openness Rating Form"

Scenario 1:

To what extent did you think the "other person" in the experiment was open and/or interested in new relationships?

Not very open/interested   Extremely
open/interested

1   2   3   4   5   6   7

To what extent did you feel that if the other person helped you with something then they would be mad if you didn't repay them?

1   2   3   4   5   6   7

Scenario 2:

To what extent did you think the "other person" in the experiment was open and/or interested in new relationships?

Not very open/interested   Extremely
open/interested

1   2   3   4   5   6   7

To what extent did you feel that if the other person helped you with something then they would be mad if you didn't repay them?

1   2   3   4   5   6   7

Scenario 3:

To what extent did you think the "other person" in the experiment was open and/or interested in new relationships?

Not very open/interested   Extremely
open/interested

1   2   3   4   5   6   7

To what extent did you feel that if the other person helped you with something then they would be mad if you didn't repay them?

1   2   3   4   5   6   7

Appendix C – Scripts

"General Directions" – [everyone was read this aloud]

Now, we would like you to take 10-15 minutes to do a writing exercise. The purpose of the writing exercise will not be to judge your writing *abilities* – as part of our research, we just want to get natural samples of real stories that people tell about someone they see every day. We have a number of topics that we are asking people to tell us about, and you'll just be asked to write about just one, selected at random. Writing *for the entire time* about the particular topic we give you will be more important than double-checking spelling or grammar.

Instructions for the writing exercise can be found on the next page. Please read the instructions carefully before advancing to the page that contains the space necessary for the writing exercise.

"Gratitude script"

For this exercise we would like you to think about a time felt really **grateful, thankful, or appreciative toward someone in your life because of a thoughtful or kind thing that he or she did for you**. Please take a minute or so to think about that person and a specific event in the past month or so that you felt this way. When you to tell us about this *recent* time, it does not matter how big or small the positive gesture, just please choose something that made you feel **grateful** at the time, and still makes you feel this way when you think about it. Feeling grateful, thankful, or appreciative is typically experienced as a positive state that makes your feel closer to the other individual. Generally a sense of obligation or indebtedness does not accompany the sensation of gratitude, thankfulness, or appreciativeness.

Some examples might be helping to solve a problem, surprising you with a gift, taking time to listen to a concern, or spending time doing something he or she would not typically do. Please take time to imagine what the positive event was like and try to relive it again in your mind's eye. Then describe what made you feel this way as vividly and in as much detail as you can.

The following questions may help you with this task: What were you feeling? What made you feel that way? What was important for you? What led up to that feeling? Did that event set off some chain of thoughts or fantasies that enhanced your feelings? What were they?

Please describe the event and your feelings as vividly and in as much detail as you can for about 10-15 minutes. The next page contains the space in which you may write your story about the event. Again, there is no need to worry about spelling or grammar – we are just interested in finding out more about this type of event as it happens in everyday life.

Please write your story in the space below:

"Indebtedness script"

For this exercise we would like you to think about a time felt really **indebted or obligated to toward someone in your life because of a thing that he or she did for you**. Please take a minute or so to think about that person and a specific event in the past month or so that you felt this way. When you to tell us about this *recent* time, it does not matter how big or small the gesture, just please choose something that made you feel **indebted or obligated to that person** at the time, and still makes you feel this way when you think about it. Feeling indebted or obligated is typically experienced as a negative state that makes your feel as though you must repay the gesture that he or she expressed.

Some examples might be helping you pay for something you could not afford. Please take time to imagine what the event was like and try to relive it again in your mind's eye. Then describe what made you feel this way as vividly and in as much detail as you can.

The following questions may help you with this task: What were you feeling? What made you feel that way? What was important for you? What led up to that feeling? Did that event set off some chain of thoughts or fantasies that enhanced your feelings? What were they?

Please describe the event and your feelings as vividly and in as much detail as you can for about 10-15 minutes. The next page contains the space in which you may write your story about the event. Again, there is no need to worry about spelling or grammar – we are just interested in finding out more about this type of event as it happens in everyday life.

Please write your story in the space below:

"Control script"

For this exercise, we would like you to tell us about a *recent* time when someone you know did something that was not part of his or her typical routine. It does not matter how big or small the action, just please choose something that you noticed to be unusual behavior, and still makes you feel this way when you think about it.

