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Brigham Young University

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Returning Thanks to God and Others: The Relational, Prosocial, and Emotional Consequences of
Transcendent Indebtedness

Jenae Marie Nelson

A dissertation submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Sam A. Hardy, Chair
Blake L. Jones
Edwin E. Gantt
Dianne M. Tice

Department of Psychology

Brigham Young University

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ABSTRACT

Returning Thanks to God and Others: The Relational, Prosocial, and Emotional Consequences of Transcendent Indebtedness

Jenae Marie Nelson
Department of Psychology, BYU
Doctor of Philosophy

Gratitude and indebtedness facilitate cooperative relationships and altruism. Although most of the world endorses some belief in God, gratitude and indebtedness to God have not received adequate empirical attention. The “Gratitude to God” research initiative was created to address this gap, of which the current project is an appendage. This project encapsulates a multiphase research proposal, including three parts; a pilot study and two experimental studies. The purpose of the pilot study ($N = 475$) was to create and test experimental manipulations for the two experimental studies. Experiment 1 ($N = 659$; highly religious emerging adult sample) was a 3x2 experimental design with six conditions; 1) gratitude-only to humans, 2) indebtedness-only to humans, 3) gratitude and indebtedness to humans, 4) gratitude-only to God, 5) indebtedness-only to God, and 6) gratitude and indebtedness to God. Experiment 2 ($N = 1081$; nationally representative sample) was a replication of Experiment 1. Multiple and multivariate regression analyses and MANOVAs provided evidence that conditions 3 & 6 and state responses of gratitude and transcendent indebtedness led to more prosocial giving, more positive affect, and increased relationship proximity in response to receiving a benefit from either God or humans. Gratitude with low levels of indebtedness or indebtedness with low levels of gratitude were associated with worse outcomes. Two types of indebtedness were found, transcendent indebtedness (agentic) and transactional indebtedness (obligated). More positive outcomes were associated with transcendent indebtedness. Further, positive affect and relationship proximity was moderated by secure attachment to God when God was the benefactor.

Keywords: gratitude, indebtedness, virtue, religiosity, spirituality, prosociality, attachment

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Returning Thanks to God and Others: The Relational, Prosocial, and Emotional Consequences of Transcendent Indebtedness

“To have received from one, to whom we think ourselves equal, greater benefits than there is hope to requite disposeth to counterfeit love; but really secret hatred; and puts a man into the estate of a desperate debtor...for benefits oblige...But to have received benefits from one, who we acknowledge [our] superior, inclines to love; because the obligation is no new depression: and cheerful acceptance (which men call Gratitude,) is such an honor done to the obliger, as is taken generally for retribution.” –Thomas Hobbes, Leviathan

Central Research Questions

1. What is the relationship between gratitude and indebtedness (both to God and humans)?
2. How do gratitude and indebtedness to humans compare to gratitude and indebtedness to God?
3. What are the relational outcomes of gratitude and indebtedness (to God and humans)?
4. What emotions are associated with gratitude and indebtedness (to God and humans)?

Background and Significance

Gratitude and indebtedness motivate reciprocity and prosocial behavior, underpinning cooperative relationships (Lawler & Thye, 2009). A cultural outgrowth of this moral motivation is the ancient practice of gift-giving used to promote goodwill and bind people together through reciprocal obligation (Mauss, 1966). Further, reciprocity is present in even small children (Beeler-Duden & Vaish, 2020), suggesting that reciprocity is part of an evolved cognitive system that promotes cooperative relationships and human thriving (Forster et al., 2017). Gratitude is a component of this complex biopsychosocial mechanism that has many downstream effects on individuals. Such effects include the formation of moral virtues (Emmons, 2016), enhanced emotional well-being (Wong et al., 2018), adaptive stress reactivity (Ginty et al., 2020), reductions in amygdala reactivity (Hazlett et al., 2021), and greater neural modulation of the prefrontal cortex (Kini et al., 2016). Empirical evidence of the cascade of these adaptive consequences has captured the attention of clinicians and researchers interested in cultivating and harnessing the benefits of gratitude in promoting individual flourishing. Gratitude also has broad social implications. Thriving relationships are knit with reciprocity, thought to be motivated by gratitude (Braun et al., 2018; Carlson & Rose, 2007; Gouldner, 1960). Social scientists have observed that gratitude mediates the relationship between receiving help and prosocial behaviors (Bartlett & DeSteno, 2006), and a recent meta-analysis found a moderate link ($r = .37$) between gratitude and prosocial behavior (Ma et al., 2017).

However, most research on gratitude does not distinguish between gratitude and a sense of indebtedness, reducing measurement accuracy (P. Watkins et al., 2006). It is unclear, for example, when researchers are conducting gratitude interventions (particularly interpersonal interventions involving the expression of gratitude to others) whether the effects are attributable

to gratitude or indebtedness or a combination of the two. Gratitude and indebtedness are easily confused and appear indistinguishable because they have the same precursors—receiving a benefit. Research has found that this conflation is both a conceptual and methodological error (Nelson et al., 2022; Peng et al., 2018, 2019; P. Watkins et al., 2006). Gratitude and indebtedness work in tandem, but they may have unique roles in relationship building and social exchange (Nelson et al., 2022; Oishi et al., 2019; P. Watkins et al., 2006). Specifically, there is evidence that gratitude promotes proximity seeking, building relationships (Algoe et al., 2008; Peng et al., 2018) and that indebtedness promotes equity-seeking, binding relationships (Peng et al., 2018). In other words, gratitude and indebtedness work together like cogs in the motivational wheel of reciprocity, building and binding relationships.

Despite the importance of gratitude and indebtedness in the development of prosociality, there has been a negative bias towards indebtedness in the scientific literature (Nelson et al., 2022). Consequently, the positive interactive roles of gratitude and indebtedness have not received empirical attention. Even more questions remain about gratitude and indebtedness when the benefactor is God. To address this gap, the John Templeton Foundation recently funded an initiative called the Gratitude to God Project. This is the report of our pioneering work on indebtedness to God under that initiative. Building on the conceptualization of gratitude and indebtedness as nuanced and having different varieties—we created an experiment that would allow us to address our central research questions and understand how these varieties of gratitude and indebtedness are associated with prosociality and emotional well-being.

Varieties of Gratitude and Indebtedness

It is essential to clearly define gratitude and indebtedness because modern conceptions of gratitude differ from historical conceptualizations of gratitude. Gratitude has been reduced to an

intrapersonal wellness practice from its historical roots as a communal emotion (Zechariah, 2020). Consider the ancient Hebrew phrase *assir todah*, which means bound by gratitude. *Assir todah* is similar to the English phrases “debt of gratitude” or “much obliged” (Gelber, 2014). These phrases are falling out of modern vernacular, reflecting the changing perception of gratitude (*Google Books Ngram Viewer*, 2022). It is important to acknowledge the contemporary reframing of gratitude as a personal emotion—as it has created a shift in how gratitude is measured and cultivated.

Nevertheless, experts acknowledge that gratitude is a complex social construct, often characterized as a disposition or trait (Lin, 2019) or an affective state (Ma et al., 2017). Gratitude can also be a virtue when it is paired with indebtedness, motivating moral action (Tudge et al., 2018). Gratitude has also been defined in terms of dimensionality—with evidence that oblique models (i.e., multidimensional with common correlated factors) are more psychometrically sound (Hammer & Brenner, 2019). In this framework, gratitude is a superordinate construct enveloping many aspects such as appreciation and indebtedness. Gratitude has been further analyzed into *prepositional gratitude* (grateful to someone—creating a triadic relationship between benefactor, beneficiary, and benefit) and *propositional gratitude* (grateful for—compromising a dyadic relationship between beneficiary and benefit, where there is no benefactor or the benefactor is ambiguous) (Manela, 2019). An example of propositional gratitude is an adolescent saying, “I’m grateful for my new car.” To make this example prepositional gratitude, one would need to add a benefactor, “I’m grateful to my parents for my new car.” For the most part, prepositional gratitude is relational and propositional gratitude is not. The exceptions to this rule would be when prepositional gratitude includes a non-agentic benefactor (“I’m grateful to the universe for my new car”) or when propositional gratitude is

aimed at a person (“I’m grateful for my parents.”) But to simplify, when we refer to prepositional gratitude, we mean the triadic type of gratitude between agentic benefactors, beneficiaries, and benefits. There is empirical evidence that both forms of gratitude are connected with enhanced psychological well-being, but prepositional or relational gratitude is associated with enduring postintervention benefits (O’Connell et al., 2017) and prosocial behavior via direct reciprocity (Ma et al., 2017).

Feeling Gratitude and Expressing Gratitude

To explain the relationship between gratitude and prosocial behavior, scholars have conceptualized gratitude as a moral emotion (e.g., Haidt, 2003; McCullough et al., 2001). Recent neuroimaging supports this view with evidence that gratitude is an emotion experienced in the reward system of the brain that makes the beneficiary feel closer to the benefactor (Yu et al., 2017). Moral emotions link values to behavior (Tangney et al., 2007). However, a sense of indebtedness may be the actual underlying mechanism in social exchange that fosters reciprocal action (Peng et al., 2018). Some social scientists even posit that gratitude is not a virtue (value in action) without a sense of indebtedness—because, without indebtedness, gratitude is insufficient to promote reciprocity (Tudge & Freitas, 2018). In this view, gratitude without indebtedness is just appreciation (Roberts & Telech, 2019; Tudge et al., 2015), leaving only a shell of gratitude for self-presentation (Baumeister & Ilko, 1995). Thus, *transient gratitude* is shallow gratitude divorced from duty, obligation, and indebtedness (Emmons, 2016).

Therefore, gratitude without indebtedness might be more of what social psychologist, C. Daniel Batson, calls an *end-state emotion*—like happiness—that does not produce moral behavior itself (Batson, 2015). It is the combination of gratitude and indebtedness that constitutes *transcendent gratitude*—or moral gratitude that motivates prosocial behavior and relational

bonding (Roberts & Telech, 2019). In other words, indebtedness may be what bridges the gap between feeling gratitude and expressing gratitude. In this model, gratitude is the reward or the signal to the brain after receiving an intentional benefit—making the receiver feel closer to the giver. Subsequently, the evaluation and awareness of the gift as costly and valuable initiates a sense of indebtedness, activating the norm of reciprocity and motivating behavior.

Varieties of Responses to Indebtedness

Indebtedness is a condition and a cognitive framework accompanied by emotions that vary depending on appraisals associated with the characteristics of the benefactor, the nature of the benefit, beneficiary characteristics, and the relationship structure and quality between the beneficiary and benefactor (Nelson et al., 2022; Tsang et al., 2021). If we were to categorize indebtedness as an emotion, it would function much like a *need-state emotion*. *Need-state emotions*—like fear or guilt—can propel recipients into action (Batson, 2015). In other words, indebtedness acts as a tension-state, collecting potential energy for reciprocity—and conversely, gratitude functions as an end-state emotion that reinforces relationships through the neurological reward systems (Yu et al., 2017). The problem with conceptualizing indebtedness solely as an emotion is that different types of indebtedness produce different emotions (Buchtel et al., 2018; Nelson et al., 2022). Imagine the following scenarios:

1. Leaving home for college and realizing how indebted you are to your parents for all they've done for you.
2. Opening an overdue bill from a financial lender.
3. Wanting to “pay it forward” after a stranger showed unsolicited kindness to you.
4. Owing your neighbor for babysitting your kids for you when an emergency came up.
5. Acknowledging your indebtedness to a wise teacher or mentor for your success.

6. Being indebted to a cruel landlord.

These experiences are qualitatively different—yet all would activate the human drive to seek equity. In these situations, you can see how the magnitude of gratitude would vary. Therefore, an important distinction is this: even though indebtedness is a tension state, it is more accurate to conceptualize it as a cognitive state, with the pattern of emotions that accompany it varying according to the circumstances surrounding the social exchange. Indebtedness is similar to accountability which can be positive or negative depending on the circumstances (Bradshaw et al., 2022; Evans, 2021; Torrance, 2021). Nevertheless, even when indebtedness has a negative emotional valence—the human response to indebtedness is an evolved complex social motivator that drives reciprocity, generosity, and upstream altruism (Beeler-Duden & Vaish, 2020; Gouldner, 1960; Peng et al., 2018). Given the lack of empirical understanding of the positive varieties of indebtedness, it deserves more thoughtful empirical exploration.

Prior research has identified two different types of social indebtedness: 1) *transactional indebtedness*, a “pay it off” orientation, which often involves negative emotions and low gratitude, and 2) *transcendent indebtedness*, a “pay it back” and “pay it forward” orientation, which involves positive emotions and high gratitude (Nelson et al., 2022, p. 4). Taken literally, being indebted to someone means owing someone for something. Other types of indebtedness, such as institutional indebtedness (owing a lender), are so qualitatively different from social indebtedness that we do not review them here or include them in the definition of social indebtedness.

Affective and cognitive responses to interpersonal debt can vary drastically from a pattern of negative emotions (e.g., resentment, annoyance, shame, embarrassment) to a constellation of positive emotions (e.g., happiness, awe, elation, appreciation, love) to a mixed

assortment of emotions (e.g., gratitude, delight, guilt, love, sorrow). The negative affective pattern of interpersonal indebtedness—or *transactional indebtedness* is the type of indebtedness most frequently discussed in the scientific literature (Algoe et al., 2008; Greenberg & Shapiro, 1971; Watkins et al., 2006). This orientation began with pioneering research on interpersonal indebtedness that focused solely on aversive responses to indebtedness (Greenberg & Shapiro, 1971). Greenberg positioned indebtedness and gratitude as dichotomized variables, setting the stage for a long-standing view of indebtedness as a negative emotion. This dichotomy has proven to be a conceptual and methodological mistake because the emotions associated with owing depend on several factors. Indebtedness is present even when gratitude and positive emotions are also present (Layous et al., 2017), suggesting that gratitude and indebtedness are not mutually exclusive.

Despite the enduring negative view of indebtedness in the literature, a more favorable view has emerged in recent years. A factor analysis of different responses to receiving revealed that while owing and feeling beholden were components of indebtedness, feeling like a burden, regret, and uneasiness were associated with another factor, which the researchers titled “regret for bothering” (Naito & Sakata, 2010, p. 185). This finding suggests that discomfort associated with receiving is a separate phenomenon from indebtedness. Researchers are coming to acknowledge that the experience of indebtedness is multifaceted and has deep historical, cultural, and religious roots, and has connections to psychological well-being (Lebra & Lebra, 1974, 1986; Nelson et al., 2022; Washizu & Naito, 2015). For example, Naikan Japanese therapy involves bringing a client’s awareness of their indebtedness by having them recall the benevolence they have received. This indebtedness practice reveals the interdependent nature of

human existence (Naito & Sakata, 2010) and is effective at improving relationships, cultivating gratitude, and realizing social responsibilities (Fujisaki, 2020).

