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Original Article

Benefit valuation predicts gratitude☆

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ABSTRACT

Gratitude is an emotion that promotes cooperative relationships and is elicited when an act reveals that an actor values the recipient, especially when the benefit conferred is greater than the recipient expected. But, recipient expectations might vary depending on how much the benefactor is perceived to value the recipient — all else equal, the greater the benefactor is perceived to value the recipient's welfare, the greater the recipient's expectations of benefit delivery. Thus, at a given benefit level, it might be easier to exceed the threshold of expectation in a relationship for which the recipient holds low expectations (e.g., a stranger) as compared to a relationship for which the recipient holds high expectations (e.g., a sibling). This leads to the prediction that cognitive representations of welfare valuation *inversely* correlate with gratitude: The greater the expected welfare valuation, the more difficult it is to exceed expectations of benefit delivery and, therefore, the less felt gratitude. To test this prediction, we conducted two experiments in which subjects estimated how much they perceived a particular person in their social network to value the subject's welfare. Next, subjects estimated how grateful they would feel if this person provided them with differing levels of benefits. Contrary to our model, we found that gratitude was predicted by the magnitude of the benefit, but not by the recipient's perception of the benefactor's valuation of the recipient.

1. Introduction

Forming cooperative relationships with non-kin is a component of human social life. Because the problems of forming cooperative relationships almost surely formed a selective regime for humans as the species was evolving (Delton, Krasnow, Cosmides, & Tooby, 2011), natural selection plausibly designed in humans specialized information-processing mechanisms – cognitive adaptations – that enable people to make decisions about relationship formation and maintenance that would have, on average, increased ancestral humans' access to the benefits of cooperation and decreased the risk of exploitation (Tooby & Cosmides, 1996; Trivers, 1971).

Various features of human cognition have been posited as adaptations for regulating the formation and maintenance of cooperative relationships. These include, among others, the ability to reason about who has cheated in a social exchange (Cosmides, 1989), anger (Sell, Tooby, & Cosmides, 2009), an appetite for punishing individuals who have imposed costs on the self (Krasnow, Cosmides, Pedersen, & Tooby, 2012; Pedersen, Kurzban, & McCullough, 2013), and mechanisms for forgiveness and reconciliation (McCullough, Kurzban, & Tabak, 2012). Over the past fifteen years, evidence has accumulated to suggest that gratitude is also a viable candidate for inclusion on this list (McCullough, Kimeldorf, & Cohen, 2008). Gratitude is an emotion that is typically evoked when one receives costly, unexpected, and intentionally rendered benefits, and is thought to play a key role in regulating the initiation and maintenance of social relationships (Bartlett, Condon, Cruz, Baumann, & Desteno, 2012; DeSteno, Bartlett, Baumann, Williams, & Dickens, 2010; Lim, 2012; McCullough, Kilpatrick, Emmons, & Larson, 2001; McCullough et al., 2008; Tooby & Cosmides, 2008; Trivers, 1971). Here we begin to investigate the nature of the proximate mechanisms that enable gratitude to perform this function. Specifically, we examined whether gratitude is affected by how much a beneficiary believes a benefactor values the beneficiary's welfare.

1.1. Causes and effects of gratitude

One way to understand the function that gratitude evolved to perform is to examine the types of information that gratitude-producing cognitive systems appear to process efficiently and how that information affects behavior (see Sperber, 1994; Williams, 1966). Researchers have found that gratitude responses are sensitive to the benefits received by the recipient and the costs incurred by the actor (McCullough et al., 2008; Tesser, Gatewood, & Driver, 1968), the extent to which the act was voluntary and intentional (Tesser et al., 1968;

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Tsang, 2006), and how the benefit received compares to other available benefits (Wood, Brown, & Maltby, 2011). Furthermore, researchers have found that experiencing gratitude predicts recipients' willingness to act prosocially toward the benefactor (Algoe, 2012; Algoe, Haidt, & Gable, 2008; Bartlett et al., 2012; Bartlett & DeSteno, 2006; DeSteno et al., 2010; McCullough et al., 2008). Taken together, gratitude appears to be caused, at least in part, by the perception that an actor *is willing to incur costs to raise the beneficiary's welfare* — that is, the actor demonstrates that he or she *values* the beneficiary. Therefore, the function of the resultant gratitude might be to signal to the benefactor that an act was indeed perceived as a benefit, and that the beneficiary has increased his or her value of the benefactor, thus reinforcing the benefactor to continue providing benefits to the beneficiary and strategically foreshadowing the beneficiary's intent to return benefits in the future (Bartlett et al., 2012; DeSteno et al., 2010; McCullough et al., 2001).

The reciprocal process of receiving and then returning welfare-enhancing benefits within a dyad can increase the degree to which the two individuals are willing to forego benefits, or incur costs, in order to deliver benefits to each other. Over the course of many such exchanges of benefits, the two members of the dyad might begin to regulate their behavior toward each other not on the basis of the value of any single benefit that they might be able to receive from their partners, but rather, *from their respective partners' overall propensity to provide benefits*. As a consequence, a relationship that begins with the exchange of goods can develop into a relationship based on partners' perceived regard for each other's welfare, which humans typically recognize as friendships (Barclay, 2013; Hruschka, 2010).

1.2. Partner choice as a solution to an evolutionary problem

At first glance, the proposition that gratitude motivates the delivery of benefits to another individual appears to present an evolutionary problem: A design feature that promotes individuals to deliver benefits to others should *reduce* rather than raise its bearer's lifetime reproductive success unless the act of delivering those benefits leads to additional reproductive benefits later in time for the donor, or the increased reproductive success of the donor's genetic relatives (West, Griffin, & Gardner, 2007). We posit that gratitude, and the return of benefits that it motivates, evolved because it solved the problem of securing cooperative partners that provide unique and valuable benefits.

The extent to which individual candidates for cooperative interactions can deliver benefits to potential recipients is limited by the finite nature of those donors' time and resources. In part, this limitation is caused by the fact that resource acquisition is a highly variable trait (both within and between humans; Altman, 1984; Apicella, Marlowe, Fowler, & Christakis, 2012; Gurven, Kaplan, & Gutierrez, 2006), but it is also caused by within-person and between-person variation in people's *needs* for others' assistance (Hill, Hawkes, Hurtado, & Kaplan, 1984; Kaplan, Hill, Lancaster, & Hurtado, 2000). As a result, people should also vary in both their ability and their propensity to deliver benefits to others, as well as their need for acquiring cooperative partners who might be in a position to render assistance to them (due to temporary and chronic variations in body condition, physical strength, illness, and other reversals of fortune; Tooby & Cosmides, 1996). Therefore, individuals that engage in mutually beneficial cooperative interactions with conspecifics might also evolve adaptations that enable them to make fitness-positive decisions related to whether, when, and to whom to deliver benefits. In turn, potential recipients of a cooperator's generosity should possess adaptations that motivate them to present themselves as the best possible candidates for receiving such benefits (Roberts & Sherratt, 1998). (Of course, cooperators and recipients are not actually two distinct populations, and therefore adaptations for both delivering and receiving benefits should be operating within the mind of all humans.)