Some examples might be changing a schedule, temporarily acting out of character, saying something you are not used to hearing from him or her, or wearing something he or she would not usually wear. Please take time to imagine what the unusual event was like and try to relive it again in your mind's eye. Then describe what was unusual about the event as vividly and in as much detail as you can.

The following questions may help you with this task: What were you thinking? What made you think that? What was important for you? What led up to that thought? Did that event set off some chain of thoughts or fantasies? What were they?

Please describe the event and your feelings as vividly and in as much detail as you can for about 10-15 minutes. The next page contains the space in which you may write your story about the event. Again, there is no need to worry about spelling or grammar – we are just interested in finding out more about this type of event as it happens in everyday life.

Please write your story in the space below:

Decision Sheet – A

For this next task you will be asked questions about how you would split up a sum of money in a series of imaginary scenarios. For this exercise, pretend a researcher in a psychological study has given you $100 and asked that you split that money between you and another person. You will have complete autonomy in deciding how to split the money between you and the other participant. Regardless of the split you propose the other person must accept your offer.

Scenario 1:

Imagine that the other person in this experiment is completely anonymous to you. Imagine that they are in the other room and will see your offer. Importantly they will never know your identity or anything about you.

Amount you keep: _____

Amount you offer: _____

Scenario 2:

The other person is a 22-year-old female who has recently attended a university in the south, but out of state. She recently moved to town to take a job as a human resources consultant. She signed up for this experiment because she saw an advertisement online and was hoping to meet new people.

Amount you keep: _____

Amount you offer: _____

Scenario 3:

The other person in this experiment is a 20-year-old Junior who attends now attends UNC. She has attended UNC continuously since her freshman year and is currently conducting this experiment for course credit. She was encouraged to do the experiment by her close friends that she has known since freshman year.

Amount you keep: _____

Amount you offer: _____

Decision Sheet – B

For this next task you will be asked questions about how you would split up a sum of money in a series of imaginary scenarios. For this exercise, pretend a researcher in a psychological study has given you $100 and asked that you split that money between you and another person. You will have complete autonomy in deciding how to split the money between you and the other participant. Regardless of the split you propose the other person must accept your offer.

Scenario 1:

Imagine that the other person in this experiment is completely anonymous to you. Imagine that they are in the other room and will see your offer. Importantly they will never know your identity or anything about you.

Amount you keep: _____

Amount you offer: _____

Scenario 2:

The other person is a 22-year-old female who has recently attended a local university in the research triangle area and will soon take a job as a human resources consultant in another state.

Amount you keep: _____

Amount you offer: _____

Scenario 3:

The other person in this experiment is a 20-year-old Junior who now attends UNC. She recently transferred here from another university and is currently conducting this experiment for course credit but is hoping it will be a way to meet new people.

Amount you keep: _____

Amount you offer: _____

Appendix E – Tables

Table 1

Self-Reported Mean Ratings of Emotion by Emotion Induction

Emotion Manipulation	Gratitude Experienced	Indebtedness Experienced
Gratitude Letter (N=20)	5.00 (1.03)	2.20 (1.96)
Indebtedness Letter (N=15)	4.07 (1.91)	3.73 (1.75)
Control Letter (N=23)	1.57 (1.80)	0.30 (0.70)

Notes: Standard Deviations in parentheses

Table 2

Main Effects for the Pilot Study – Mean Offers for the Three Vignettes

		Anonymous	Young Professional	UNC Student
Emotion				
	Gratitude	37.00 (14.18)	38.00 (21.42)	38.00 (18.02)
	Control	27.39 (23.25)	28.74 (22.31)	31.09 (21.69)
	Indebtedness	41.33 (24.16)	38.67 (25.32)	36.67 (27.69)
Context				
	Open	33.67 (23.74)	36.17 (23.18)	37.50 (21.02)
	Closed	35.00 (18.76)	32.71 (22.90)	32.50 (23.15)

Notes: Standard Deviations in parentheses

Table 3

Ratings of Openness to New Relationships

	Young Professional	UNC Student
Open	5.53 (1.71)	6.32 (0.77)
Not Open	3.29 (1.72)	3.5 (1.41)