Predicting Gratitude and Indebtedness: Four-Factor Framework

As has been shown, receiving a benefit can evoke many different responses. Researchers conducting a factor analysis determined that responses to receiving help loaded onto four distinct factors; 1) positive affect (warmth, joy, happiness, gratitude), 2) negative affect (unpleasantness, depression, annoyed, troubled), 3) burdensome (regret for bothering and causing a problem, uneasiness, feeling sorry), and 4) indebtedness (owing to the benefactor and feeling beholden) (Naito & Sakata, 2010). Further, a review of the literature on gratitude and indebtedness reveals the response to receiving depends on the following four factors (see Figure 1), which have been identified now by two independent researchers (Nelson et al., 2022; Tsang et al., 2021):

1. *Characteristics of the beneficiary*

- a. Collectivist cultures have more positive views of indebtedness and obligations than individualistic cultures (Buchtel et al., 2018; Janoff-Bulman & Leggatt, 2002; Washizu & Naito, 2015).
- b. Koreans experience more indebtedness than Americans (Oishi et al., 2019).
- c. Humility is connected to reciprocity (Exline et al., 2014).
- d. Oxytocin injections produce positive feelings and mitigate negative feelings after receiving help (Human et al., 2018).
- e. Self-focus increases aversive feelings towards indebtedness; other focus increases positive affect and gratitude (Mathews & Green, 2010).
- f. Relationship promotion focus increases gratitude (Mathews & Shook, 2013).
- g. Autonomous motivations increase reciprocity (Kong & Belkin, 2019).

2. *Characteristics of the benefactor*

- a. Benevolence is associated with gratitude (Kong & Belkin, 2019; Mathews & Shook, 2013; Peng et al., 2018).
- b. Helper intentions (benevolent vs. ulterior motives) influence gratitude but not indebtedness (J.-A. Tsang, 2006; Yulan Li et al., 2019).
- c. Intentional helping produces gratitude (Buchtel et al., 2018; Peng et al., 2018; Yu et al., 2017).
- d. The expectation of reciprocity decreases gratitude and increases indebtedness (Washizu & Naito, 2015; P. Watkins et al., 2006).

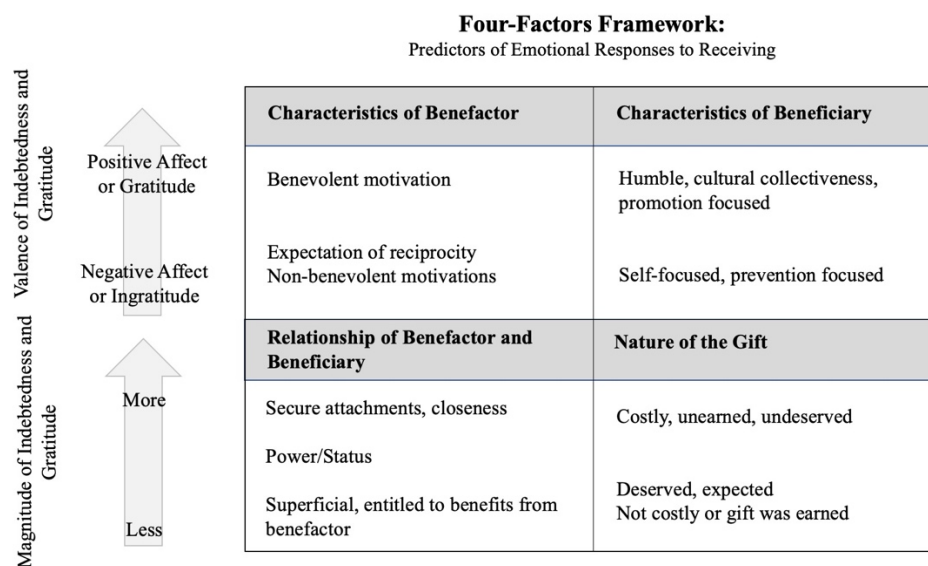
3. *The beneficiary and benefactor relationship*

- a. Perception of benefactor responsiveness increase gratitude (Algoe et al., 2008).
- b. Relationship closeness produces more gratitude and indebtedness (Oishi et al., 2019).
- c. Inequity in the relationship produces more indebtedness (Buchtel et al., 2018).

4. *The nature of the benefit*

- a. Costly gifts influence indebtedness but not gratitude (Peng et al., 2018).
- b. Benefit offered vs. asked for increases gratitude (Peng et al., 2018).
- c. Focus on the value of the gift rather than the cost enhances gratitude and indebtedness (Forster et al., 2017; Peng et al., 2018; Shiraki & Igarashi, 2016).

Figure 1



Note. (Figure from Nelson et al., 2022). Sources are provided in the text. Some factors have curvilinear relationships with emotional responses or interactive relationships with other factors; this figure is just for general demonstration.

Gratitude and Indebtedness to God

Research on interpersonal gratitude and indebtedness has created a framework for understanding how gratitude and indebtedness build and bind relationships, but many questions remain unanswered. Little is known about recipient responses when God is the benefactor. In social exchange, individuals interact with countless benefactors across the lifespan in ways that can be positive, problematic, or indifferent. In a spiritual exchange, religious individuals portray God as a Benevolent Giver, and spiritual gifts include opportunities, privileges, atonement, and even life itself. Direct reciprocity (pay it back) is common in interpersonal social exchange, whereas direct reciprocity to God may be more difficult. For this reason, diffuse reciprocity (pay it forward) may be a more likely form of reciprocity when returning thanks to God. This may be

especially true in Western monotheistic religions, where direct reciprocity practices are uncommon. In contrast, in ancient polytheistic and pagan religions, where ritualistic sacrifices and offerings to gods are common, we might observe a different pattern of reciprocal behavior. Therefore, gratitude and indebtedness to God may have different prosocial consequences than interpersonal gratitude and indebtedness (to humans). However, research on gratitude to God remains sparse, and transcendent indebtedness to God is a new construct (Nelson et al., 2022) that is just beginning to be understood.

Construct Stability with Broad Prosocial Applications

Unveiling the mechanics of gratitude and indebtedness by studying these phenomena in religious individuals has several advantages. First, interpersonal gratitude (gratitude to humans) fluctuates based on the personal and relational factors of the dyad in the social exchange. However, gratitude and indebtedness to God are focused solely on one dyad—and it is relatively stable across time. This stability allows for greater experimental control and construct stability. Second, if one accepts a *theistic* God, a benevolent God figure (Miller, 2016), God can be a constant, unchanging resource for developing gratitude.

Further, gratitude to God may generally enhance the psychological and physiological benefits of gratitude (Rosmarin et al., 2011). Therefore, clinicians, parents, teachers, and mentors can help guide others in developing the virtue of gratitude by cultivating gratitude and indebtedness to God, regardless of present circumstances or the quality of their interpersonal relationships. If gratitude and indebtedness to God lead to more diffuse reciprocity, they also have broad implications for prosocial and moral behavior. A recent meta-analysis on gratitude and prosociality showed that interpersonal gratitude is associated with direct reciprocity but not

diffuse reciprocity or upstream altruism (Ma et al., 2017). Perhaps gratitude and indebtedness to God may uniquely promote diffuse prosocial behaviors.

Last, developing gratitude and indebtedness to God may 1) serve as a prototype for ideal interpersonal gratitude and indebtedness and potentially 2) compensate for poor interpersonal relationships where gratitude and indebtedness are low. Therefore, we proposed to test our research questions with a 3x2 experimental design to disentangle the differences between God and human benefactors and test the differences in relational and emotional consequences of the varieties of indebtedness and gratitude (see Figure 2.) There were three parts to this study, a pilot study to test manipulations and materials, an experiment using a highly religious sample, and a second replication and expanded experiment composed of a nationally representative sample.

Figure 2

	Gratitude Only	Indebtedness Only	Gratitude and Indebtedness
To God	Condition 1	Condition 2	Condition 3
To Humans	Condition 4	Condition 5	Condition 6

The Present Studies

The present work comprises three OSF (Open Science Framework) pre-registered components, a pilot study, Experiment 1, and Experiment 2. All these studies are a part of a larger call for proposals on the Gratitude to God Project funded by The Templeton Foundation.

Pilot Study

Participants

Given the objectives of the proposed work to observe the phenomena of gratitude and indebtedness to God, we piloted our materials with a participant pool from a religious institution, Brigham Young University (BYU) ($N = 475$, $M_{age} = 22$, 63% female, 88% White, 1% Black, 1% Native American, 2% Asian, 1% Native American, 1% Hawaiian or Pacific Islander, and 2% Other). BYU students are highly religious (99% are members of The Church of Jesus Christ of Latter-day Saints; 94% attend church weekly or more; 82% report having a life committed to God; 72% participate in private religious practices daily or more). The average participant's family income ranged from \$100,000 to-150,000. There were no exclusion criteria for the pilot study. Using our local participant pool for piloting was time and cost-effective.

Procedures

All hypotheses, procedures, manipulations, and measures were pre-registered using the Open Science Framework (some wordings of the hypotheses have been changed for clarity). Any follow-up analyses that were not pre-registered are referred to as such or as exploratory analyses. The study was administered online using Qualtrics and the SONA system participant pool at BYU. We chose an online format for all the studies in the present work due to the COVID-19 Pandemic and world conditions, which made in-lab studies difficult and to be more time and cost-efficient. Students in psychology courses were recruited to participate in the online piloting and given course credit for participation. Participants first responded to trait measures (presented randomly). They were then randomly assigned to one of six conditions (see Figure 2), where they were asked to read four vignettes in a random sequence (see Appendix A).

Participants were randomly assigned (using a randomizer in Qualtrics) to one of six conditions; 1) GTG and ITG condition, 2) GTG only condition, 3) ITG only condition, 4) indebtedness to humans only condition, 5) gratitude to humans only condition, and 6) gratitude

and indebtedness to humans condition (see Figure 2). We manipulated gratitude and indebtedness with vignettes (see Figure 2). The wording of the vignettes in the same condition column (cells 1 & 4, 2 & 5, and 3 & 6) were similar, but the benefactor's name was exchanged from a human to God. Participants were blinded to the purposes of the experiment and the condition to which they were assigned. We collected state measures of gratitude, indebtedness, and other possible emotional and cognitive responses to test manipulation effectiveness. At the conclusion of the survey, participants were given an opportunity to write letters to pediatric patients under a cover story. Last, they were asked what they thought the study was about and provided general feedback. See Figure 3 for a flowchart of the timeline of measures administered.

Manipulations

Each experimental condition received a set of four vignettes in random order to maximally prime participants. See Appendix A for example vignettes. Vignettes were created using the four-factor framework (see Figure 1). Participants were asked to “please put yourself in the situation and imagine how you would respond.” In the stories, the participant either receives help finding employment, gets a needed medical procedure, receives a Christmas present, or has their life saved in a car crash. The vignettes were varied slightly across conditions to evoke different levels of gratitude and indebtedness (to God or humans).

Measures

Measures were administered in random order (with items in random order). Composite scores were created for analysis. Then participants were randomly assigned to one of six conditions where they read four vignettes (see Appendix). Afterward, state measures were administered, and the measure of prosocial behavior.

State Gratitude. State gratitude levels were manipulated by slight alterations in the stories concerning variables associated with gratitude (as informed by the four-factors framework). For example, benevolent helper intention is associated with gratitude but does not affect indebtedness (Tsang, 2006), and the expectation of reciprocity decreases gratitude and increases indebtedness (Washizu & Naito, 2015; P. Watkins et al., 2006). Mean composite scores of gratitude across the four vignettes were created to control for differences across vignettes and to be used for statistical analysis ($\alpha = .78$) as a part of the cognitive and emotional responses to the vignettes. Participants rated the intensity of their gratitude from 1 “Not at all” to 5 “Very Much.”

State Indebtedness. State indebtedness was manipulated similarly to gratitude but by including slight changes in variables associated with indebtedness. For example, indebtedness is experienced when a benefit is viewed as costly (Greenberg et al., 1971) and the benefactor expects reciprocity (P. Watkins et al., 2006). Mean composite scores of both agentic and obligatory indebtedness were created across the four vignettes ($\alpha = .84$) as a part of the cognitive and emotional responses to the vignettes. Two types of indebtedness were included, obligated indebtedness (“Indebtedness: obligated to repay”) and transcendent indebtedness (“Indebtedness: desire to repay”). Participants rated the intensity of their indebtedness from 1 “Not at all” to 5 “Very Much.”

State Gratitude and Indebtedness. Variables associated with both gratitude and indebtedness were manipulated in the vignettes to evoke both responses. For example, gratitude and indebtedness are experienced when the benefactor is viewed as close to the beneficiary (Oishi et al., 2019) and when the gift is valued (Peng et al., 2018; Shiraki & Igarashi, 2016). Sum

composite scores of gratitude and indebtedness across the four vignettes were also created ($\alpha = .72$) as a part of the cognitive and emotional responses to the vignettes.

Gratitude to God. The Gratitude to God Scale ($\alpha = .93$, 10 items, e.g., "Life is a wonderful gift from God."; Watkins et al., 2018) was used to measure gratitude towards God. Responses were given on a scale of 1 "Strongly disagree" to 5 "Strongly agree."

Transcendent Indebtedness to God. The T-ITG scale ($\alpha = .92$, six items, e.g., "I owe God for my life"; Nelson et al., 2022) was used to measure transcendent indebtedness to God. Participants rated responses from 1 "Strongly disagree" to 5 "Strongly agree."

Secure Attachment to God. The Attachment to God Inventory was used to measure secure attachment to God ($\alpha = .91$, nine items, three that measure secure attachment, e.g., "I have a warm relationship with God"; Beck & McDonald, 2004). Responses ranged on a scale from 1 "Strongly agree" to 7 "Strongly disagree."

Trait Gratitude. Different dimensions of dispositional gratitude ($\alpha = .88$, 16-items, prepositional gratitude, e.g., "I couldn't have gotten where I am today without the help of many people", propositional gratitude, e.g., "Life has been good to me"); Watkins et al., 2003) were measured with the GRAT-short scale. Items were rated from 1 "Strongly disagree" to 7 "Strongly agree."

Aversive interpersonal indebtedness. Aversive interpersonal indebtedness ($\alpha = .90$, nine items, e.g., "When someone gives me something or provides a favor to me, I usually feel somewhat uncomfortable at first"; Greenberg & Shapiro, 1971) was measured with the Greenburg Scale Items were rated from 1 "Strongly disagree" to 6 "Strongly agree."

Empathy. Empathy was measured using a subscale from the Interpersonal Reactivity Index ($\alpha = .81$, seven items, e.g., "I often have tender, concerned feelings for people less

fortunate than me”; Davis, 1980). Responses were rated from 1 “Does not describe me well” to 5 “Describes me very well.”