On the basis of this reasoning, Barclay (2013) argued that natural selection should favor cooperative strategists who are motivated to seek out other cooperative strategists in an attempt to entice those potential interaction partners to deliver some of their limited benefits. In this "competitively cooperative" environment, the people with the highest capacity for delivering benefits will be most sought after by conspecifics and will also have the greatest influence over other cooperators' willingness to deliver benefits. Essentially, potential recipients would reap the most benefits by successfully outcompeting others' "bids" for the time and resources of potential donors. In support of this conjecture, model-based simulations of the evolution of cooperation have indeed shown that cooperators fare much better when they can preferentially choose to interact with other cooperators (Bergstrom, 2003; Wang, Suri, & Watts, 2012).

Other existing evidence supports this conjecture as well. For instance, people tend to associate with those who share a similar capacity and disposition for cooperation: Among hunter-gatherers for whom success in resource acquisition is closely linked to physical strength, strong people tend to befriend other strong people whereas weak people tend to befriend other weak people (Apicella et al., 2012). An adaptation for engaging in this type of "assortative cooperation," which is conceptually similar to mate-choice models based on the concept of assortative mating (Barclay, 2013), should motivate people to make bids, through acts of benefit-delivery, for the cooperation of people who have a high capacity for cooperation and who demonstrate potential for cooperating with the bidder. Consistent with this claim, Apicella et al. (2012) also discovered that people generally are motivated to direct benefits to strong people rather than weak people, as if they use some of their surplus resources as a way of signaling their interest in establishing relationships with the best possible cooperation partners.[1]

1.3. Gratitude as an emotional adaptation for partner choice

Gratitude appears to fit the bill as an adaptation that would enable individuals to succeed in navigating a sea of potential cooperators. As stated above, gratitude tends to be elicited when recipients of a beneficent act perceive that benefits were intentionally delivered (Tesser et al., 1968; Tsang, 2006). This suggests that a dedicated cognitive program for producing gratitude should motivate recipients to return benefits to benefactors that appear to hold a generous disposition *toward the recipient* — that is, those whose actions imply a propensity for delivering benefits into the future.

We propose that gratitude evolved for its ability to focus attention on benefactors' generosity directed toward the recipient and to subsequently motivate the recipient to signal regard for the benefactor; that is, by making a bid for the benefactor's further cooperative actions. The currency for such bids could be explicit acts of benefit delivery (e.g., you helped me yesterday, so I will do my best to help you when you need it in the future), but they might also involve acknowledgement of receiving the benefit (e.g., "Thank you"), promises to return benefits (e.g., "I owe you one"), signaling one's enjoyment of the benefit, or even praising the benefactor (Watkins, Scheer, Ovnicek, & Kolts, 2006). By acknowledging the receipt of the benefit, both the benefactor and recipient will know that the other party knows that the act benefitted the recipient and that the recipient has signaled (perhaps accurately) that he or she is inclined to return benefits to the benefactor in the future.

For the purpose of the present experiments, we were interested in the factors that influence when gratitude is experienced, specifically the recipient's expectations about a benefactor's disposition to be

[1] As a caveat, it is important to point out that the decision-making processes, and the consequences thereof, of choosing cooperative partners may or may not be consciously available: In the same way natural selection favored mechanisms for feeling genuine disgust at the prospect of mating with a sibling, even though the detrimental evolutionary consequences of the act are not necessarily known or understood by all people (Lieberman, Tooby, & Cosmides, 2007), natural selection has likely favored people who were appropriately motivated to cooperate with others who would later cooperate with the initiator of cooperation, despite being completely unaware of the evolutionary consequences.

generous toward the recipient (and vice versa). Based on our hypothesis, gratitude should result from the receipt of benefits that are more valuable than one would have expected from a given benefactor, given one's estimates of that benefactor's regard for one's welfare prior to the receipt of the benefit in question.

1.4. Gratitude and expected welfare valuation

The proposition that gratitude is activated by the receipt of benefits that are larger than one would have expected from a given person turns on the idea that people form expectations regarding the levels of costs that their interaction partners should be willing to incur to make benefits available to the self. These expectations can be considered formally in terms of a computed cognitive representation called a "welfare tradeoff ratio" (WTR; Delton & Robertson, 2016; Tooby & Cosmides, 2008). Tooby and Cosmides (2008) proposed that humans possess a dedicated computational system that derives welfare tradeoff ratio estimates (which are, essentially, exchange rates that reflect the extent to which one can expect, on average, to obtain fitness benefits by making sacrifices to one's own welfare in order to raise the welfare of another individual) for each person in one's social universe. With this WTR-estimating mechanism (or set of mechanisms), humans can then form distinct representations of the value that one should place on others' welfare, that is, the extent to which they should be willing to reduce their own welfare in order to boost another's welfare, in addition to representations of one's own value in the minds of other people (i.e., how much others appear to be willing to reduce their own welfare in order to raise the perceiver's welfare).

In turn, these WTR estimates can be used to inform other decisions. For example, suppose that Person A repeatedly observes that Person B tends to deliver benefits to Person A only if the benefits to Person A outweigh the costs to Person B by a factor of 5. From this 1:5 ratio, Person A can infer that Person B values Person A's welfare no more than 20% as much as his or her own (i.e., that Person B holds a WTR for Person A that is no greater than $1/5 = 0.2$). Person A can use this inference about Person B′s WTR for him as information to guide his or her own decision-making about when to offer benefits to B. For example, if Person A has a benefit that he can provide *either* to Person B (whom he perceives to hold a WTR for him that is no greater than 0.2) *or* to Person C (whom he perceives to hold a WTR for him that is no greater than 0.4) then, ceteris paribus, Person A should give that benefit to Person C, since Person C′s behavior toward A has revealed that Person C values Person A's welfare more than Person B does. As is the case with most cognitive mechanisms, we do not expect these WTR estimates to be consciously available; instead, we believe that smaller WTR estimates will enter awareness as gut feelings that we lexicalize with statements such as "I don't think that person likes me very much," while larger estimates will translate consciously into, "I think that person likes me quite a bit," and so forth.