Notes: Standard Deviations in parentheses

Table 4

Main Effects for the Full Study – Mean Offers for Each Vignette

		Anonymous	Young Professional	UNC Student
Emotion				
	Gratitude	38.04 (18.72)	33.70 (20.56)	43.48 (16.60)
	Indebtedness	32.05 (18.44)	37.15 (23.71)	41.02 (18.76)
	Control	32.78 (25.81)	36.18 (24.79)	39.28 (24.18)
Context				
	Open	N/A	35.94 (23.71)	44.77 (14.64)
	Closed	N/A	35.32 (18.48)	37.94 (23.54)
Total		34.39 (21.08)	35.63 (21.18)	41.35 (19.83)

Notes: Standard Deviations in parentheses

Table 5

Logistic Regression Analysis – Dichotomized at $30

	Anonymous	Young Professional	UNC Student
Emotion Main Effect	$X^2=3.821$, p=0.148	$X^2=0.765$, p=0.682	$X^2=2.207$, p=0.332
Openness Main Effect	NA	$X^2=0.108$, p=0.742	$X^2=6.266$, p=0.012*
Interaction Effect	NA	$X^2=0.565$, p=0.754	$X^2=1.824$, p=0.402

Note. * = significant at 0.05

Table 6

Logistic Regression Analysis – Dichotomized at $2

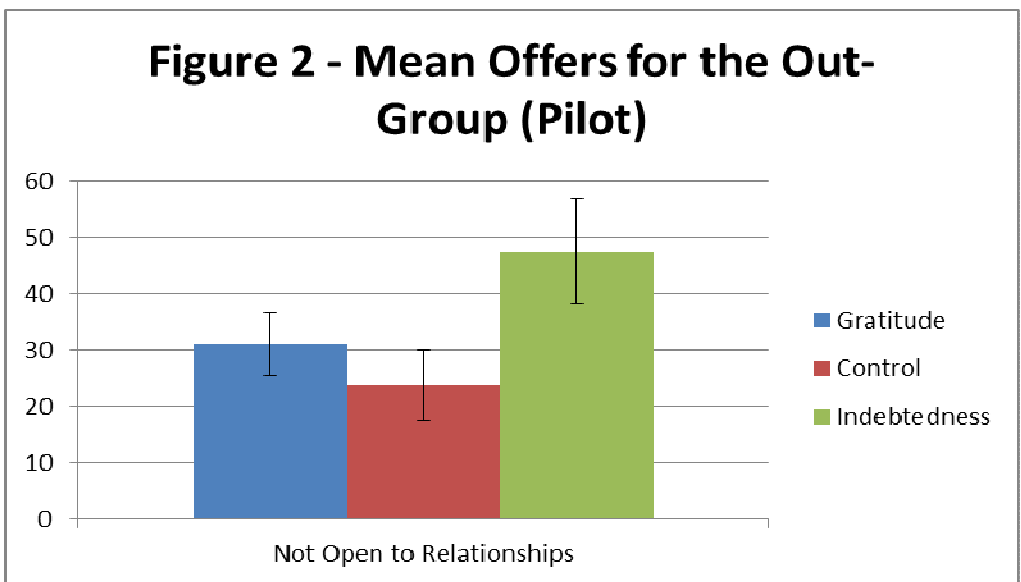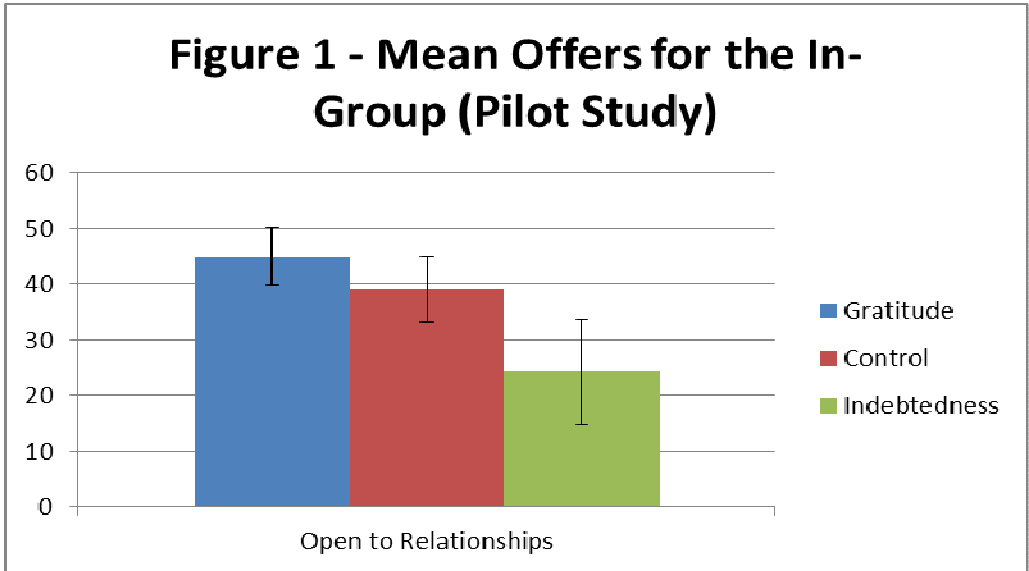|	Anonymous	Young Professional	UNC Student
Emotion Main Effect	X^2=1.429, p=0.489	X^2=1.843, p=0.398	X^2=0.863, p=0.649
Relationship Context Main Effect	NA	X^2=0.571, p=0.450	X^2=2.462, p=0.117
Interaction Effect	NA	X^2=1.352, p=0.509	X^2=0.586, p=0.746