Benefactor Effort. After the participants read each vignette, they were asked about the perceived effort of the benefactor ($\alpha = .74$, e.g., how much of a role they played, how much they sacrificed, how much they contributed). Responses were rated on a scale from 1 “Not at all” to 5 “Very Much.” Mean composite scores across the vignettes and conditions were created.

Beneficiary Effort. After the participants read each vignette, they were asked about their perceived effort in obtaining the benefit ($\alpha = .84$, e.g., how much of a role they played, how much they sacrificed, how much they contributed) on a scale from 1 “Not at all” to 5 “Very Much”. Mean composite scores across the vignettes and conditions were created.

Direct Reciprocity. After the participants read each vignette, they were asked how likely they would be to repay their benefactor ($\alpha = .85$). Responses were rated on a scale from 1 “Not at all” to 5 “Very Much”. Mean composite scores across the vignettes and conditions were created.

Relationship Proximity. After the participants read each vignette, they were asked how much closer they felt to their benefactor ($\alpha = .83$). Responses were rated on a scale from 1 “Not at all” to 5 “Very Much”. Mean composite scores across the vignettes and conditions were created.

Cognitive and Emotional Responses. Participants’ cognitive and emotional responses to receiving a benefit were measured with an extended version of Watkins’ affect scale (P. Watkins et al., 2006). After reading each vignette, participants were asked, “of the responses listed below, which did you experience while imagining the story? Please indicate the intensity of your response.” Responses ranged from 1 “Not at all” to 5 “Very Much”. The following responses

were listed, “grateful ($\alpha = .78$), indebted (obligated to repay) ($\alpha = .81$), indebted (desire to repay) ($\alpha = .73$), resentful ($\alpha = .67$), glad ($\alpha = .75$), proud ($\alpha = .84$), guilty ($\alpha = .83$), irritated/annoyed ($\alpha = .76$), love ($\alpha = .85$), apathy (this item was an attention check), entitled ($\alpha = .86$), humbled ($\alpha = .85$), fortunate ($\alpha = .72$), surprised ($\alpha = .82$). Composite scores of the response items across vignettes and conditions were created.

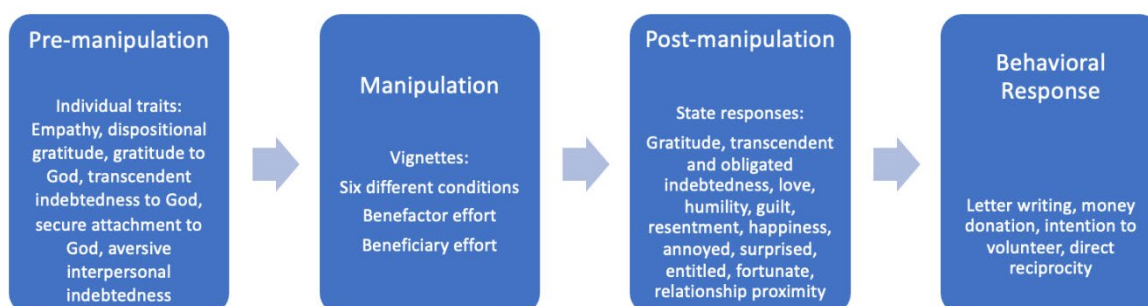
Negative Affect. Negative affect was a composite variable ($\alpha = .88$) created from the “resentful” and “irritated/annoyed” response. Guilt was not included in the composite score for negative emotions because although guilt is aversive, it is also considered a prosocial emotion that facilitates relationship repair and equity-seeking (Vaish & Hepach, 2020).

Positive Affect. Positive affect was a composite variable ($\alpha = .83$) created from the “love” and “glad” responses.

Prosocial Behavior. Prosocial behavior can be a form of diffuse reciprocity (paying it forward). One of the purposes of the pilot study was to measure diffuse reciprocity by developing a prosocial measure of helping that was not monetary, could be observed and administered online, and did not require expensive software (i.e., interactive prosocial games). To do this, we created a cover story, stating that in light of the current COVID-19 Pandemic, we teamed up with a charitable organization to provide support for pediatric patients who, at the time, were unable to receive visitors. At the beginning of the survey, we explained that *kindness.org* was sponsoring the research (a cover story created with their permission), and sometime during the survey, they would be asked to participate in an activity from our sponsor. After participants read the vignettes, we showed participants a quick advertisement from *kindness.org*. They were then presented with the activity from our sponsor, an opportunity to write pediatric patients small notes of encouragement. Participants were given five blank text

boxes where they could choose to write 0-5 letters. This part of the survey was optional. Through iterative attempts, participant feedback, and statistical analysis, we found that the *kindness.org* affiliation and advertisement were priming the participants and eliminating the manipulation effect. As a result, we removed the advertisement and changed the cover story to include a partnership (not sponsorship) with “Just Serve,” an online database of service opportunities. After making the change, we were able to observe variability in responses that coincided with anticipated condition effects. We included all the data (with and without the advertisement) to test condition and vignettes efficacy because the vignette responses were collected before the presentation of the advertisement. We created two continuous variables from the letter data (number of letters written 0-5 and number of words used across letters). We also created a dichotomous variable (did they write a letter yes/no). After observing that some of the letters were nonsense responses, we had two research assistants quality check the responses and delete any nonsense responses (e.g., none, no thank you).

Figure 3



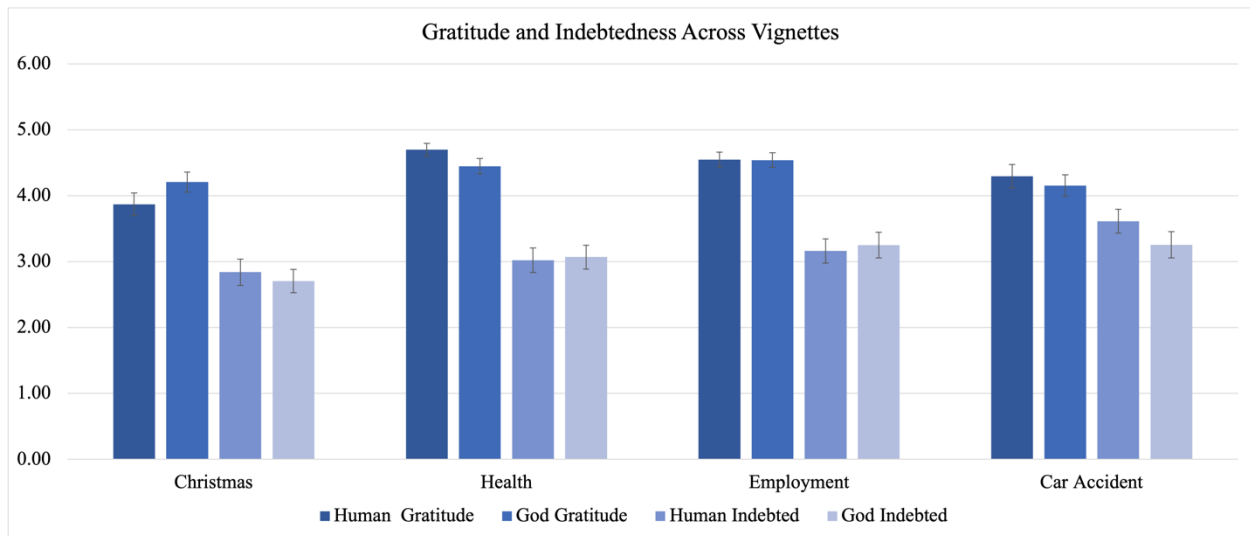
Analytic Strategy

We used t-tests to compare responses to the vignettes and compare the effectiveness of the vignettes. Next, we performed ANOVAs of the groups to see if the patterns of results

differed across conditions in the way we anticipated. Through this method, in combination with participant feedback, we piloted the experimental manipulations for Studies 1-2.

Results

Paired sample t-tests comparisons of the vignettes showed that the vignettes manipulated state gratitude and indebtedness in the direction anticipated for each condition (see Figure 4 for means across vignettes). Some vignettes performed better for gratitude, while others performed better for indebtedness. We determined these differences were most likely due to the varying cost/value of the gifts given across the vignettes. Therefore, to control for the differences in the cost across vignettes, a composite score of all four vignettes' responses was created for analysis. Interestingly, we could not isolate gratitude and indebtedness from each other (see figure 2), which provides compelling evidence for their co-occurring nature after receiving a benefit. Even when we manipulated the vignettes in such a way that we should have observed only gratitude or only indebtedness—they were always observed together at varying levels. We were, however, able to effectively manipulate levels of state gratitude and indebtedness across conditions in a meaningful way. We found evidence for this by conducting an ANOVA between subjects to compare gratitude across experimental conditions and then indebtedness. There was a significant effect of our vignettes on gratitude, $F(5, 459) = 17.85, p < .001$, and indebtedness, $F(5, 459) = 22.72, p < .001$ across conditions.

Figure 4

Experiment 1

Pre-registered Hypotheses

H1: GTG and ITG Synergism. People who experience a combination of gratitude to God (or humans) and indebtedness to God (or humans) will be higher on reciprocal prosocial behavior and proximity seeking than those who only experience one or the other of gratitude or indebtedness. In other words, the two in combination will have a more substantial impact on outcomes than each will separately.

H2: Moderating Factors. The magnitude of gratitude and indebtedness to God *and* humans that people experience will depend on the four factors outlined in Figure 1. This figure shows the four moderating factors and the expected patterns of effects.

H3: Diffuse Reciprocity. People who experience transcendent indebtedness to God will be more likely to engage in diffuse reciprocity than those who experience transcendent indebtedness to humans.

H4: Relationship Proximity. People who experience more gratitude (to God or humans) will show more relationship proximity to their benefactor after receiving a benefit than those who experience indebtedness (to God or humans).

H5: Emotional Valence. People who experience indebtedness (to God or humans) and not gratitude will feel more negative affect (e.g., resentment, annoyed). In contrast, those who experience gratitude *and* indebtedness will feel more positive affect (e.g., love, gladness).

Exploratory Hypotheses

H6: God Conditions. People in the God conditions (versus human conditions) will experience more gratitude, indebtedness, relationship proximity, positive affect, diffuse reciprocity (paying it forward), and less negative affect.

Participants

The sample for Experiment 1 consisted of psychology students attending Brigham Young University for reasons stated previously. Power analysis for a six group ANOVA based on a conservative estimate of effect size ($d = .20$; Buchtel et al., 2018; Peng et al., 2018) and 80% power, with significance criteria of $p < .05$, suggested a total $N = 501$ (calculated using G*Power 3.1 software). Nevertheless, we aimed for at least 600 participants to hit our target N sample size. Data collection began on March 24th, 2021, and ceased on December 17th, 2021, once we reached 600 participants and the semester ended (this decision was made based on the consideration of students using the SONA system because course credit from participation is often offered at the end of the semester). The actual sample size was $N = 659$, with around 108 participants in each condition (M age = 21, 61% female, 91% White, 1% Black, 2% Native American, 4% Asian, 1% Native American Hawaiian or Pacific Islander, and 5% Other [numbers do not add up to 100% because participants were allowed to check more than one option]). BYU students are highly

religious (99% are members of The Church of Jesus Christ of Latter-day Saints; 94% attend church weekly or more; 82% report having a life committed to God; 72% participate in private religious practices daily or more). The average participant's family income ranged from \$100,000 to-125,000. Twelve atheist and agnostic (and no belief in God) participants were excluded from the experiment due to the aims of the study to understand religious phenomena. Four participants under the age of 18 and 30 who completed less than 10% of the survey or spent less than a minute on the survey were not included in the dataset.

Procedure, Manipulations, Measures

Procedures, manipulations, and measures were the same as those in the pilot study, with the exceptions detailed here. The Institutional Review Board (IRB) at BYU granted approval for Experiments 1 & 2 (IRB# X2020-491, no IRB approval was necessary for pilot research). Participant consent was obtained before beginning the survey. The survey was identical to the pilot study presented above (albeit changes to the vignettes and cover story were made during the piloting process, the final versions are presented in the Appendix). In addition, based on pilot feedback, we asked participants if they felt rushed taking the survey (rated from 1 "not at all" to 3 "yes, a lot") as a control variable.

Analytic Strategy

All analyses were performed using Stata SE 16 statistical software. The analytic code that was used is available to view at the OSF. First, the data was prepared by cleaning the data according to the exclusion criteria, items were reverse coded as needed, and composite variables were created. After running frequencies and tests of normality, we discovered some outliers in the word length variable of prosocial behavior. The variable was Winzorized (fenced to the 95% interquartile range) to deal with the extreme outliers. Next, we obtained descriptive statistics.

The hypotheses were tested using either regression or MANOVA analyses. In cases where two models were tested, the different models allowed us to parse out individual differences (state responses) from situation differences (randomly assigned conditions) in outcomes. For example, we used state-level predictors in the first model to determine if individual reported state levels of gratitude and indebtedness predicted prosocial behavior. But to determine if conditions (where both gratitude and indebtedness were expected to be high) predicted more prosocial behavior than other conditions, we used a second model with conditions as the predictor. We repeated this method (testing individual and situation factors) for nearly all the hypotheses to ensure that participants passed the manipulation checks.

We performed multiple regression (one independent variable with multiple dependent variables) and multivariate regression (one or more dependent variables with multiple independent variables), and MANOVAs (multiple dependent continuous variables with a categorical dependent variable) using the Stata “manova” command that allows for multiple dependent and independent variables to be tested in one model and to obtain an overall significance test for the model. Second, if the significance test was significant, we used the “mvreg” command to obtain the significance tests for each dependent and independent variable (mvreg also allows for follow-up tests to correct for multiple comparisons). The MANOVA command allows for categorical or continuous independent and dependent variables to be included in the model by specifying the type of variable (.i before the variable if it’s categorical, .c before the variable if it’s continuous). For all the hypotheses, we used the same code and two-step process, but for simplicity in explanation, we will not repeat the details of the process. We will only report the results of both steps as a single regression analysis.

Hypothesis 1. Gratitude paired with transcendent indebtedness leads to the best prosocial outcomes. We ran two models to determine if gratitude paired with transcendent indebtedness predicts prosocial behavior. First, we ran a multivariate regression to test if state gratitude and state transcendent indebtedness predicted direct reciprocity, diffuse reciprocity, and relationship proximity. Second, we ran a MANOVA, using a categorical variable, the gratitude and indebtedness conditions, to predict direct reciprocity, diffuse reciprocity, and relationship proximity.