As opportunities to exchange benefits accrue over a set of interactions, Person A will compute increasingly refined estimates of B′s propensity to take actions that raise A's welfare, and vice versa. To clarify, a refined WTR estimate will be difficult, or maybe even impossible, to derive from only a single act of benefit-delivery; therefore, it is not any isolated act of benefit-delivery that reveals WTR (though acts can be consistent or inconsistent with a WTR estimate), but a series of acts. However, it is likely that estimates based on a single act can become more refined as the costliness of an act increases; for example, paying for someone's food does not reveal as much about how much the benefactor regards the beneficiary's welfare, whereas saving someone's life does. In general, we expect that refined estimates of another's WTR for the self are achieved through repeated interactions, rather than isolated acts.

So what do welfare tradeoff ratios have to do with gratitude? Tooby and Cosmides (2008) proposed that gratitude functions as a coordinator of behaviors that would display the beneficiary's up-regulated welfare valuation for a benefactor, which in turn causes the benefactor's perceived valuation of the beneficiary to increase as well. Using Tooby and Cosmides's (2008) conceptualization of interpersonal welfare valuation, we believe the WTR estimator is the proximate information-processing system that gratitude-producing mechanisms use to evaluate the net costs, net benefits, and overall expectations of engaging in social interactions with other actors in one's social universe.

1.5. Hypotheses and the current study

On the basis of the above verbal model, we consider here a novel hypothesis about gratitude that has not, as far as we know, received empirical scrutiny. Because (a) expectations of receiving benefits are thought to be negatively related to gratitude, and (b) estimates of welfare valuation are thought to be positively related to expectations of benefit delivery, we predicted that gratitude for benefits should be higher when those benefits are provided by people who recipients perceive to have lower WTRs for them (e.g., strangers or casual acquaintances) than when benefits are provided by benefactors who recipients perceive to have higher WTRs for them (e.g., mothers or good friends). All else equal, for an individual (e.g., a relative) who has an already high WTR toward another, an act that delivers a benefit (e.g., a parent giving a child $50 for his birthday) might exceed expectations only slightly, generating relatively low levels of gratitude. By contrast, when a low WTR exists between two individuals (e.g., acquaintances), the same act should exceed expectations greatly, generating higher levels of gratitude.

There are some alternative hypotheses that one could develop, depending on their assumptions about the social world. For example, if one expects small amounts of benefit delivery from everyone, regardless of perceived welfare valuation, then one might predict an interaction such that WTR only predicts gratitude at higher levels of benefit delivery. However, we think that even small values of benefit delivery can exceed expectations; for example, if a stranger decides to pay for someone else's meal, that may indeed exceed expectations and cause gratitude, whereas if a meal is provided by someone who generally performs that act (e.g., a parent), that act may not exceed expectations and, therefore, may not elicit gratitude. Based on our hypothesis that expectations of benefit delivery will be positively related to WTR *across all values of benefit delivery*, we expected to find a negative main effect of WTR.

The hypothesis that welfare valuation is negatively related to WTR has received indirect support by researchers who have found that people anticipate feeling more grateful when receiving a benefit from someone of a distant relationship category than when receiving the same benefit from someone of a closer relationship category (Bar-Tal, Bar-Zohar, Greenberg, & Hermon, 1977; Rotkirch, Lyons, David-Barrett, & Jokela, 2014), but there remains substantial room for refining what these empirical results mean by trying to isolate the underlying cognitive routines (e.g., the hypothesized WTR-generating mechanisms described above) that might drive the empirical pattern that Bar-Tal et al. (1977) and Rotkirch et al. (2014) have identified.

Our aim in the experiments described herein was to test the hypothesis that gratitude is more readily elicited when one receives benefits from a benefactor who is perceived to have a low WTR toward oneself than from a benefactor who is perceived to have a high WTR for oneself. By analyzing the relationship between WTR estimates and gratitude, we are removing the need to infer value that is based solely on relationship category, thereby expanding on work by Bar-Tal et al. (1977) and Rotkirch et al. (2014). In Experiment 1, we asked subjects to indicate how they believed they would feel in response to hypothetical scenarios in which people for whom subjects had differing expectations regarding others' valuations of the subjects (e.g., strangers, acquaintances, good friends, kin, etc.) provided subjects with various benefits. We predicted that gratitude for any given benefit would be higher when people imagined receiving that benefit from a person whose value for the

participant was lower prior to the receipt of the benefit (e.g., a stranger) than from a person whose value for the participant was higher prior to the receipt of the benefit (e.g., a parent). In Experiment 2, we tested the same prediction using experimental materials that corrected some potential shortcomings in the materials we used for Experiment 1.

2. Experiment 1

2.1. Subjects

Subjects were 524 (38.93% Female; M_{age} = 31.84, SD = 10.15) workers from Amazon's Mechanical Turk. Subjects were paid $1.25 to complete a brief questionnaire.

2.2. Procedure

The survey for Experiment 1 was programed using the Qualtrics Survey Software. Subjects were prompted to respond to hypothetical scenarios in which a specific person from their life (or a stranger) delivered a benefit to them in an 8 (between-subjects: relationship category) × 21 (within-subjects: scenario) experimental design. Subjects were randomly assigned to think about one person from their real lives who fell into one of eight relational categories: Stranger, acquaintance, closest friend, cousin, sibling, mother, father, or romantic partner. Subjects were first asked to indicate whether there was someone in their lives who occupied each of the eight categories (i.e., we did not assume that everyone had a father or a romantic partner, for instance), with the exception of the stranger and closest friend categories, which we assumed were applicable to all subjects. The software branched subjects away from stimulus materials that related to any relationship categories that were not applicable to them (e.g., an only child was not assigned to consider stimuli related to siblings). Subjects then entered the name of one specific person who fell under their assigned category (with the exception of stranger); the rest of the experiment used that target person's name (e.g., "Imagine that John…") rather than the name of the relational category (e.g., "Acquaintance") to prompt subjects' responses.

Next, each subject provided an estimate of how much he/she valued the welfare of his/her assigned target person, as well as an estimate of how much he/she believed his/her assigned target person valued the subject's welfare (*Welfare Tradeoff Ratios*; see below). Finally, each subject was presented with 21 scenarios in which a subject's target person provided him/her with a benefit. Subjects rated how grateful they believed they would feel in response to each (detailed below).