Note. * = significant at 0.05

Table 7

Mean Offers for Exploratory Analysis – Emotion and Social Distance

|	Gratitude	Control	Indebtedness
Anonymous	38.04 (18.72)	32.78 (25.81)	32.05 (18.44)
Young Professional	33.70 (20.56)	36.18 (24.79)	37.16 (18.41)
UNC Student	43.48 (16.60)	39.28 (24.18)	41.02 (18.76)

Note. Standard Deviations in parentheses

Appendix F – Figures

Figure 1 - Mean Offers for the In-Group (Pilot Study)

Open to Relationships

- Gratitude
- Control
- Indebtedness

Figure 2 - Mean Offers for the Out-Group (Pilot)

Not Open to Relationships

- Gratitude
- Control
- Indebtedness
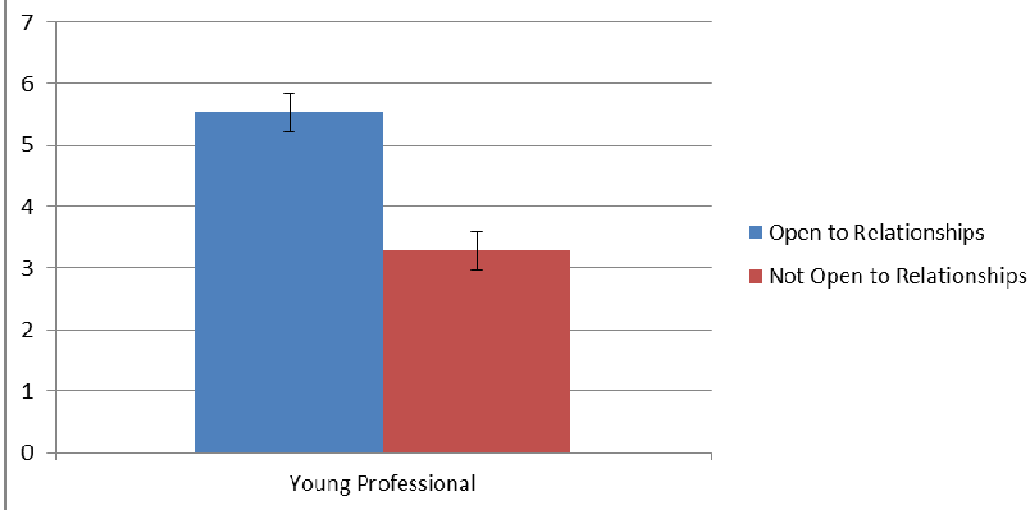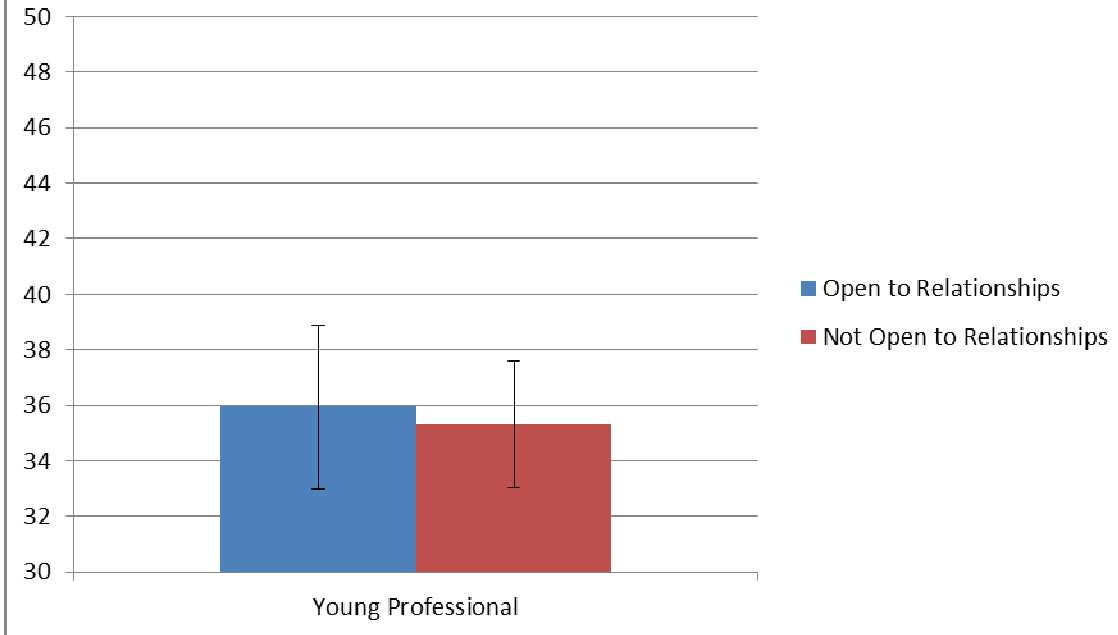
Figure 3 - Subjective Ratings of Openness to New Relationships for the In-Group (Pilot)
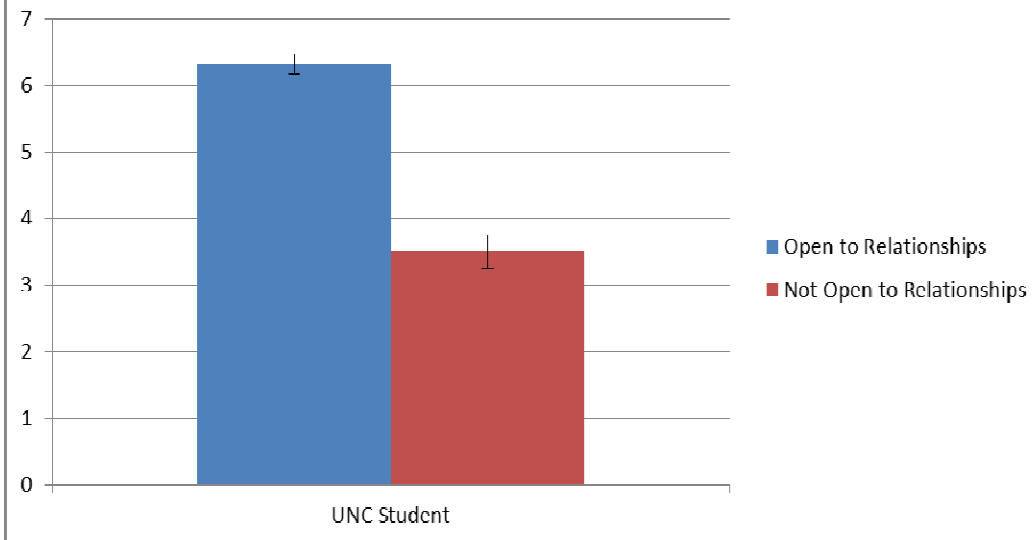
Figure 4 - Subjective Ratings of Openness to New Relationshps for the Out-Group (Pilot)