Hypothesis 2. The Four-Factor Framework predicts levels of gratitude and indebtedness after receiving a benefit. We ran two models to determine if the four factors predicted gratitude and indebtedness; 1) predicting with state responses, and 2) predicting with the randomly assigned condition. With the first model, we ran a multivariate regression using participant ratings of benefactor effort, beneficiary effort, and relationship proximity (variables from the four-factor framework) to predict state gratitude and indebtedness response to the vignettes. Second, we conducted a MANOVA to test whether the conditions predicted state gratitude and indebtedness responses. After reviewing the results of the two models, we ran follow-up analysis to determine which trait variables were influencing state levels of gratitude and indebtedness.

Hypothesis 3. Transcendent indebtedness to God leads to more diffuse reciprocity than transcendent indebtedness to humans. We ran two models to test whether transcendent indebtedness to God (vs. humans) leads to more diffuse or direct reciprocity; 1) predicting with state responses, and 2) predicting with randomly assigned conditions. First, we ran a multiple regression to determine if state transcendent indebtedness to God predicted more diffuse or direct

reciprocity. Second, we conducted a MANOVA predicting diffuse and direct reciprocity with transcendent indebtedness conditions (to God vs. humans).

Hypothesis 4. State gratitude responses to receiving a benefit will lead to more relationship proximity than indebtedness. We ran one model to test if state gratitude (vs. state indebtedness) leads to closer relationship proximity. To do this, we ran a multiple regression with relationship proximity as the dependent variable and state gratitude and state indebtedness as the independent variables.

Hypothesis 5. Transcendent gratitude and indebtedness will be associated with more positive affect and less negative affect. We ran two models to determine if transcendent gratitude and indebtedness predicted positive affect or negative affect (vs. gratitude only and indebtedness only); 1) predicting with state responses, and 2) predicting with randomly assigned conditions. First, we ran a multivariate regression with positive emotions (love, gladness) and negative emotions (resentment, annoyed) as dependent variables and a sum score of state gratitude and transcendent indebtedness as the independent variable. Second, we ran the next model with the same dependent variables but with gratitude and indebtedness conditions (conditions 3 and 6) as the independent variable.

Hypothesis 6. Gratitude and Indebtedness to God lead to better outcomes than gratitude and indebtedness to humans. Finally, we performed an exploratory analysis to answer one of the central research questions regarding the differences between gratitude and indebtedness to God and humans. This was tested by performing a MANOVA with state gratitude, state indebtedness, relationship proximity, positive affect, diffuse reciprocity (letter writing), direct reciprocity, negative affect as the dependent variables, and conditions as the independent variable.

Results

Means and descriptive statistics are provided in Tables 1 and 3. Correlations between variables are provided in Table 2 in the Appendix.

Table 1

Descriptive Statistics of Experiment Variables

	<i>N</i>	Mean	SD	min	max	kurtosis	skewness
Age	659	20.71	3.16	18	57	41.97	4.76
Income	652	8.45	3.7	1	14	2.13	-.09
Rushed during survey	569	3.38	.94	1	4	1.92	-.9
T-ITG	657	4.46	.66	1	5	6.85	-1.79
Empathy	657	4.12	.58	1.71	5	3.49	-.67
Gratitude	657	5.92	.7	3.5	7	3.46	-.84
Aversive indebtedness	657	3.6	1.02	1	6	2.55	.03
GTG	657	4.54	.54	1.6	5	6.77	-1.8
Secure attachment to God	579	5.76	1.04	1.67	7	4.15	-1.1
Letters	659	2.32	1.92	0	5	1.55	.22
Cond 1	659	.84	.37	0	1	4.3	-1.82
Cond 2	659	.83	.37	0	1	4.24	-1.8
Cond 3	659	.83	.37	0	1	4.19	-1.79
Cond 4	659	.84	.37	0	1	4.3	-1.82
Cond 5	659	.83	.37	0	1	4.24	-1.8
Cond 6	659	.84	.37	0	1	4.35	-1.83
Condition	651	3.49	1.7	1	6	1.74	0
State gratitude	654	4.44	.63	1.5	5	5.45	-1.45
State obligated indebted	654	3.25	1.11	1	5	2.19	-.27
State agentic indebted	654	3.77	.93	1	5	2.34	-.44
Direct reciprocity	654	3.94	.9	1	5.33	2.8	-.66
State happiness	654	4.14	.72	1.75	5	2.93	-.7
State love	654	3.78	1.02	1	5	2.68	-.69
State resentment	654	1.59	.61	1	4	3.57	1.03
State guilt	654	2.46	1.01	1	5	2.41	.46
State pride	654	2.28	1.01	1	5	2.9	.72
State annoyance	654	1.59	.68	1	4	3.83	1.18
State combined indebted	654	3.51	.91	1	5	2.47	-.33
Relationship proximity	654	4.05	.85	1	6	2.55	-.48
State humility	654	3.87	.91	1	5	2.92	-.68
State fortunate	576	4.35	.66	1	5	4.89	-1.23
State surprise	576	4.05	.8	1.5	5	3.23	-.84
State entitled	654	1.48	.68	1	4.75	6.65	1.87
Beneficiary effort	654	2.74	.94	1	5	2.15	.29
Benefactor effort	654	4.49	.61	1.75	6	4.22	-1.06
Letter word count	656	136.32	194.02	0	1840	26.29	3.97
Positive Affect	654	3.96	.81	1.38	5	2.73	-.62
State grateful and indebted	659	30.36	6.2	0	40	6.98	-1.28
Negative Affect	654	1.59	.59	1	3.88	3.72	1.09

Note. *N* = 659

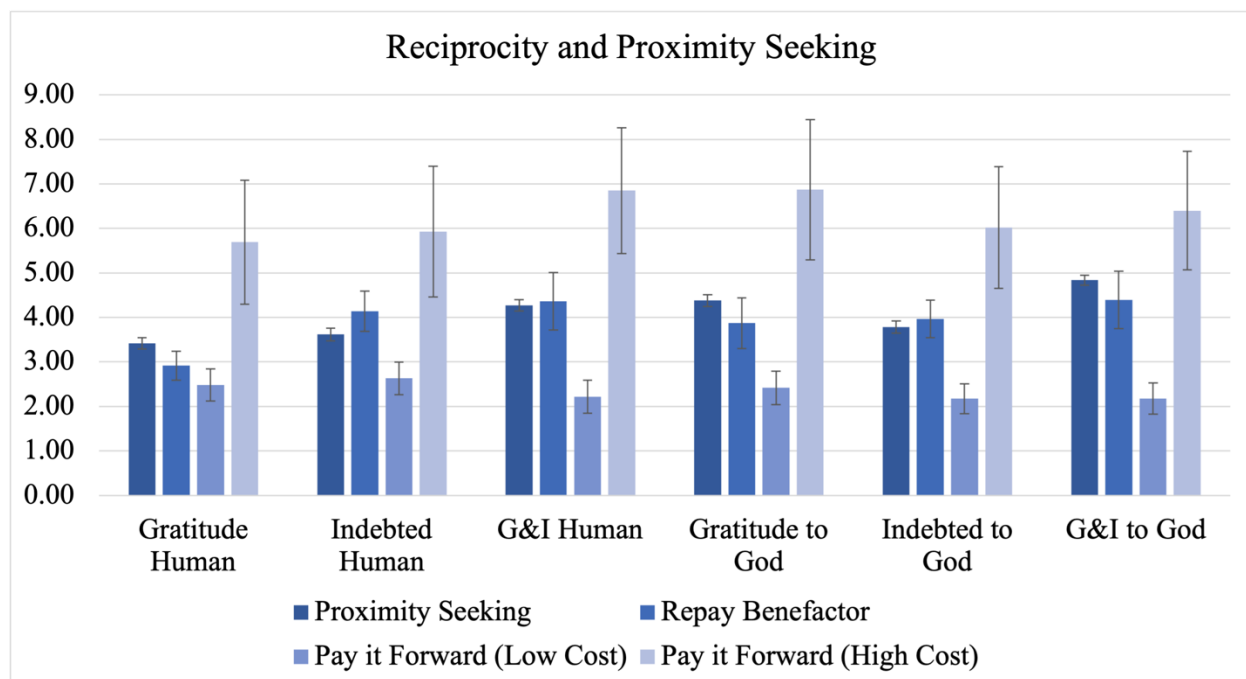
Hypothesis 1. Gratitude paired with transcendent indebtedness leads to the best

prosocial outcomes. To test this hypothesis, we ran two models; one using state responses of

gratitude and indebtedness to predict prosocial outcomes, and a second model using conditions (3 & 6) to predict prosocial outcomes. We found support for our hypothesis on the state level and partial support on the level of conditions. First, the multivariate regression revealed that the sum score of state gratitude (to God or humans) and state indebtedness (to God or humans) significantly predicted prosocial behavior (direct and diffuse reciprocity) and relationship proximity, $F(4, 647) = 260.84, p < .001$. State gratitude and indebtedness predicted 51% of the variance explaining direct reciprocity ($b = .11, p < .001$), 47% of the variance predicting relationship proximity ($b = .10, p < .001$), but only predicted 2% of the variance explaining diffuse reciprocity (letter writing) ($b = .05, p < .001$).

Second, we ran a MANOVA with gratitude and indebtedness conditions (3 & 6) predicting prosocial outcomes, $F(8, 1292) = 41.25, p < .001$ (see Figure 5). The results indicated that being in the gratitude and indebtedness conditions (3 & 6) accounted for 21% of the variance, explaining increased direct reciprocity, and 18% of the variance explaining increased relationship proximity with the benefactor. Gratitude and indebtedness conditions significantly predicted increased direct reciprocity (gratitude and indebtedness compared to indebtedness-only condition ($b = .32, p < .001$) and gratitude and indebtedness compared to gratitude-only condition ($b = .99, p < .001$)). Gratitude and indebtedness conditions also predicted increased relationship proximity (gratitude and indebtedness compared to indebtedness-only ($b = .84, p < .001$) and gratitude and indebtedness compared to gratitude-only ($b = .66, p < .001$)). However, gratitude and indebtedness conditions did not predict diffuse reciprocity.

Figure 5



Note. $N = 659$. MANOVA results for the model, $F(6, 1298) = 54.39, p < .001$.

Hypothesis 2. The Four-Factor Framework predicts levels of gratitude and indebtedness after receiving a benefit. The pilot study indicated that the vignettes successfully manipulated gratitude and indebtedness (to God or humans) in a pattern we anticipated across vignettes (see Figure 4) and conditions. However, we ran additional analyses to test this hypothesis more directly using the Experiment 1 sample. First, we ran two models, one with state predictors and one with condition as the predictor. Second, after observing that the condition effect sizes were small, we ran some follow-up analysis to determine which trait predictors influenced state gratitude and indebtedness levels.

First, we ran a multivariate regression to determine if participant ratings of benefactor effort, beneficiary effort, and relationship proximity predicted state gratitude and indebtedness responses $F(9, 1577) = 98.32, p < .001$. These predictors are moderators from the Four-Factor Framework, so we anticipated they would moderate levels of gratitude and indebtedness.

Multivariate regression showed that state gratitude was significantly related to benefactor effort ($b = .37, p < .001$), beneficiary effort ($b = .17, p < .001$), and relationship proximity ($b = .30, p < .001$). Further, state transcendent indebtedness was also significantly related to benefactor effort ($b = .34, p < .001$), beneficiary effort ($b = -.15, p < .001$), and relationship proximity ($b = .57, p < .001$). Finally, state obligated indebtedness was also significantly related to benefactor effort ($b = .49, p < .001$), beneficiary effort ($b = -.24, p < .001$), and relationship proximity ($b = .15, p < .01$).

Second, we ran a MANOVA with state gratitude and state indebtedness predicted by randomly assigned condition, $F(15, 1775) = 32.43, p < .001$ (see Figure 6). We used condition as an independent variable because the conditions were manipulated by making slight modifications to the vignettes using the Four-Factor Framework to tap into the moderators of gratitude and indebtedness. Therefore, we anticipated that the conditions would effectively manipulate gratitude and indebtedness in the direction specified by Figure 1. The results provided evidence to support our hypothesis. Randomly assigned conditions predicted 19% of the variance predicting gratitude, 26% predicting transcendent indebtedness, and 21% predicting obligated indebtedness.

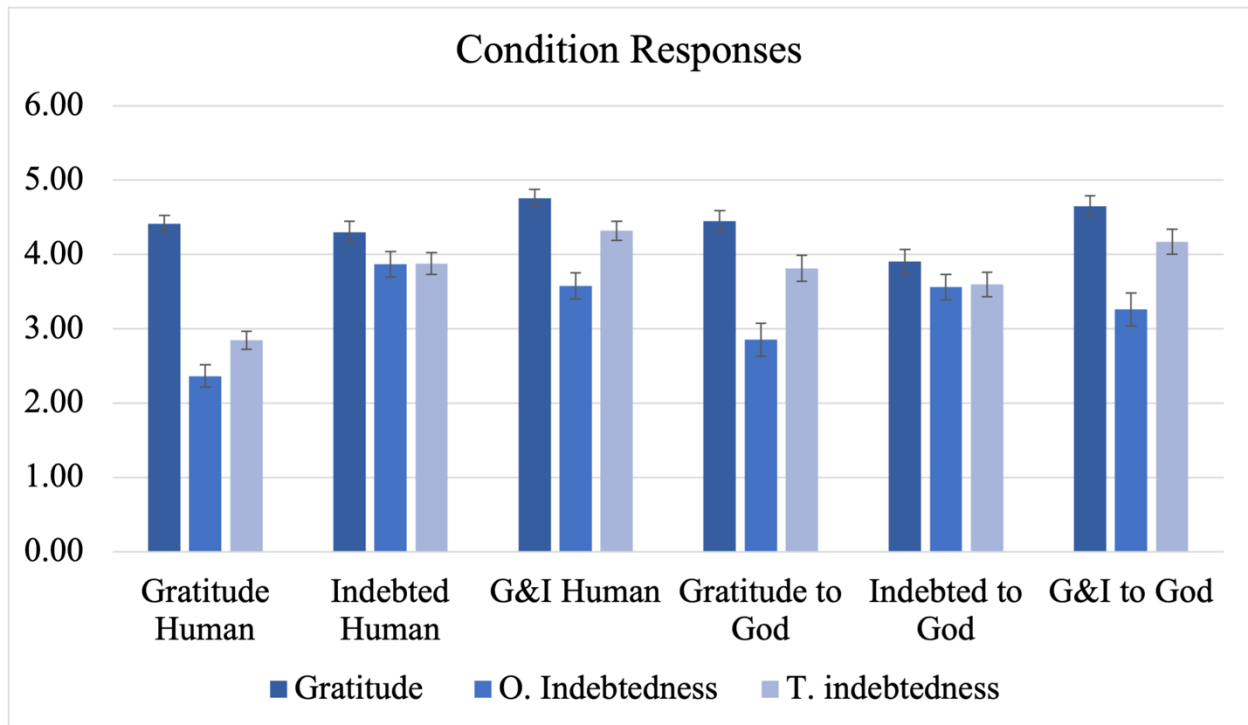
However, after observing that the condition effects only accounted for a small portion of the variance explaining gratitude and indebtedness, we ran a follow-up analysis to determine if the trait variables could account for more of the variance. To test this, we conducted a multivariate regression analysis predicting gratitude and indebtedness with assigned condition, controlling for demographics (sex, age, income) and trait variables (attachment to God, gratitude, empathy, gratitude to God, aversive interpersonal indebtedness, and transcendent indebtedness to

God). The analysis revealed that the follow-up model predicted 36% of state gratitude, 30% of state transcendent indebtedness, and 26% of obligated indebtedness.