2.3. Welfare tradeoff ratios

To obtain estimates for each subject's perceptions of how much the target person (e.g., stranger, closest friend) valued the subject's welfare, subjects responded to a series of ten hypothetical scenarios adapted from Jones and Rachlin's (2006) social discounting measure, which is also similar to other measures used to assess WTR (Delton, 2010; Kirkpatrick, Delton, de Wit, & Robertson, 2015). In our adaptation of the social discounting measure, subjects were told to take the perspective of the target person and to make a series of choices in the manner that they would expect the target person to act. To ease understanding, we refer to the two agents in this measure as the allocator (whose decisions are based on how subjects *expect* the target person to act) and the recipient (who is actually the subject). The allocator was told to either allocate some varying amount of money (which varied in decreasing order) to themselves or a fixed amount of money to the recipient (Appendix A). This approach to measuring WTRs is predicated on the assumption that the allocator will begin by always allocating the $85 to themselves, since people are always better off by obtaining $85 for themselves than directing $75 to any other person — even if they value that person as much as they value themselves. We assumed further that as soon as the benefit to the recipient (i.e., the fixed amount of $75) appears to be more valuable to the allocator than the direct benefit (e.g., $15) is to the allocator, then they will start allocating money to the recipient. By taking note of the "switch point" (the midpoint between the last tradeoff in which allocators choose money for themselves and the first tradeoff in which they direct the $75 to recipients) it becomes possible to infer subjects' perceptions of the targets' WTRs toward themselves (Delton, 2010; Delton & Robertson, 2016). We refer to the value obtained from this measure as $WTR_{other \rightarrow self}$.

2.4. Scenarios

Each subject completed 21 scenarios in total (one scenario was repeated twice, yielding 20 unique scenarios), presented in a random order, and each scenario involved a situation in which the target person delivered a particular benefit to the subject. For example, in one scenario, subjects assigned to the "stranger" condition were asked to imagine how they felt if the stranger returned the subject's lost wallet. The subjects were asked to respond to each scenario by stating how grateful they thought they would feel (on a 6-point Likert-type scale: 1 = Not at all; 6 = Extremely) after experiencing each event (Appendix B). On the same scale, subjects also indicated how much they believed they would want to return benefits to the target and how much they believed they would feel obligated to return benefits. Our goal was to expose subjects to a wide range of qualitatively different cost/benefit scenarios. Some acts seemed qualitatively lower-cost (e.g., holding a door open) than others (e.g., saving the subject's life), but the differences were less clear for other scenarios (e.g., returning a lost wallet vs. helping change a car tire).

With the exception of the monetary benefits, we had no formal way of quantifying the exact costs and benefits associated with each scenario. To address this issue, we scaled each item by surveying an additional 201 workers on Amazon's Mechanical Turk (29.35% Female; M_{age} = 29.94, SD = 8.21). Subjects in this calibration sample were paid $0.50 to provide a monetary estimate of the value for each act given in the original survey. We calculated the average value for each scenario (range: $1.73 to $828,587.50), then log-transformed those mean values to put them on a more manageable scale (range: 0.24 to 5.92) for use in Multilevel Linear Modeling (Muthén & Muthén, 1998-2012); by doing so, we were able to place the qualitative scenarios on a quantitative scale whose value could be analyzed with multilevel modeling.

2.4.1. Statistical model

Data conformed to a two-level nested structure (scenarios nested within subjects) in which the scenario was a within-subject factor and expected welfare valuation (i.e., $WTR_{other \rightarrow self}$) was a between-subjects variable. Data were analyzed using Multilevel Linear Modeling (MLM) in Mplus version 7 (Muthén & Muthén, 1998-2012); missing data were handled using Full Information Maximum Likelihood (FIML). This model was used to predict gratitude as a function of the log-transformed benefit value of the scenario and as a function of expected welfare valuation.The outcome variable was modeled as η_{ij} = the amount of gratitude in scenario i by person j, such that

$$\eta_{ij} = \beta_{0j} + \beta_{1j}(\text{Bebefit}) + e_{ij},$$
$$\beta_{0j} = \gamma_{00} + \gamma_{01}\left(\text{WTR}_j\right) + u_{0j},$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}\left(\text{WTR}_j\right) + u_{1j},$$

where β_{0j} and β_{1j} are the intercept and slope coefficients, respectively, u_{0j} and u_{1j} are random effects representing the remaining variation between subjects' individual intercepts and slopes, and e_{ij} represents residual within-person variation. The magnitude and statistical significance of the parameter estimate β_{1j}(Benefit) enabled us to evaluate whether feelings of gratitude were a function of benefit value (as established in our independent calibration sample). The magnitude

and statistical significance of the parameter $\gamma_{01}(\mathrm{WTR}_j)$ enabled us to evaluate whether feelings of gratitude, irrespective of benefit size, were moderated by participants' valuation of their relationship with the hypothesized benefactor. The magnitude and statistical significance of the parameter $\gamma_{11}(\mathrm{WTR}_j)$ enabled us to evaluate whether the effect of benefit size on feelings of gratitude was itself moderated by participants' valuation of their relationship with the hypothesized benefactor.

2.4.2. Experiment 1 results

Fig. 1 shows the distributions of $WTR_{other \rightarrow self}$ for each relationship category. Means and standard deviations of gratitude at each level of $WTR_{other \rightarrow self}$ and benefit value are displayed in Table 1. Results of the final model are displayed in Table 2.

We tested whether $WTR_{other \rightarrow self}$ had a significant effect on the relationship between benefit value and gratitude. Based on a likelihood-ratio test, our final model was better at predicting gratitude than an unconditional model, $\chi^2(5) = 1156.384$, $p < .001$. $WTR_{other \rightarrow self}$ was not related to feelings of gratitude, b = .17, 95% CI [−.04, .37], $p = .107$. Log_{10} benefit value was significantly related to gratitude, b = .03, 95% CI [.01, .04], $p = .008$: people anticipated feeling more gratitude for scenarios in which they received larger benefits. The effect of Log_{10} benefit value on anticipated gratitude did not differ as a function of participants' pre-benefit estimates of $WTR_{other \rightarrow self}$, b = .003, 95% CI [−.02, .03], $p = .769$.

2.4.3. Experiment 1 discussion

Experiment 1 was designed to test whether expected welfare valuation would negatively predict forecasted feelings of gratitude in response to hypothetical benefit-delivery scenarios. However, we failed to find any association between current expected welfare valuation and gratitude. Rather, gratitude was only predicted by the value of the received benefit.

Further interpretation of these findings is difficult because of three experimental limitations. First, our results were obtained from within-subjects manipulations of benefit value, which may have limited our ability to make certain causal inferences due to carry-over effects (Greenwald, 1976). Second, our measure of gratitude was assessed with a single item and may have limited measurement reliability and validity. Third, our measure of benefit value for each scenario relied on an independent calibration sample's monetary valuation of each scenario. As a consequence, it is likely that we encountered additional noise that could have been removed by asking subjects to respond to scenarios for which the relative values were known in advance.