Figure 5 - Mean Offers for the Main Effect of Openness for the Out-Group

Open to Relationships
Not Open to Relationships

Young Professional

Figure 6 - Mean Offers for the Main Effect of Openness for the In-Group

Open to Relationships
Not Open to Relationships

UNC student

84
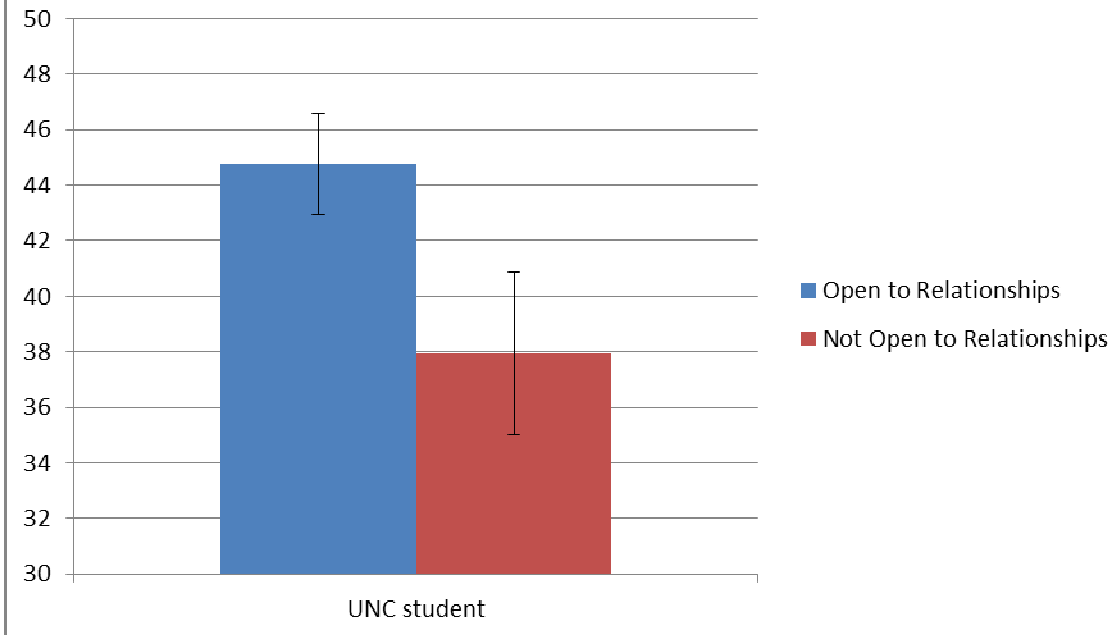
Figure 7 - Mean Offers for the Interaction Between Emotion and Social Distance
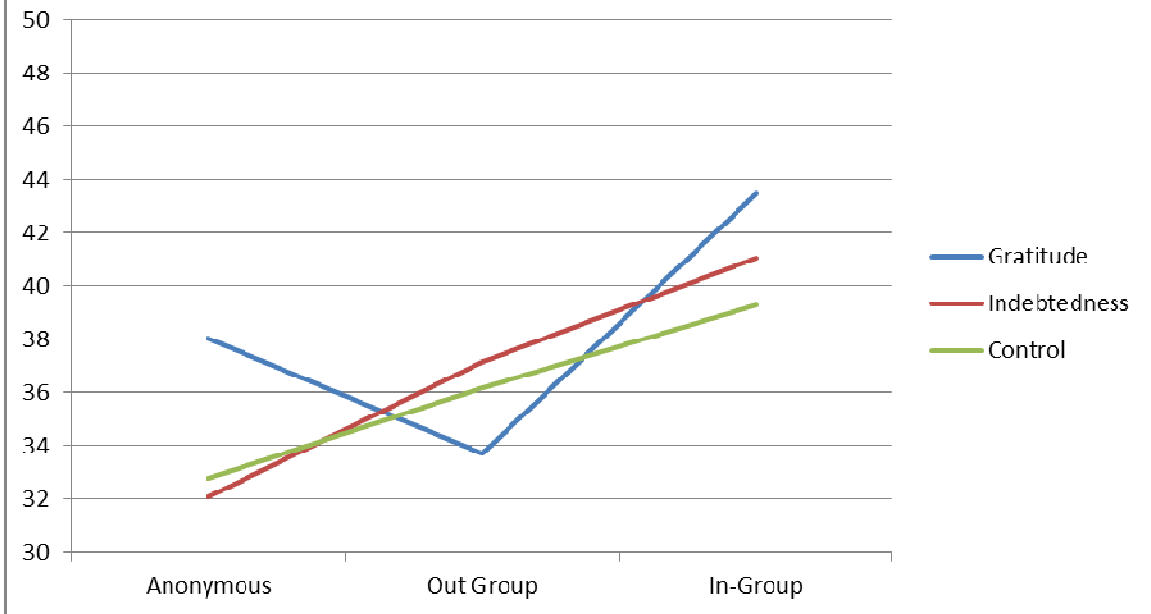
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