Specifically, significant predictors of state gratitude were: trait transcendent indebtedness to God, trait gratitude to God, and randomly assigned conditions (see Table 4 for results).

Significant predictors of state transcendent indebtedness included: age, trait transcendent indebtedness to God, trait aversive interpersonal indebtedness, and randomly assigned conditions (see Table 4 for results). Significant predictors of state obligated indebtedness included: age, trait transcendent indebtedness to God, trait aversive interpersonal indebtedness, and randomly assigned condition (see Table 4 for results).

Figure 6



Note. $N = 659$

Table 2*Multivariate Regression Coefficients and 95% CI of Predictors of Gratitude and Indebtedness*

Variables	Gratitude		Transcendent Indebtedness		Obligated Indebtedness	
	B	[95% CI]	B	[95% CI]	B	[95% CI]
Demographics						
Sex (Male)	-.04	[-.13, .05]	-.06	[-.21, .08]	-.13	[-.31, .04]
Age	-.01	[-.02, .00]	-.03**	[-.06, -.01]	-.04*	[-.06, -.01]
Income	-.00	[-.01, .01]	.01	[-.01, .03]	.01	[-.01, .03]
Trait Measures						
Attachment	.03	[-.03, .09]	.05	[-.05, .14]	.02	[-.10, .14]
Gratitude	.04	[-.04, .12]	.07	[-.05, .20]	-.03	[-.10, .14]
Empathy	-.01	[-.09, .07]	.09	[-.04, .22]	-.05	[-.21, .10]
GTG	.18**	[.04, .31]	.06	[-.16, .28]	-.05	[-.32, .21]
A. Indebted	-.01	[-.05, .03]	.11**	[.04, .17]	.25***	[.17, .33]
T-ITG	.21***	[.11, .31]	.35***	[.19, .51]	.31**	[.12, .51]
G&I Conditions (3 & 6)						
vs. Indebted-only 2 & 5	-.61***	[-.71, -.50]	-.45***	[-.61, -.29]	.31**	[.11, .51]
vs. Grat-only 1 & 4	-.26***	[-.36, -.16]	-.89***	[-1.05, -.73]	-.76***	[-.96, -.57]

Note. *** = $p < .001$, ** = $p < .01$, * = $p < .05$. Coefficients are unstandardized. 95% Confidence intervals list lower limits first, then upper limits in brackets. Attachment = secure attachment to God, GTG = gratitude to God, A. Indebted = aversive interpersonal indebtedness, T-ITG = transcendent indebtedness to God, G&I = gratitude and indebtedness, Indebted-only = indebtedness-only, Grat-only = gratitude only.

Hypothesis 3. Transcendent indebtedness to God leads to more diffuse reciprocity than transcendent indebtedness to humans. We tested this hypothesis with two models, one using state transcendent indebtedness as a predictor, and the second, using the gratitude and indebtedness (to God) condition. We used the gratitude and indebtedness condition because it was hypothesized to be the highest on transcendent indebtedness (we found evidence to support this as well, see Figure 6). First, we ran a multivariate regression with state transcendent indebtedness predicting diffuse and direct reciprocity. The results revealed that state transcendent indebtedness to God predicted both types of reciprocity (direct, $b = .74, p < .001$ and diffuse, $b = .41, p < .001$), contrary to our hypothesis.

Second, we ran a MANOVA with the gratitude and indebtedness to God condition predicting reciprocity types. Contrary to our hypothesis, the results revealed that participants in the gratitude and indebtedness to God conditions (vs. human gratitude and indebtedness conditions) were no more likely to pay it forward versus directly repaying God.

Hypothesis 4. State gratitude responses to receiving a benefit will lead to more relationship proximity than indebtedness. To test this, we ran a multiple regression with gratitude and transcendent indebtedness predicting relationship proximity. The results of the multiple regression indicated that state gratitude (to God or humans) and state transcendent indebtedness (to God or humans) accounted for 51% of the variance in predicting relationship proximity ($F(2, 651) = 121.98, p < .001$). Unexpectedly, both state gratitude ($\beta = .38, p < .001$) and state transcendent indebtedness ($\beta = .44, p < .001$) were significant predictors of participants reporting greater relationship proximity with their benefactor, with transcendent indebtedness having a larger effect size.

Hypothesis 5. Transcendent gratitude and indebtedness will be associated with more positive affect and less negative affect. To test this hypothesis, we ran two models; one model predicting emotional responses with state gratitude and indebtedness (to God and humans) and another model using the gratitude and indebtedness conditions as the predictor. First, we ran a multivariate regression analysis with the sum score of state gratitude (to God and humans) and state indebtedness (to God or humans) predicting positive and negative affect, $F(2, 651) = 130.33, p < .001$). The results indicated that the sum score of state gratitude and indebtedness explained 28% of the variance predicting more positive affect ($b = .08, p < .001$) but only 7% of the variance explaining less negative affect; however, the relationship was significant ($b = -.03, p < .001$).

Second, we ran a MANOVA with gratitude and indebtedness (to God and humans) conditions predicting positive and negative affect, $F(4, 1300) = 92.85, p < .001$. Positive affect ($R^2 = .21$) and negative affect ($R^2 = .32$) were significantly different across conditions. See Table 3 for means across conditions. Specifically, participants in the indebtedness-only conditions (to God or humans) had less positive affect ($b = -.89, p < .001$) and more negative affect ($b = .73, p < .001$) than those in the gratitude and indebtedness conditions. Further, participants in the gratitude-only conditions had less positive affect ($b = -.26, p < .001$) but similar levels of negative affect ($b = .06, p < .001$) as the gratitude and indebtedness conditions.

As previously mentioned, for theoretical reasons, guilt was not included in the composite score of negative affect because guilt is considered a prosocial emotion. Interestingly, an exploratory follow-up one-way ANOVA revealed that guilt was the highest in the indebtedness-only conditions (versus gratitude and indebtedness conditions, $b = -.72, p < .001$; indebtedness-only versus gratitude-only conditions, $b = -1.42, p < .001$). This relationship between guilt and

conditions held true across God and human conditions. In both cases, guilt was highest in the indebtedness-only conditions. Further, a multiple regression predicting guilt with both types of state indebtedness ($R^2 = .22$) found that obligated indebtedness was related to more guilt ($b = .47$, $p < .001$). In comparison, transcendent indebtedness was related to *less* guilt ($b = -.10$, $p < .05$).

Table 3

Means, Standard Deviations, and 95% Confidence Intervals for Experiment Variables Across Conditions

Variable	Condition 1			Condition 2			Condition 3		
	<i>M</i>	<i>SD</i>	LL, UL	<i>M</i>	<i>SD</i>	LL, UL	<i>M</i>	<i>SD</i>	LL, UL
Gratitude	4.38	1.30	[4.29, 4.47]	4.26	1.56	[4.15, 4.37]	4.77	.78	[4.71, 4.83]
Indebtedness	2.60	1.56	[2.45, 2.73]	3.87	1.82	[3.73, 4.02]	3.95	1.82	[3.82, 4.08]
R. Proximity	3.42	1.56	[3.29, 3.54]	3.62	1.82	[3.48, 3.75]	4.27	1.82	[4.14, 4.40]
Direct R.	2.92	1.56	[2.79, 3.04]	4.14	1.56	[4.03, 4.25]	4.36	1.82	[4.23, 4.50]
Diffuse R.	2.48	4.94	[2.12, 2.85]	2.63	4.94	[2.27, 3.00]	2.22	4.94	[1.85, 2.59]
Pos. Affect	3.80	1.82	[3.67, 3.94]	3.17	1.82	[3.03, 3.31]	4.15	1.82	[4.02, 4.29]
Neg. Affect	1.39	1.30	[1.30, 1.48]	2.06	1.30	[1.96, 2.16]	1.37	1.04	[1.30, 1.22]

Note. $N = 659$

Table 3. Continued

Means, Standard Deviations, and 95% Confidence Intervals for Experiment Variables Across Conditions

Variable	Condition 4			Condition 5			Condition 6		
	<i>M</i>	<i>SD</i>	LL, UL	<i>M</i>	<i>SD</i>	LL, UL	<i>M</i>	<i>SD</i>	LL, UL
Gratitude	4.54	1.56	[4.42, 4.66]	3.96	1.82	[3.82, 4.10]	4.72	1.30	[4.62, 4.82]
Indebtedness	3.33	2.34	[3.16, 3.51]	3.58	1.82	[3.43, 3.73]	3.72	2.34	[3.55, 3.88]
R. Proximity	4.38	1.82	[4.24, 4.51]	3.79	1.82	[3.65, 3.92]	4.84	1.56	[4.73, 4.95]
Direct R.	3.87	2.34	[3.70, 4.04]	3.97	1.82	[3.84, 4.10]	4.39	2.34	[4.22, 4.56]
Diffuse R.	2.42	4.94	[2.04, 2.80]	2.17	4.42	[1.84, 2.51]	2.18	4.68	[1.82, 2.53]
Pos. Affect	4.36	1.56	[4.25, 4.47]	3.74	1.56	[3.62, 3.86]	4.54	1.56	[4.43, 4.65]
Neg. Affect	1.37	1.04	[1.29, 1.44]	2.05	1.56	[1.94, 2.17]	1.27	1.04	[1.18, 1.35]

Note. $N = 659$

Exploratory Analysis Hypotheses

Hypothesis 6. Gratitude and Indebtedness to God lead to better outcomes than gratitude and indebtedness to humans. To test the final hypothesis, we ran a MANOVA comparing gratitude and indebtedness conditions (God versus human) predicting outcomes, $F(6, 210) = 20.03$ $p < .001$). We found partial support for our hypothesis. Specifically, gratitude, indebtedness, negative affect, and diffuse reciprocity (letter writing) were not significantly different across conditions. However, relationship proximity ($b = .57, p < .001$) and positive affect ($b = .39, p < .001$) were significantly higher in the God conditions.

Experiment 2: Cloud Research Experiment

The purpose of Experiment 2 was to replicate Experiment 1 findings in a more diverse, nationally representative sample and investigate how gratitude and indebtedness relate to different types of prosocial behavior (letter writing and charitable donation). First, we will review what was replicated; then, we will report new findings.

Pre-registered Hypothesis: Experiment 1 Replication

Hypothesis 1 – 6. We hypothesize that our findings from Experiment 1 will be replicated in Experiment 2.

Exploratory Analysis Hypothesis

Hypothesis 7: Transcendent indebtedness will predict high-cost versus low-cost diffuse reciprocity. People who experience high levels of indebtedness will be more likely to perform a high-cost prosocial behavior than the low-cost prosocial behavior.

Participants

The sample was collected using Qualtrics Research Cloud Services. Based on preliminary power analysis and results from Experiment 1, our target N sample size was 600 participants.

The initial launch began on September 13, 2021. Data collection ceased once the sample reached 600 “good complete” participants as determined by Qualtrics data quality checks. However, due to sampling errors from the cloud services, the survey had to be reopened on February 23, 2022, to collect more participants to obtain a nationally representative sample in terms of gender and ethnicity. For this reason, we had a larger sample size than anticipated. The actual sample size was $N = 1081$, with around 170 participants in each condition ($M_{age}=44$, 52% female, 62% White, 12% Black, 2%, 17% Hispanic, 4% Asian, and 5% Other [numbers do not add up to 100% because participants were allowed to check more than one option]). The average participant’s income ranged from \$45,000 to-\$60,000. Participants under the age of 18 and those who identified as atheist or agnostic (with no belief in God) were excluded from the experiment per pre-registered exemption criteria.

Procedure, Manipulations, Measures

Procedures, manipulations, and measures were the same as those in the pilot study, with the exceptions detailed here. An online format was used for the reasons described previously and to replicate Experiment 1 procedures as closely as possible. Data collection, procedures, manipulations, and measures were the same as Experiment 1, with two exceptions, which we will detail here. First, participants were recruited using Qualtrics Cloud Research Services. Second, a new measure of prosocial behavior was added, which will be described next.

Prosocial behavior: Charitable donation. A charitable donation option was added to the survey. Participants were asked if they would be willing to donate a portion of their participation earnings to a pediatric hospital (on a scale from 0 to 100%). Including this measure in Experiment 1 was not feasible because participants were compensated with course credit. This measure allowed us to compare different types of prosocial behaviors (letter writing and

charitable donation). After the survey, participants were debriefed and given full compensation for their time, regardless of the amount of money they indicated they would donate.

Analytic Strategy

For Hypothesis 1-6, we followed the same analytic strategy to replicate Experiment 1 with Experiment 2 data. Hypothesis 7 was tested with multiple regression controlling for demographic variables (age, sex, income) and a variable to measure how rushed the participant was while taking the survey. Charitable donation was the dependent variable, and state gratitude and indebtedness were the independent variables. Another multiple regression was performed with the same variables but having the letter-writing activity as the dependent variable.

Results

Hypothesis 1. Gratitude paired with transcendent indebtedness leads to the best prosocial outcomes. The findings from Experiment 1 were replicated.

Hypothesis 2. The Four-Factor Framework predicts levels of gratitude and indebtedness after receiving a benefit. Hypothesis 2 was replicated with one exception. Beneficiary effort was not significantly related to state obligated indebtedness (whereas in Experiment 1, they were significantly negatively related).