That benefit delivery reveals, to some extent, a person's willingness to trade off one's own welfare is inherent to the idea of a welfare tradeoff ratio. Therefore, any act of benefit delivery will reveal some information about how much the benefactor values the beneficiary, and this is inescapable. It would be possible to vary the relative cost/benefit ratio when examining these scenarios (e.g., the benefactor investing $1 on behalf of the beneficiary to provide the beneficiary with $5; the benefactor paying a $1 transaction fee to provide the beneficiary with $5), which may have been done in the first experiment (e.g., risking one's life to save another's is potentially 1:1, but not necessarily so, assuming both parties survive), but this was not analyzed. Instead of attempting to analyze the dynamics of how a single act could reveal WTR, we accounted for this potential confound in the second experiment by making all scenarios cost/benefit structure 1:1 (e.g., benefactor gives $10 at a cost of $10). Therefore, everyone received the same revealed WTR in the act itself; the only difference between conditions is how much each participant thought the benefactor valued the participant's welfare. This was the only way to test whether prior expectations influence how people respond to a given act of benefit delivery. For example, if a given act of benefit delivery provides information to the beneficiary that the benefactor values the beneficiary at WTR = ~1, then the relative increase for someone with a low prior (e.g., WTR of ~.2) is greater than the relative increase for someone with a high prior (e.g., WTR of ~.6). Further, we think it is important to note that there is still some uncertainty in any single act, and therefore a single act does not reveal an exact WTR estimate, but only provides an additional piece of information to update a WTR estimate.

To address the limitations of the first experiment, we used a between-subjects design in Experiment 2, which conferred two primary advantages: (1) The between-subjects design allowed us to make direct causal inferences regarding our manipulation of benefit value; and (2) the between-subjects design was also ideal for computing easily interpretable effect sizes using multiple regression. To address the limitations regarding the reliability and validity of our measure of gratitude in Experiment 1, in Experiment 2 we assessed gratitude using multiple items. Finally, we only asked subjects to respond to scenarios in which the value of the benefit was known — specifically, by using only monetary benefits. This way, we could be certain as to how

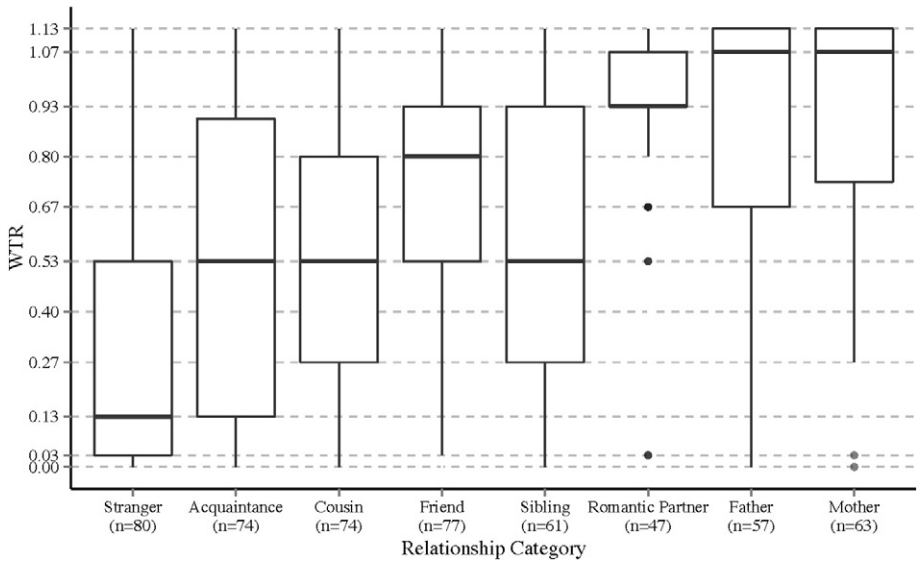

Fig. 1. Box and whiskers plots for WTR data in experiment 1. Boxes show the interquartile range (IQR), horizontal lines show the median, whiskers show all values within 1.5*IQR, and dots show outliers.

Table 1
Means and standard deviations for gratitude across each WTR and benefit value in Experiment 1.