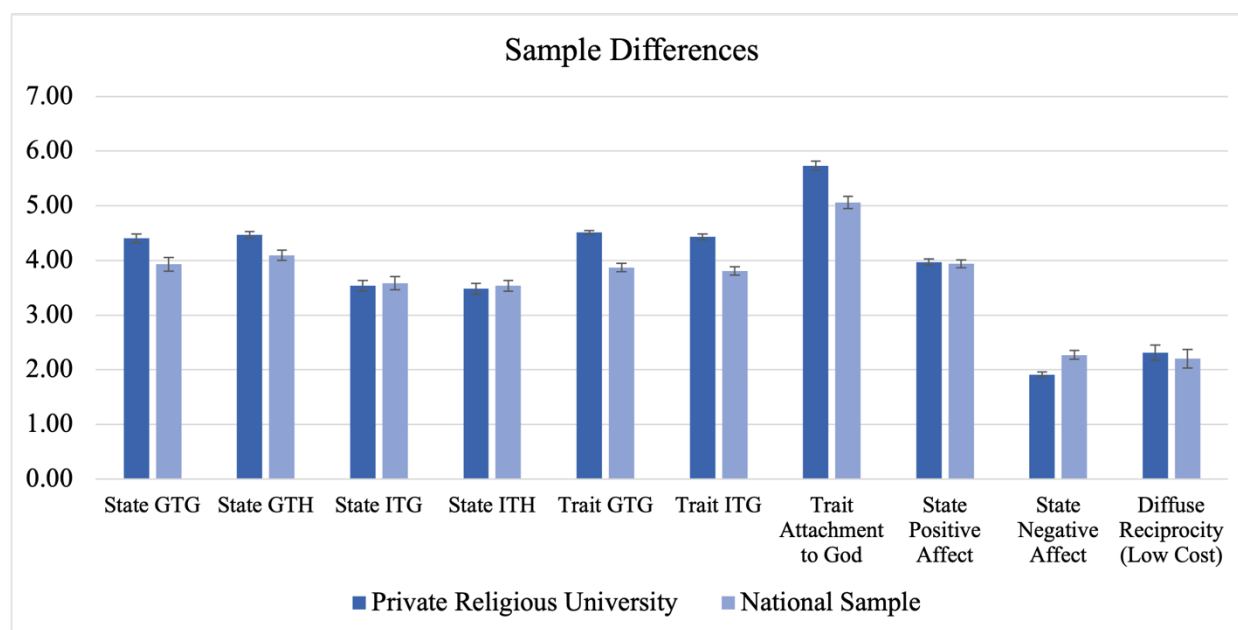
Hypothesis 3. Transcendent indebtedness to God leads to more diffuse reciprocity than transcendent indebtedness to humans. The findings from Experiment 1 were replicated.

Hypothesis 4. State gratitude responses to receiving a benefit will lead to more relationship proximity than indebtedness. The findings from Experiment 1 were replicated, with both predictors being significant; however, gratitude had the larger effect size (gratitude, $R^2 = 60$, indebtedness, $R^2 = 30$).

Hypothesis 5. Transcendent gratitude and indebtedness will be associated with more positive affect and less negative affect. Hypothesis 5 was partially replicated. Gratitude and transcendent indebtedness were significantly related to higher ratings of positive affect ($b = .08$, $p < .001$) but not negative affect. This finding can be explained by differences across samples in negative affect responses (see Figure 7). In addition, patterns varied across condition comparisons. Specifically, positive affect was similar across conditions in this sample, while the religious sample had significant differences across conditions.

Hypothesis 6. Gratitude and Indebtedness to God lead to better outcomes than gratitude and indebtedness to humans. Hypothesis 6 was not replicated. We ran some follow-up analyses to unpack the differences between samples and uncover why this occurred. First, we compared descriptive statistics of the main variables from the two samples (see Figure 7). Finding that the private religious school sample was significantly higher on state gratitude to God, trait gratitude and indebtedness to God, trait secure attachment to God—while being lower on negative state affect, warranted further analysis.

Figure 7



Of specific interest given the research questions was the finding that the religious sample was significantly higher on secure attachment to God, which could have influenced the results according to the Four-Factor Framework. To test this, we ran several follow-up moderation analyses to determine if high, moderate, or low secure attachment to God in the second sample moderated outcomes, which it did.

To compare samples for the moderation analyses, we combined the data from the two samples and then created a categorical sample variable (1= the religious sample, 0 = the national sample). Next, we ran a regression analysis predicting state gratitude levels with attachment to God and the sample as the moderator. The model accounted for 30% of the variance predicting gratitude ($F(3, 1372) = 55.33, p < .001$), with significant main effects for attachment ($b = .25, p < .001$) and sample ($b = -.85, p < .001$) on gratitude. The interaction effect of being in the highly religious sample and secure attachment was significant ($b = .12, p < .01$) (see Figure 8).

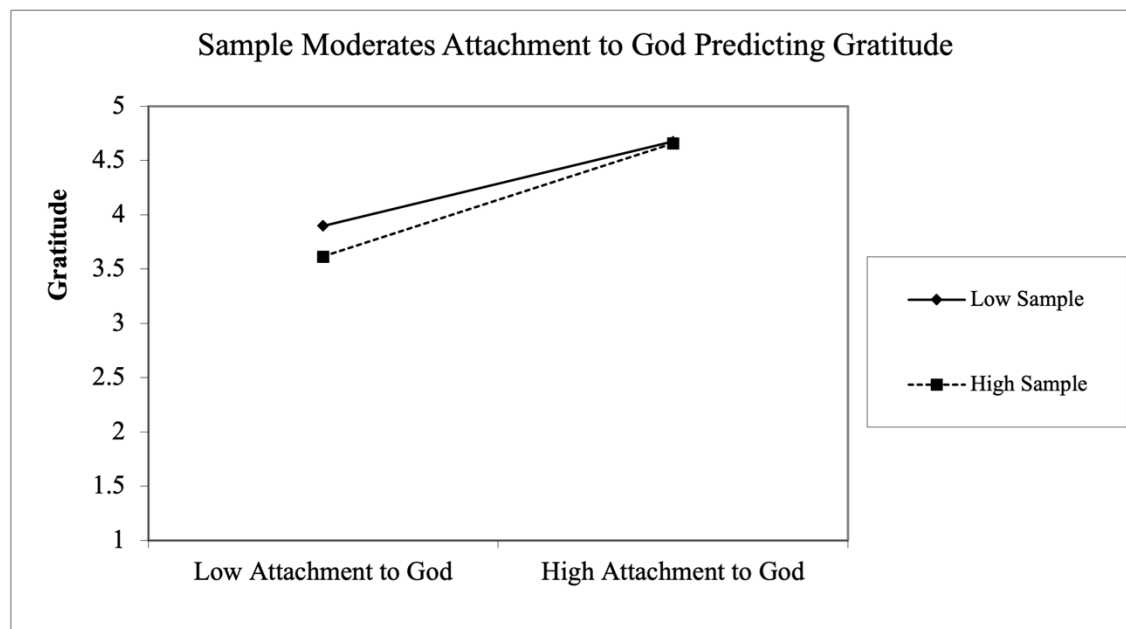
Next, to test whether secure attachment to God in the second sample could have affected findings from Hypothesis 6, we ran a moderation analysis using only the data from the second sample. We ran three moderation analyses to determine if attachment to God moderated the effects of being in the God conditions. First, we ran a moderation analysis predicting gratitude with God condition, moderated by attachment to God levels. Second, we performed a moderation analysis predicting relationship proximity with the same independent variables. Third, we performed another moderation analysis, predicting positive affect with the same independent variables.

First, we tested whether high secure attachment moderated the association between gratitude and being in the God conditions, $R^2 = .26, F(3, 695) = 81.28, p < .001$. An interaction effect was found with high versus low secure attachment levels and state gratitude ($b = .55, p <$

.001) (see Figure 9). Second, we tested whether secure attachment moderated the association between relationship proximity and being in a God conditions $R^2 = .29$, $F(5, 700) = 56.50$ $p < .001$. An interaction effect was found between low and high attachment to God and being in a God condition ($b = .73$, $p < .001$) (see Figure 10). Last, we tested whether attachment level moderated the relationship between being in the God conditions and positive affect, $R^2 = .27$, $F(5, 695) = 50.48$, $p < .001$. There was an interaction between moderate versus low secure attachment and God conditions ($b = .84$, $p < .001$) (see Figure 11) predicating positive affect.

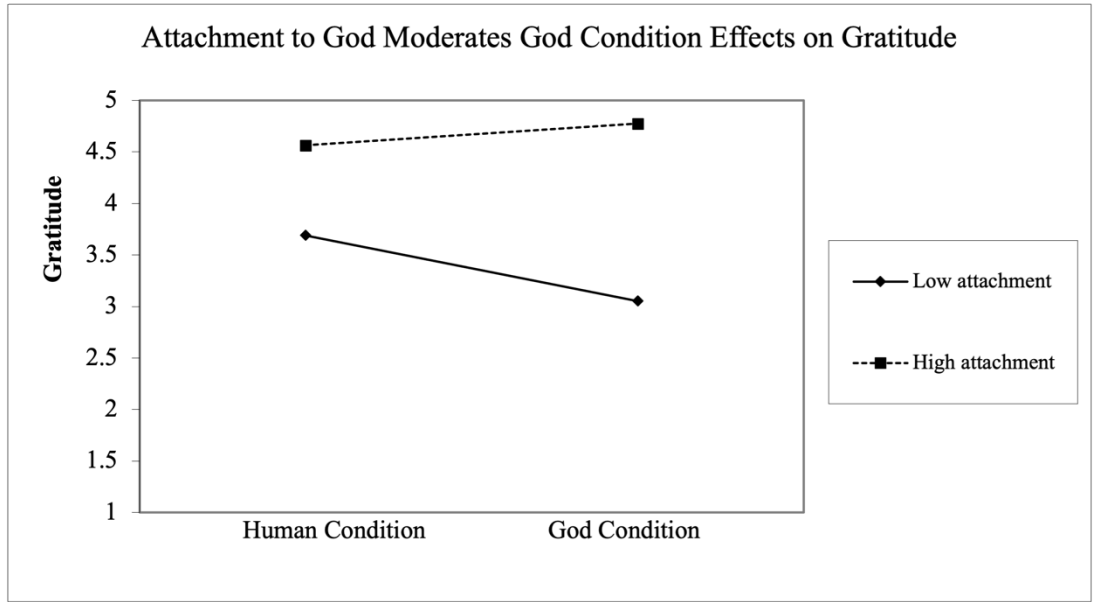
These follow-up analyses suggest that emotional and relational outcomes are moderated by high levels of secure attachment to God, a pattern we would expect to see given that relationship quality is one of the predictors in the Four-Factor framework.

Figure 8



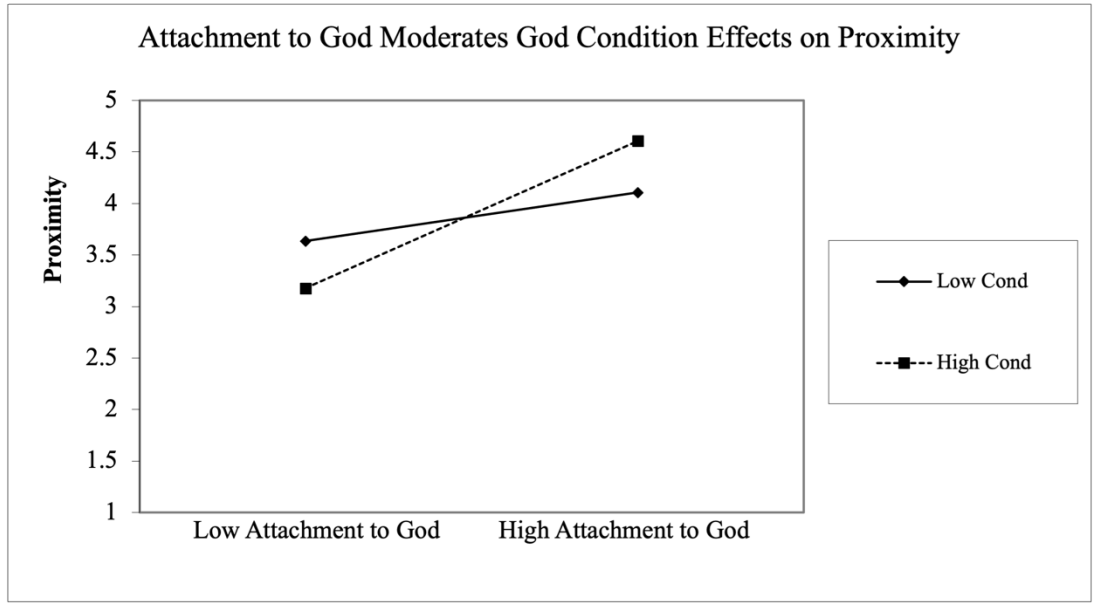
Note. $N = 1298$. $R^2 = .30$, $F(3, 1294) = 108.19$, $p < .001$. Low sample indicates national sample, high sample indicates private religious university sample.

Figure 9



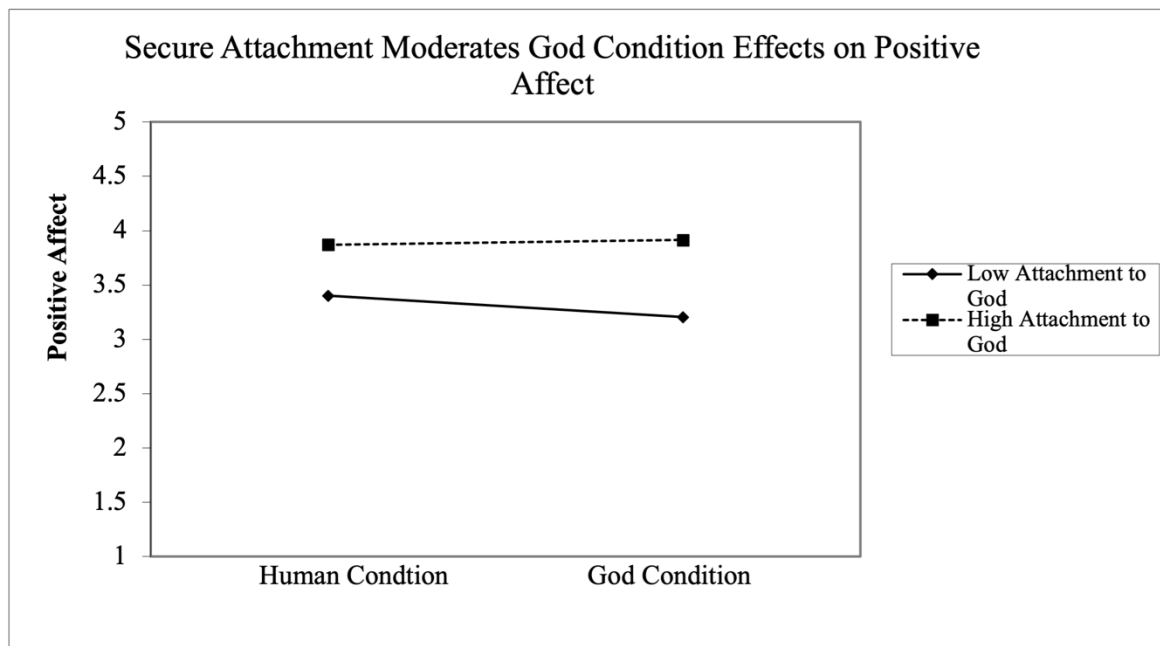
Note. $N = 1081$, Nationally representative sample. $R^2 = .26$, $F(3, 1075) = 114.23$, $p < .001$.

Figure 10



Note. $N = 1081$, Nationally representative sample. $R^2 = .24$, $F(3, 1036) = 109.65$ $p < .001$.a

Figure 11



Note. $N = 1081$. $R^2 = .27$, $F(5, 695) = 50.48$, $p < .001$. Low God condition indicates high sample indicates private religious university sample.

Hypothesis 7: Transcendent indebtedness will predict high-cost versus low-cost diffuse reciprocity. To determine whether transcendent indebtedness predicts high-cost versus low-cost diffuse reciprocity, we ran two multiple regressions controlling for demographic variables (age, sex, income), a variable to measure how rushed the participant was while taking the survey, and state gratitude. The first model predicted high-cost diffuse reciprocity with transcendent indebtedness, while the second model predicted low-cost diffuse reciprocity with transcendent indebtedness. The results from the first multiple regression demonstrated that the model was significant ($R^2 = .13$, $F(8, 583) = 11.67$, $p < .001$). State transcendent indebtedness ($b = 7.11$, $p < .001$), age ($b = -.29$, $p < .01$), and being rushed during the survey ($b = 33.97$, $p < .001$), were significant predictors of charitable donations.

The second model predicting low-cost diffuse reciprocity with transcendent indebtedness was also significant ($R^2 = .17$, $F(8, 615) = 16.11$, $p < .001$). Specifically, state gratitude ($b = .49$,

$p < .001$), sex (male, $b = -.62$, $p < .05$), and being rushed during the survey ($b = -2.27$, $p < .001$), were significant predictors of writing letters. Further, a follow-up MANOVA revealed that participant sum scores of state gratitude and indebtedness significantly predicted both types of charitable giving (letter $R^2 = .15$, money $R^2 = .11$, $F(12, 1168) = 13.75$, $p < .001$).

Discussion

Cooperative interpersonal interactions build and bind society (Lawler & Thye, 2009). Social and behavioral scientists have credited gratitude as the moral mechanism that explains reciprocal altruism (Algoe, 2012; Bartlett & DeSteno, 2006), a claim that may need more empirical evidence (Ma et al., 2017; Peng et al., 2018). While the link between gratitude and prosocial behaviors may need more empirical scrutiny, the individual benefits of gratitude are not disputed—with abundant research linking gratitude to positive well-being (Boggiss et al., 2020; Ginty et al., 2020; Wong et al., 2018), popularizing the use of intentional gratitude practices in positive psychology and pop culture over the past 20 years. However, despite the rise of intentional gratitude practices, the ephemeral nature of gratitude interventions (Cregg & Cheavens, 2020; Wood et al., 2010), coupled with the generational increase in shallow gratitude (Baumeister & Ilko, 1995; Nelson et al., 2022) and narcissism (Twenge & Foster, 2010), cast doubt that cultivating the emotion of gratitude alone leads to more prosocial behaviors and virtue development.

Virtue and gratitude scholars have long advocated for a portrait of gratitude that transcends episodic gratitude and includes moral action (Emmons, 2016; Emmons & McCullough, 2004; Tudge et al., 2015). But if even the brightest flicker of gratitude isn't enough to create coals of moral action or produce moral character—what is missing? One possible answer is beginning to emerge from decades worth of gratitude research. Gathering these hints, we hypothesized that the link between feeling gratitude and expressing gratitude is transcendent

indebtedness—an undervalued moral mechanism of reciprocal altruism (Ma et al., 2017; Nelson et al., 2022). Pioneering work on transcendent indebtedness to God as positive and paradigmatic pivoted the field away from a negative bias towards indebtedness, prompting researchers to explore the positive social and psychological functions of transcendent indebtedness (Nelson et al., 2022). This new vision and valuation of indebtedness allowed us also to hypothesize that pairing gratitude with transcendent indebtedness would magnify emotional, relational, and prosocial reciprocity. In addition, we hypothesized that acknowledging God as a salient and active benefactor in the lives of believers has the potential to bridge shallow gratitude with transcendent gratitude and indebtedness, opening a viable path of self-transcendence and prosocial behavior.

The findings from this experimental work are the first to find empirical support for these hypotheses—specifically, that the synergistic relationship of gratitude and transcendent indebtedness has a causal effect on outcomes. First, we found evidence that different levels of gratitude and indebtedness led to behaviorally distinct types of gratitude and indebtedness. Specifically, individuals prompted to experience both gratitude and indebtedness had better relationship and prosocial outcomes than those who primarily experienced gratitude or indebtedness. Second, we could successfully predict state gratitude and indebtedness responses with the Four-Factor Framework. Third, we found that gratitude and indebtedness to God did not significantly increase the likelihood of diffuse reciprocity over direct reciprocity to the benefactor. Fourth, we found that both gratitude and indebtedness predicted enhanced relationship proximity to the benefactor after receiving a gift. Fifth, we found supporting evidence that gratitude and transcendent indebtedness are associated with more positive affect and less negative affect than transient gratitude and aversive indebtedness, thus providing more

evidence that transcendent indebtedness is emotionally distinctive from aversive indebtedness and transient gratitude. Last, we did not replicate our findings from exploratory Hypothesis 6 in the nationally representative sample, that relational and emotional outcomes would be better in the God conditions. Follow-up moderation analyses provided evidence that these observed differences in results could be attributed to higher levels of secure attachment to God in sample 1. This relationship merits further exploration. Overall, these experiments provide valuable insights into gratitude as a moral emotion and transcendent indebtedness as a moral mechanism.

Interpersonal Gratitude Comes With Indebtedness

Our pilot work and hypothesis testing demonstrated that we could successfully manipulate state gratitude and indebtedness to God and humans in the directions we anticipated. Interestingly, we found gratitude and indebtedness to be inseparable, a finding that conflicts with prior work suggesting a division between these constructs (Mathews & Green, 2010; P. Watkins et al., 2006). Nevertheless, other researchers have also found gratitude and indebtedness to be co-occurring (Oishi et al., 2019). These experimental results are compelling evidence that gratitude and indebtedness are inseparable in social exchange. In other words, interpersonal gratitude is likely to involve at least some levels of indebtedness. Therefore, we speculate that the effects of interpersonal gratitude interventions are likely to be attributable to mechanisms associated with both gratitude and indebtedness, and future work should attend to these distinctions.

Varieties of Gratitude and Indebtedness

We were able to create conditions where (1) gratitude was high, and indebtedness was low (*transient gratitude* “gratitude-only,” conditions 1 and 4), (2) indebtedness was high, and gratitude was low (*transactional indebtedness* “indebtedness-only” conditions 2 and 5), and (3) where both gratitude and indebtedness were high (*gratitude and transcendent indebtedness*

“gratitude and indebtedness” conditions 3 & 6). These variations in gratitude and indebtedness levels did lead to distinctive conditions and state-level responses, which led to significantly different behavioral, emotional, and relational outcomes. This provides evidence that gratitude and indebtedness (to God and humans) are co-occurring, multidimensional, and dynamic constructs. Most interestingly, we distinguished obligated indebtedness (more common in transactional indebtedness) from agentic indebtedness (more common in transcendent indebtedness). These results reinforce prior findings that , “shoulds” can be perceived as “wants” (Janoff-Bulman & Leggatt, 2002, p. 261; Kong & Belkin, 2019). This agentic orientation towards responsibilities may be especially common in individualistic societies (Buchtel et al., 2018). These findings have profound implications for motivating prosocial behaviors cross-culturally.

Outcomes of Transcendent Gratitude and Indebtedness

Emotional and relational outcomes were the most positive when participants felt high levels of both gratitude and transcendent indebtedness. Specifically, we found that positive affect, relationship proximity, direct reciprocity (pay it back), and diffuse reciprocity (pay it forward) were significantly higher for those experiencing gratitude and transcendent indebtedness. This is a finding supported by previous work (Nelson et al., 2022). Further, we found higher negative affect in indebtedness-only conditions, replicating what prior studies have found when examining transactional types of indebtedness (Algoe et al., 2008; Greenberg & Shapiro, 1971; Watkins et al., 2006). Even effects traditionally attributed to gratitude (relationship proximity) and not indebtedness were associated with the virtue pair.

Interestingly, when participants were given the option to either write a letter (low-cost prosocial behavior because they were getting compensated for their time) or donate a percentage

of their earnings (high-cost prosocial behavior), people who reported feeling more transcendent indebtedness were more likely to choose the high-cost donation option. People who reported more gratitude were more likely to select the low-cost activity. This finding demonstrates that gratitude and indebtedness may motivate different types of prosocial tasks. However, a composite score of both gratitude and indebtedness predicted both types of charitable giving, suggesting people high on both gratitude and indebtedness are equally motivated to perform both types of altruism. Overall, we found substantial evidence that state gratitude paired with transcendent indebtedness may be the best scenario for promoting positive outcomes. Taken together, gratitude and transcendent indebtedness harmonize to promote reciprocity, prosocial behaviors, enhanced relationships, and higher reports of emotional well-being.

When the Benefactor is God

Gratitude and indebtedness to God seem to have similar cognitive and emotional appraisals as interpersonal indebtedness—with one remarkable exception. The emotional and prosocial benefits of gratitude and indebtedness to God are magnified in highly religious individuals, which aligns with prior research (Rosmarin et al., 2011). Moderation analyses provided evidence that relational and emotional outcomes are enhanced by interventions involving God as a benefactor. These findings should be tested in a longitudinal intervention to see if these differences have a lasting effect on outcomes.

Limitations

There are several limitations to consider when interpreting the findings of this project. First, despite replicating our results in a diverse, representative sample, our samples were from the United States. Consideration of this should be taken into account when trying to generalize to populations from different cultures and geographical regions because prior work has

demonstrated cultural variations in gratitude and indebtedness (Naito & Sakata, 2010; Oishi et al., 2019; Shiraki & Igarashi, 2016; Washizu & Naito, 2015). Second, while our measure of prosocial behavior was a behavioral measure, our other outcome variables were self-report measures which have well-known limitations such as social desirability bias. Third, the measurement of state emotions was thin. Other measures such as PANAS (Watson et al., 1988) have used this single-item structure before with considerable success. Nevertheless, future research should incorporate deeper measures of state emotions (such as humility or love) to determine how they relate to receiving a benefit. Fourth, using panel workers for participants poses some threats to the generalizability of our findings regarding gratitude and indebtedness and donation preferences. Getting paid to do the prosocial letter-writing activity (while it was still optional) poses confounds that should be considered; therefore, we caution over-generalizing these findings. However, the prosocial money donation measure has fewer potential confounds as participants believed their compensation would actually be deducted and, therefore, may be a more robust measure of prosocial behavior. All points considered, the goal of the present work was to gather general-level knowledge about gratitude and indebtedness to God and humans—creating a springboard for future research which can address these limitations and replicate and extend these findings.

Conclusion

Gratitude and indebtedness are prosocial mechanisms that build and bind relationships by promoting relationship proximity (building) and reciprocity (binding). Despite the significant social implications of these mechanisms, researchers are only beginning to understand the dynamic relationship between gratitude and indebtedness and the relational and emotional consequences of various levels of these attributions. Therefore, the purpose of the present work

was to explore the relationship between gratitude and indebtedness (to God and humans), compare the differences between gratitude and indebtedness to God versus humans, and determine the relational and emotional consequences of different types of gratitude and indebtedness.

Implications and Future Research

The results of these two experiments have important implications for research, theory, and practice. First, these findings should be considered when researching gratitude. Experimental manipulation of levels of gratitude and indebtedness allowed us to observe that there are different varieties of gratitude and indebtedness and that they relate differently to emotional and relational outcomes. These results indicate that gratitude and indebtedness are not inherently good or bad, as interpersonal empirical research has leaned in the past (Algoe et al., 2008; Greenberg & Shapiro, 1971; Watkins et al., 2006). Distinguishing obligated indebtedness (have to repay) from transcendent indebtedness (want to repay) is vital for researchers to move past negative models of indebtedness and begin to understand the important positive social functions and contributions of indebtedness in cooperative relationships. Therefore, we suggest moving past dichotomized models of gratitude and indebtedness, acknowledging the varieties of gratitude and indebtedness, and improving the measurement accuracy of both social constructs. As other researchers have urged, improving the measurement accuracy of gratitude and indebtedness is imperative to understanding the variance explained by indebtedness when studying the effects and predictors of gratitude (P. Watkins et al., 2006). Lastly, our findings suggest that while gratitude and indebtedness need to be differentiated, they can't be disassociated in interpersonal relationships and social exchange.

Second, these findings shed theoretical light on the nuanced nature of gratitude. Our findings suggest that acquiring the virtue of gratitude and indebtedness requires a process similar to those suggested by researchers of character development, (1) maintaining the right amount (i.e., Goldilocks principle or Aristotelian mean), (2) having the right contexts (e.g., being balanced by virtue pairing, and (3) be appropriately applied to circumstances (i.e., Aristotelian phronesis) (Lerner, 2019). We also add that reductionist models of virtue development might be particularly problematic because virtues and moral emotions are likely to co-develop and form constellations along axes associated with different dimensions of morality (e.g., helping; Gray & Wegner, 2011).

These findings harmonize well with other research findings that incorporate nuanced psychological models of virtue. Examples of these include new perspectives on “the double-edged sword of loyalty” (Berry et al., 2021, p.1) and when courage is bad in the case of self-harm (Pury et al., 2015). Other examples of nuanced models of virtues include finding the balance between perseverance and flexibility (Pan & Yu, 2018), stillness and productivity (Treanor, 2007), and generality and specificity (Schunn & Anderson, 1999). Future research on gratitude and indebtedness (or any social mechanisms) should incorporate more nuanced models. Specifically, these nuanced models should (1) create theoretical room for varieties of virtue to exist and (2) seek to understand the complex phenomenology of virtues embedded in contexts (co-existing and interacting with other virtues and values). Virtue pairing is an exciting area of new research for social and developmental psychologists interested in the development and structure of character and virtue.

Finally, these findings have many implications for practical applications. First, understanding and cultivating the moral virtue of gratitude (transcendent gratitude) requires

serious consideration of indebtedness. Improving measurement accuracy will move the field forward in creating more effective gratitude interventions and allow researchers to understand the unique roles that gratitude and indebtedness play in intervention effects. Gratitude and indebtedness seem similar to other virtues that are enhanced with virtue pairing, such as courage and patience (Cazzell et al., 2022) and love and loyalty (Wong & Wong, 2018). These experimental findings suggest that interpersonal gratitude and indebtedness are not only synergistic but are inseparable when situated in interpersonal relationships.