WTR											
Log Benefit	0	0.03	0.13	0.27	0.4	0.53	0.67	0.8	0.93	1.07	1.13
0.24	5.41 (2.37)	6 (1.84)	5.61 (2.29)	6.18 (1.71)	6.14 (1.7)	6.16 (1.8)	6.46 (1.33)	5.44 (2.26)	6.12 (1.56)	5.8 (2.06)	5.89 (1.97)
0.45	4.21 (2.14)	5.26 (1.84)	4.61 (2.19)	4.88 (1.98)	4.86 (2)	5.1 (1.8)	5.72 (1.31)	4.44 (2.31)	5.21 (1.7)	5.22 (1.96)	4.96 (2.09)
0.56	4.72 (1.89)	5.41 (1.44)	4.87 (1.77)	5.79 (1.47)	5.31 (1.43)	5.53 (1.47)	5.59 (1.07)	5.19 (1.78)	5.29 (1.48)	5.19 (1.56)	5.3 (1.71)
0.61	5.93 (1.98)	6.38 (1.62)	6.13 (2.05)	6.59 (1.44)	6.57 (1.42)	6.53 (1.43)	6.72 (1.03)	6.07 (1.96)	6.4 (1.56)	6.31 (1.76)	6.34 (1.7)
0.92	3.97 (1.94)	5 (1.84)	4.17 (1.77)	5.12 (1.84)	4.74 (1.87)	4.73 (1.69)	5.28 (1.57)	4.07 (2.09)	4.72 (1.63)	4.63 (1.83)	4.55 (1.81)
1.07	4.34 (1.86)	5.07 (1.64)	4.39 (1.9)	4.97 (1.78)	4.83 (1.46)	5.02 (1.49)	5.39 (1.37)	5.15 (1.79)	5.03 (1.49)	4.86 (1.67)	4.91 (1.74)
1.11	5.79 (2.13)	6.38 (1.61)	5.96 (2.33)	6.29 (1.71)	6.46 (1.7)	6.43 (1.45)	6.74 (0.93)	6.11 (1.93)	6.44 (1.54)	6.36 (1.76)	6.27 (1.81)
1.14	5.31 (1.89)	5.86 (1.59)	5.39 (1.97)	6.09 (1.44)	5.97 (1.42)	6.04 (1.46)	6.11 (1.1)	5.56 (1.95)	6.03 (1.52)	5.75 (1.76)	5.95 (1.73)
1.19	4.28 (1.67)	4.59 (1.56)	3.57 (1.41)	4.76 (1.44)	4.34 (1.35)	4.45 (1.32)	4.7 (1.46)	4.41 (1.69)	4.73 (1.42)	4.53 (1.57)	4.45 (1.72)
1.42	4.17 (1.65)	4.22 (1.48)	3.7 (1.11)	4.62 (1.3)	4.23 (1.03)	4.35 (1.23)	4.8 (1.31)	4.67 (1.52)	4.65 (1.32)	4.95 (1.39)	4.59 (1.37)
1.43	4.48 (2.16)	5.17 (1.8)	4.43 (1.93)	5.56 (1.91)	5.34 (1.73)	5.65 (1.71)	5.85 (1.43)	4.74 (2.28)	5.47 (1.63)	5.31 (1.93)	5.07 (1.97)
1.72	3.55 (1.94)	4.1 (1.84)	2.91 (1.35)	4.18 (1.57)	3.91 (1.67)	3.88 (1.42)	4.54 (1.52)	3.44 (1.87)	4.05 (1.5)	3.98 (1.82)	3.76 (1.72)
1.84	4.48 (1.92)	5.33 (1.74)	4.65 (1.99)	5.5 (1.71)	5.14 (1.5)	5.55 (1.69)	5.72 (1.39)	5.22 (1.8)	5.47 (1.5)	5.25 (1.8)	5.01 (1.91)
1.97	4.34 (2.02)	5.1 (1.68)	4.17 (1.77)	5.41 (1.64)	5.03 (1.48)	5.16 (1.71)	5.59 (1.45)	5.11 (1.83)	5.27 (1.67)	5.19 (1.82)	5.07 (1.8)
2.76	4.62 (1.97)	5.17 (1.78)	4.43 (1.78)	5.56 (1.71)	5.06 (1.49)	5.27 (1.82)	5.46 (1.43)	4.89 (2.1)	5.19 (1.66)	5.03 (1.85)	5.13 (1.88)
2.77	4.52 (2.23)	5.66 (1.84)	5 (2.02)	5.29 (2.17)	5.29 (2.09)	5.86 (1.78)	6.09 (1.35)	4.85 (2.44)	5.55 (1.72)	5.42 (2.04)	5.45 (1.99)
2.94	4.45 (1.78)	4.98 (1.38)	3.83 (1.47)	4.97 (1.62)	4.57 (1.4)	4.88 (1.34)	5.17 (1.25)	4.7 (1.49)	4.79 (1.5)	4.89 (1.54)	4.85 (1.76)
3.04	3.59 (1.68)	3.93 (1.59)	3.35 (1.43)	4.15 (1.35)	3.89 (1.3)	4.22 (1.39)	4.41 (1.31)	3.81 (1.36)	4.28 (1.37)	4.38 (1.54)	3.98 (1.68)
5.06	5.03 (2.46)	6.09 (1.87)	5.7 (2.27)	5.76 (2.27)	5.74 (2.24)	6.14 (1.93)	6.5 (1.28)	5.22 (2.64)	6.03 (1.75)	5.95 (2.07)	5.78 (2.17)
5.83	5.21 (2.11)	6.07 (1.54)	5.22 (2.15)	5.79 (1.84)	5.89 (1.73)	6.14 (1.48)	6.04 (1.19)	5.48 (1.89)	5.75 (1.56)	5.64 (1.71)	5.67 (2.02)
5.92	4.38 (2.13)	5.31 (1.81)	4.65 (1.94)	5.29 (1.88)	5.23 (1.66)	5.43 (1.77)	5.85 (1.38)	4.67 (2.34)	5.47 (1.66)	5.2 (1.96)	5.12 (2.03)

the value of each scenario compared to the value of other scenarios, without relying on subjective estimates from subjects or from a calibration sample.

3. Experiment 2

3.1. Subjects

Subjects were 3864 (43.63% Female; $M_{age} = 30.94$; $SD = 10.39$) workers from Amazon's Mechanical Turk. Subjects were paid $0.50 to complete a brief questionnaire. Cases from the cousin condition were removed from analyses because the target names for that condition were not properly displayed, leaving us with a final sample size of 3260 (43.71% Female; $M_{age} = 30.78$, $SD = 10.26$).

3.2. Procedures

The survey for Experiment 2 was programed using Qualtrics Survey Software. The format of Experiment 2 was identical to that of Experiment 1 with respect to randomization of the target person and the WTR questionnaire; the differences were in the formatting of which scenarios were displayed (see Benefit-Delivery Scenarios) and in subjects' available responses to the scenarios (see Gratitude Measures). In this experiment, we used a between-subjects design, which required each subject to provide one $WTR_{other \rightarrow self}$ estimate and to respond to only one benefit-delivery scenario.

3.3. Benefit-delivery scenarios

People only responded to one of five benefit-delivery scenarios; the subject either received (hypothetically) $0.01, $1, $10, $100, or $1000 from the target person.

Table 2
Unstandardized coefficients for Experiment 1 analyses.

Level 1	Level 2	Coefficient (SE)	*p*	95% CI
$WTR_{other \rightarrow self}$ predicting Gratitude				
Intercept, β_0	Intercept, γ_{00}	4.45 (.08)	<.001	4.30, 4.61
	WTR, γ_{01}	.17 (.10)	0.107	−.04, .37
Log_{10} Benefit, β_1	Intercept, γ_{10}	.03 (.01)	0.008	.01, .04
	WTR, γ_{11}	.003 (.01)	0.769	−.02, .03

3.4. Gratitude measures

Gratitude was measured by averaging subjects' responses (on a 6-point Likert-type scale; *"Not at all"* to *"Extremely"*) to three items ($\alpha = .98$): (1) *"How grateful would you feel?"*; (2) *"How thankful would you be?"*; and (3) *"How appreciative would you feel?"*

3.5. Data management

All regression analyses were conducted using R version 3.1.2 (R Core Team, 2014). Just as in Experiment 1, benefit delivery values were log-transformed to bring the original scale (range: $.01, $1000) to a more manageable scale (range: −2, 3). To ensure our regression output provided interpretable information, we added a constant of 2 to our predictor variable (log_{10} benefit value), so that we could interpret our intercept as the expected level of gratitude when receiving the smallest benefit (i.e., $0.01).

3.5.1. Experiment 2 results

Distributions of $WTR_{other \rightarrow self}$ for each categorical condition are displayed in Fig. 2. Means and standard deviations of gratitude at each level of $WTR_{other \rightarrow self}$ and benefit value are displayed in Table 3. Results for the model analyzed for Experiment 2 are displayed in Table 4.

First, we conducted a linear regression analysis to examine whether $WTR_{other \rightarrow self}$ and log_{10} benefit value (and their interaction) predicted anticipated gratitude. The overall model was significant, $F(3, 3263) = 1245$, $R^2 = .53$, $p < .001$. There was a significant main effect for $WTR_{other \rightarrow self}$, $b = .38$, $p < .001$, $\eta^2_{partial} = .005$: The values participants ascribed to their relationship partners prior to the benefits were positively, rather than negatively, related to how much gratitude they anticipated feeling in response to the benefit. There was also a significant main effect for log_{10} benefit value, $b = .74$, $p < .001$, $\eta^2_{partial} = .24$: Greater benefit value predicted more anticipated gratitude. Finally, the interaction between benefit value and $WTR_{other \rightarrow self}$ was not significant, $b = -.03$, $p = .285$, $\eta^2_{partial} = .0004$.