Clinicians interested in incorporating the positive benefits of transcendent indebtedness into interventions can do so by incorporating the facets of the Four-Factor Framework. First, have a relational component in your gratitude practices. Propositional materialistic gratitude lists (grateful for things) often do not include a benefactor, and if so, they will not inspire transcendent indebtedness. Second, acknowledge your interdependence on others. Take notice of the role, effort, and sacrifice that others have put into helping you attain the good things in life instead of focusing on how much you have done to deserve or earn them. Third, assign good intent to others who do good things for you. Do not assume that their motives for helping or giving you a gift are ulterior. Fourth, reframe obligations to reciprocate as freely accepted invitations. Obligated indebtedness (have to repay) is associated with more guilt and less prosocial giving. Agentic, transcendent indebtedness (desire to repay) reaps positive relational and emotional outcomes. Last, indebtedness is the most transcendent when you focus on repayment as an expression or token of gratitude rather than balancing a scorecard.

In conclusion, the findings from this multi-experiment study expand current models of reciprocity in relationships and prosocial behavior that positions gratitude as the central or lone figure. Instead, we present evidence for transcendent indebtedness as a misunderstood and

undervalued player in prosocial interactions. Including God as a benefactor was also novel—providing cues that interpersonal and divine gratitude may have similar cognitive structures and appraisals. Also valuable is the insight that gratitude and indebtedness to God are not only paradigmatic but a transcendent experience beyond interpersonal gratitude and indebtedness for the religiously devout. We anticipate that these findings will allow researchers and clinicians to more effectively connect with the phenomenological varieties of gratitude and indebtedness—and tap into the prosocial mechanism of transcendent indebtedness to enhance relationships, emotional well-being, and gratitude to God and humans.

Appendix A

Differences Across Conditions: An Example Vignette

Condition 1: Gratitude to Humans Only

*Below you will see a story about finding employment. Please try to put yourself in the situation and imagine how you would respond. Please read the story very carefully.

You have recently found yourself unemployed and are desperate to find a job. Your financial situation forced you to move back in with your parents. In order to find employment, you have been working hard to refine your resume and have been applying for many jobs. You have been searching for a job for over 3 months and can't wait to get back out on your own. You worry that you'll never find a job in the current economy, but you continue to apply for positions. You discover an especially exciting job prospect, but it requires that you get a letter of recommendation from an old employer. You are a promising candidate for the job, you meet all the requirements, and your work experience is a perfect match for the job. You reach out to your old employer and send them a pre-written letter of recommendation so that all they have to do is sign. The previous employer agrees and sends the letter to the new employer. Your interview for the job goes extremely well, and they even say that they wanted to hire you when they received your resume. They offer you the position on the spot. You know that all your hard work finding a job has paid off.

*How much do you think your efforts helped you get the job?
(1, "not very much" to 5, "very much")

How much do you think your previous employer helped you get the job?
(1, "not very much" to 5, "very much")

How likely would you be to try to repay your previous employer?
(1, "not very much" to 5, "very much")

How much closer would you feel to your previous employer after getting their help?
(1, "not very much" to 5, "very much")

Of the responses listed below, which did you experience while imagining the story? Please indicate the intensity of your response.
(1, "not very much" to 5, "very much")

Grateful
Indebted (obligated to repay)
Indebted (desire to repay)
Resentful
Glad
Proud
Guilty
Irritated/annoyed
Love
Apathy
Entitled
Humbled
Fortunate
Surprised

*For brevity, the instructions and response questions for the other conditions will not be provided here in the appendix.

Condition 2: Indebted to Humans Only

You have recently found yourself unemployed and are desperate to find a job. Your financial situation forced you to move back in with your parents. In order to find employment you have been working hard to refine your resume and have been applying for many jobs. You have been searching for a job for over 3 months and can't wait to get back out on your own. You worry that you'll never find a job in the current economy, but you continue to apply for positions. You discover an especially exciting job prospect, but it requires that you get a letter of recommendation from an old employer. You are not a promising candidate for the job, you don't meet all the requirements, and your work experience is not a perfect match for the job. You reach out to your old employer and ask him to write a letter of recommendation for you. After not hearing from him for several days, he finally gets back to you. He informs you that he is extremely busy, but he agrees to send a letter of recommendation despite the great imposition—on the condition that you will owe him a favor in return. Your interview for the job does not go well, but they say that the letter of recommendation was so complimentary that they offer you the job on the spot. You know you would not have gotten the job without your employer's letter of recommendation.

Condition 3: Gratitude and Indebtedness to Humans

You have recently found yourself unemployed and are desperate to find a job. Your financial situation forced you to have to move back in with your parents. In order to find employment you have been working hard to refine your resume and have been applying for many jobs. You have been searching for a job for over 3 months and can't wait to get back out on your own. You worry that you'll never find a job in the current economy but you continue to apply for positions. You discover an especially exciting job prospect but it requires that you get a letter of recommendation from an old employer. You are not a promising candidate for the job, you don't meet all the requirements, and your work experience is not a perfect match for the job. You reach out to an old employer and ask him to write a letter of recommendation for you. He informs you that he is extremely busy but gladly agrees to send a letter to the new employer, despite the great imposition. Your interview for the job does not go well, but they say that the letter of recommendation was so complimentary that they offer you the job on the spot. You know you would not have gotten the job without your previous employer's letter of recommendation.

Condition 4: Gratitude to God Only

You have recently found yourself unemployed and are desperate to find a job. Your financial situation forced you to move back in with your parents. In order to find employment you have been working hard to refine your resume and have been applying for many jobs. You have been searching for a job for over 3 months and can't wait to get back out on your own. You worry that you'll never find a job in the current economy, but you continue to apply for positions. You discover an especially exciting job prospect. You are a promising candidate for the job, you meet all the requirements, and your work experience is a perfect match for the job. You decide to pray and ask God to help you get the position. Your interview for the job goes extremely well, they even say that they wanted to hire you when they received your resume. They offer you the position on the spot. You know that all your hard work finding a job has paid off.

Condition 5: Indebtedness to God Only

You have recently found yourself unemployed and desperate to find a job. Your financial situation forced you to move back in with your parents. In order to find employment you have been working hard to refine your resume and have been applying for many jobs. You have been searching for a job for over 3 months and can't wait to get back out on your own. You worry that you'll never find a job in the current economy, but you continue to apply for positions. You discover an especially exciting job prospect. You are not a promising candidate for the job, you don't meet all the requirements, and your work experience is not a perfect match for the job. You decide to pray and ask God to help you get the position. You feel like God rarely answers your prayers, so this time you bargain with God that if he helps you get this job you will start going back to church. Your interview for the job does not go well, but they say that for some reason they feel like you should get the job and that they offer you the job on the spot. You know you would not have gotten the job without God's intervention but now you feel like you have to keep your end of the bargain.

Condition 6: Gratitude and Indebtedness to God

You have recently found yourself unemployed and are desperate to find a job. Your financial situation forced you to move back in with your parents. In order to find employment you have been working hard to refine your resume and have been applying for many jobs. You have been searching for a job for over 3 months and can't wait to get back out on your own. You worry that you'll never find a job in the current economy, but you continue to apply for positions. You discover an especially exciting job prospect. You are not a promising candidate for the job, you don't meet all the requirements, and your work experience is not a perfect match for the job. You decide to pray and ask God to help you get the position. Your interview for the job does not go well, but they say that for some reason they feel like you should get the job and they offer you the job on the spot. You know you would not have gotten the job without God's intervention.

Appendix B

Table 2.
Correlations of Experiment Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(1) Age	1													
(2) Income	-0.18*	1												
(3) Sex	0.17*	0.04	1											
(4) Attach	0.00	0.01	-0.05	1										
(5) Empathy	-0.04	-0.05	-0.30*	0.28*	1									
(6) Avers. Ind.	-0.01	-0.09*	-0.07	-0.14*	0	1								
(7) Gratitude	0.00	0.07	-0.05	0.51*	0.30*	-0.18*	1							
(8) GTG	-0.02	0.00	-0.11*	0.70*	0.29*	-0.09*	0.63*	1						
(9) T-ITG	0.02	0.00	-0.03	0.68*	0.21*	-0.06	0.42*	0.71*	1					
(10) S. Gratitude	-0.04	0.00	-0.07	0.37*	0.16*	-0.06	0.30*	0.40*	0.44*	1				
(11) S. Indebted	-0.12*	0.03	-0.10*	0.15*	0.07	0.18*	0.13*	0.21*	0.26*	0.37*	1			
(12) S. G&I	-0.16*	0.05	-0.07	0.19*	0.06	0.15*	0.14*	0.24*	0.31*	0.57*	0.89*	1		
(13) Proximity	-0.02	0.00	-0.14*	0.30*	0.21*	-0.01	0.24*	0.32*	0.33*	0.61*	0.48*	0.47*	1	
(14) Direct R.	-0.10*	0.01	-0.11*	0.16*	0.15*	0.14*	0.14*	0.23*	0.23*	0.41*	0.79*	0.67*	0.61*	1
(15) Letter	0.01	-0.09*	-0.10*	0.19*	0.13*	-0.06	0.18*	0.22*	0.19*	0.14*	0.08	0.15*	0.09*	0.10*
(16) Word Count	0.07	-0.08	-0.11*	0.17*	0.16*	-0.04	0.20*	0.18*	0.15*	0.10*	0.06	0.08*	0.07	0.10*
(17) Benefactor E.	0.00	0.01	-0.12*	0.22*	0.12*	-0.02	0.22*	0.29*	0.31*	0.49*	0.53*	0.53*	0.54*	0.61*
(18) Beneficiary E.	0.06	-0.05	-0.03	0.11*	0.01	-0.03	-0.03	0.01	0.03	0.12*	-0.30*	-0.21*	0.02	-0.28*
(19) Positive Aff.	-0.01	0.01	-0.03	0.32*	0.16*	-0.07	0.23*	0.26*	0.31*	0.60*	0.21*	0.28*	0.64*	0.29*
(20) Negative Aff.	-0.01	0.01	0.05	-0.18*	-0.16*	0.13*	-0.17*	-0.12*	-0.13*	-0.40*	0.12*	0.02	-0.32*	-0.02
(21) Happiness	0.02	0.00	-0.02	0.27*	0.11*	-0.10*	0.21*	0.19*	0.23*	0.55*	0.09*	0.19*	0.50*	0.16*

Table 2. Continued

Correlations of Experiment Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(22) Love	-0.02	0.03	-0.03	0.32*	0.17*	-0.04	0.22*	0.27*	0.32*	0.56*	0.27*	0.30*	0.66*	0.34*
(23) Resentment	-0.02	0.02	0.01	-0.19*	-0.13*	0.15*	-0.17*	-0.11*	-0.12*	-0.33*	0.14*	0.05	-0.26*	0.02
(24) Guilt	-0.08*	0.03	-0.12*	-0.13*	-0.01	0.24*	-0.06	-0.02	-0.07	-0.15*	0.40*	0.31*	-0.10*	0.28*
(25) Pride	-0.02	0.01	0.10*	0.08*	-0.02	-0.02	0.00	0.07	0.11*	0.22*	0.01	0.08*	0.18*	-0.03
(26) Annoyed	0.00	0.00	0.08*	-0.15*	-0.16*	0.09*	-0.15*	-0.12*	-0.12*	-0.41*	0.07	-0.01	-0.33*	-0.06
(27) Humility	0.05	0.00	-0.02	0.29*	0.15*	0.01	0.23*	0.29*	0.30*	0.53*	0.42*	0.43*	0.63*	0.46*
(28) Fortunate	0.01	0.05	-0.07	0.28*	0.16*	-0.06	0.28*	0.27*	0.29*	0.61*	0.24*	0.31*	0.56*	0.29*
(29) Surprise	-0.03	-0.02	-0.03	0.18*	0.09*	0.00	0.20*	0.23*	0.22*	0.32*	0.44*	0.42*	0.41*	0.43*
(30) Entitled	-0.04	0.03	0.09*	-0.08	-0.20*	0.10*	-0.12*	-0.10*	-0.04	-0.11*	0.10*	0.08*	-0.07	-0.04

Table 2. Continued

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
(15) Letter	1															
(16) Word Count	0.56*	1														
(17) Benefactor E.	0.10*	0.11*	1													
(18) Beneficiary E.	-0.00	-0.06	-0.39*	1												
(19) Positive Aff.	0.06	0.01	0.27*	0.21*	1											
(20) Negative Aff.	-0.04	-0.05	-0.12*	-0.15*	-0.37*	1										
(21) Happiness	0.06	0.01	0.21*	0.25*	0.89*	-0.39*	1									
(22) Love	0.05	0.01	0.28*	0.16*	0.95*	-0.30*	0.70*	1								
(23) Resentment	-0.05	-0.04	-0.07	-0.15*	-0.33*	0.92*	-0.35*	-0.27*	1							

Table 2. Continued

Correlations of Experiment Variables

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
(24) Guilt	-0.01	0.05	0.22*	-0.47*	-0.29*	0.52*	-0.35*	-0.21*	0.48*	1						
(25) Pride	0.01	-0.09*	-0.12*	0.35*	0.41*	-0.06	0.39*	0.38*	-0.04	-0.20*	1					
(26) Annoyed	-0.03	-0.05	-0.14*	-0.12*	-0.35*	0.93*	-0.37*	-0.29*	0.71*	0.49*	-0.06	1				
(27) Humility	0.07	0.03	0.44*	-0.05	0.65*	-0.18*	0.53*	0.65*	-0.14*	0.02	0.24*	-0.18*	1			
(28) Fortunate	0.08	0.04	0.31*	0.13*	0.72*	-0.38*	0.68*	0.66*	-0.34*	-0.21*	0.30*	-0.36*	0.63*	1		
(29) Surprise	0.05	0.02	0.38*	-0.18*	0.46*	0.03	0.34*	0.49*	0.04	0.21*	0.15*	0.02	0.55*	0.47*	1	
(30) Entitled	-0.03	-0.07	-0.12*	0.06	0.02	0.38*	0.00	0.03	0.34*	0.21*	0.30*	0.37*	-0.03	-0.05	0.03	1

Note. * shows significance at the .05 level. 1) Age, 2) Income, 3) Sex, 4) Secure Attachment to God, 5) Empathy, 6) Aversive Indebtedness, 7) Trait Gratitude, 8) Trait Gratitude to God, 9) Trait Transcendent Indebtedness to God, 10) State Gratitude, 11) State Indebtedness, 12) State Combined Gratitude and Indebtedness, 13) Relationship Proximity, 14) Direct Reciprocity, 15) Letter Writing, 16) Letter Word Count, 17) Benefactor Effort, 18) Beneficiary Effort, 19) Positive Affect, 20) Negative Affect, 21) Happiness, 22) Love, 23) Resentment 24) Guilt, 25) Pride, 26) Annoyed, 27) Humility, 28) Fortunate, 29) Surprised, 30) Entitled

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