3.5.2. Experiment 2 discussion

The second experiment was designed to address the limitations in the design and interpretation of Experiment 1, which involved a within-subjects design, a single self-report item for measuring anticipated gratitude, and responses to benefit-delivery scenarios for which the value of the benefit was not directly known. Experiment 2, in

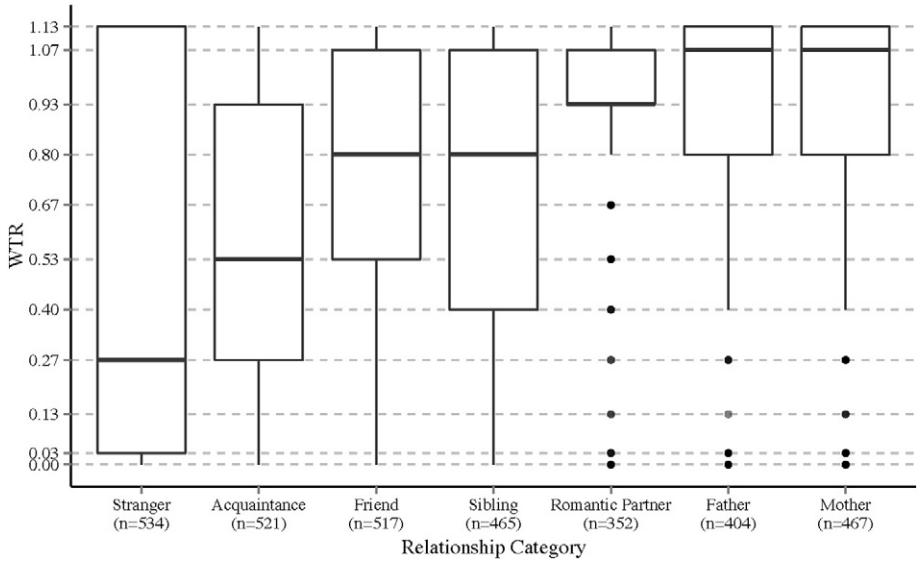

Fig. 2. Box and whiskers plots for WTR data in experiment 2 (see Fig. 1 caption for explanation).

contrast, involved a between-subjects design, a 3-item measure of gratitude, and responses to benefit-delivery scenarios for which the value of the benefit was directly known. With these methodological improvements, the results of Experiment 2 were more revealing than the results of Experiment 1: Subjects' anticipated feelings of gratitude were positively affected by both the value of the benefit and the value they ascribed to the people delivering the benefits, rather than just the value of the benefit (as shown in Experiment 1). Though the effect of expected welfare valuation was positive and significant, our results indicated that the effect accounted for less than 1% of variance. Further, the range of our measure of expected welfare valuation barely extended beyond a single unit (range: 0, 1.13); since a one-unit increase in expected welfare valuation only accounted for a .38-unit increase in anticipated feelings of gratitude, we are inclined to believe that the relationship between baseline expected welfare valuation and gratitude is probably not very meaningful.

4. General discussion

Humans, as primates that have evolved to live in large social groups, are likely to possess a suite of cognitive programs that were designed by natural selection to solve problems associated with forming and maintaining cooperative relationships (Tooby & Cosmides, 1996). Gratitude, an emotion evoked when someone receives a benefit, seems to play an important role in establishing new relationships and maintaining existing relationships (Bartlett et al., 2012; DeSteno et al., 2010; McCullough et al., 2008). The experiments presented here were designed to clarify these previous findings in light of a theory of social emotions based on the concept of Welfare Tradeoff Ratios (WTR; Tooby & Cosmides, 2008). Specifically, we proposed that greater degrees of expected welfare valuation would lead to greater expectations of benefit delivery, thereby leading to lower feelings of gratitude: In general, we expected people to feel less gratitude in response to benefits from relationship partners who had already established themselves as reliable sources of large benefits. Consistent with this notion, previous studies have found that people anticipate feeling more gratitude when receiving benefits from more distant relationship partners than from closer ones (Bar-Tal et al., 1977; Rotkirch et al., 2014).

Contrary to our predictions, and to previous findings (Bar-Tal et al., 1977; Rotkirch et al., 2014), the first experiment revealed that perceived welfare valuation, which we measured by using a modified measure of social discounting (Jones & Rachlin, 2006), was *not* a significant predictor of people's anticipated feelings of gratitude. However, there were some methodological shortcomings with this experiment: First, we used a repeated measures design, which is potentially subject to carryover effects that can obscure cause and effect relationships (Greenwald, 1976); second, we asked subjects to only respond to a single-item measure of gratitude which limited reliability and construct validity; and third, we neglected to obtain direct measurements of the subjective values participants assigned to the various hypothetical benefits they considered. After correcting these limitations in Experiment 2, we found similar results: Expected welfare valuation (as measured by a Welfare Tradeoff Ratio questionnaire) did not explain a meaningful proportion of variance in people's anticipated gratitude in response to

Table 3
Means and standard deviations for gratitude across each WTR and benefit value in Experiment 2.

WTR											
Benefit	0.00	0.03	0.13	0.27	0.40	0.53	0.67	0.80	0.93	1.07	1.13
$0.01	1.9 (1.32)	2.01 (1.14)	2.12 (1.56)	1.69 (0.9)	1.92 (1.06)	1.78 (0.88)	1.99 (1.12)	2.2 (1.18)	2.31 (1.43)	2.33 (1.43)	2.3 (1.48)
$1	3.81 (1.64)	3.6 (1.28)	3.72 (1.34)	3.17 (1.13)	3.25 (1.25)	3.67 (1.01)	3.66 (1.55)	3.82 (1.31)	3.78 (1.17)	3.7 (1.34)	3.82 (1.38)
$10	4.13 (1.28)	4.61 (1.11)	4.58 (1)	4.67 (1.24)	4.9 (0.78)	4.73 (1.2)	4.67 (0.86)	5.02 (0.81)	4.65 (0.97)	4.63 (1.08)	4.73 (1.12)
$100	4.71 (1.56)	5.02 (1.04)	5.13 (0.73)	4.95 (1.09)	5.24 (0.85)	5.28 (0.68)	5.48 (0.71)	5.53 (0.53)	5.37 (0.73)	5.36 (0.82)	5.42 (0.85)
$1000	5.05 (1.18)	5.3 (1.28)	5.72 (0.42)	5.5 (0.88)	5.69 (0.5)	5.54 (0.55)	5.48 (0.75)	5.59 (0.59)	5.57 (0.76)	5.62 (0.61)	5.54 (0.77)

Table 4
Coefficients for Experiment 2 analyses.

	Coefficient (SE)	β	*p*	95% CI	$\eta^2_{partial}$
$WTR_{other \rightarrow self}$ predicting Gratitude					
Intercept	1.98 (.08)	0	<.001	1.84, 2.13	0.18
Log_{10} Benefit	.74 (.02)	0.766	<.001	.69, .78	0.24
WTR	.38 (.09)	0.077	<.001	.20, .57	0.005
Benefit*WTR	−.03 (.03)	−0.03	0.285	−.09, .03	0.0004

hypothetical benefits, though in this experiment there was a positive significant effect. Given that our results replicated almost identically across the two studies, both of which had large sample sizes, we are confident that for this type of design, our results accurately reflect the relationship between expected welfare valuation, benefit value, and gratitude. However, there are some deeper methodological and theoretical concerns that need to be addressed before making any definitive conclusions.

Both of our experiments used anticipated feelings of gratitude, rather than actual feelings of gratitude, in response to benefits that subjects never actually received and that subjects did not actually expect to receive. Research has indicated that there are some problems with affective forecasting measures such as these because they may reflect how people think they would or should respond, rather than how they would actually respond in a given situation (Wilson & Gilbert, 2005). Though it may be tempting to blame the methods used in this study for our lack of results, the vast majority of research on gratitude and other emotions have made use of affective forecasting measures (though there are some notable exceptions, for example; Bartlett et al., 2012; Bartlett & DeSteno, 2006; DeSteno et al., 2010). That said, if affective forecasting measures are not effective at identifying true relationships between situations, emotions, and behaviors, then much of what we think we understand about emotions and behaviors may need to be revisited. To address this possible methodological weakness in gratitude research, future work should focus on validating and reassessing what we currently think we understand regarding emotions, primarily by examining emotional responses to scenarios as they actually occur.

It is also possible that we measured the wrong index of expected welfare valuation, which was an index of perceived welfare valuation prior to benefit delivery. To the extent that an act of benefit-delivery reveals a greater value than expected, it might be the *change* in value that predicts gratitude. Our study was based on the assumption that change would be somewhat dependent on prior expected welfare valuation. More specifically, we assumed that there would be more room for change, and thus change would be easier, when a prior expected welfare valuation estimate was low. However, changes in welfare valuation that are based on acts of benefit delivery could be influenced by factors that are independent of prior expected welfare valuation estimates. In other words, if gratitude is tracking changes in welfare valuation estimates, then our investigation of gratitude based primarily on prior estimates may have been missing important variation. Further, using hypothetical scenarios adds to the difficulties of assessing real-time change, as psychological representations of expected welfare valuation are likely not updating in response to hypothetical scenarios. Therefore, in addition to assessing emotions as they occur in response to real events, it will be important for future research on gratitude to assess emotions and expected welfare valuation as events are occurring, as we have done in some of our other work (Smith, Pedersen, Forster, McCullough, & Lieberman, under review).

In addition to the issue regarding the actual index of expected welfare valuation, it is possible that the measure we used to assess WTR does not perform at the level we want it to for the purpose of this study. Considering that the measure works with hypothetical scenarios that involve monetary benefits, it is possible that we were unable to capture the true extent of participants' motivations regarding their willingness to trade off benefits with others. Although much work has been done on validating this type of measure (Delton, 2010), and has even extended it to study social emotions, including gratitude (Lim, 2012), we think it is important to advance this area by assessing whether people make similar tradeoff decisions when they involve different types of resources and under varied circumstances (e.g., time or effort spent on the behalf of others). Further, we think it is important to further test the robustness of welfare tradeoff decisions under hypothetical tradeoffs, especially if the measure will be used to predict responses to other hypothetical scenarios.

Finally, we think it is important to question the model of gratitude and expected welfare valuation that we sought to test. As we stated before, we are very confident that our results accurately reflect the relationship among these variables within our experimental design; however, to the extent that our design conforms to other studies on which evidence for the role of welfare valuation in social emotions is based (e.g., Lim, 2012; Sznycer et al., 2016), we think that our results make apparent the need for more precise specifications regarding the aspect(s) of welfare valuations that one should expect to play important roles in various social emotions. Whether welfare valuation is actually important for understanding gratitude will need to be determined through more rigorous testing of the various possible hypotheses. In light of the results here and from our other research (Smith et al., under review), we currently believe that welfare valuation is important for understanding gratitude, but that it is most important to study the dynamics of how welfare valuations change, rather than simply where they begin.

To conclude, the experiments presented here provide evidence that anticipated feelings of gratitude are predicted by benefit value, but not by expected welfare valuation. Despite the theoretical connection between expected welfare valuation and gratitude, our methods might not have adequately engaged gratitude-expression systems. Additionally, gratitude might be better predicted by the positive changes in expected welfare valuation that result from acts of benefit delivery, than by current expected welfare valuation. Future studies that examine real-time gratitude expression in response to actual acts of benefit delivery and that examine the relationship between gratitude and changes in expected welfare valuation would be very useful additions to the field's understanding of this important emotion.

Appendix A. Stimuli for Welfare Tradeoff Ratio questionnaire, $WTR_{other \rightarrow self}$, used in Experiments 1 and 2

Imagine that [Target] was in the following situation:

We could pay either you or [Target] a sum of money that the person could use for anything he or she wished. The money would be his/hers to keep. Please consider the following choices as if they were real money and *choose which option you believe [Target] would prefer.*

$85 for [Target]	OR	$75 for you
$75 for [Target]	OR	$75 for you
$65 for [Target]	OR	$75 for you
$55 for [Target]	OR	$75 for you
$45 for [Target]	OR	$75 for you
$35 for [Target]	OR	$75 for you
$25 for [Target]	OR	$75 for you
$15 for [Target]	OR	$75 for you
$5 for [Target]	OR	$75 for you
$0 for [Target]	OR	$75 for you

Appendix B. Stimuli for scenarios in Experiment 1

As you think about how you would feel in response to the situation below, please keep the following assumptions in mind:

- *Each scenario happened in isolation from all other scenarios.*
- *[Target] is in good health and in a financially secure position.*

How grateful would you feel?					
Not at all	Very Little	Somewhat	Moderately	Very Much	Extremely
1. [Target] wishes you a good day.					
2. [Target] tells you a funny joke.					
3. [Target] lets you go in front of them in the grocery line.					
4. [Target] holds a door open for you.					
5. [Target] pays for your lunch.*					
6. [Target] sees you on the side of the road with a flat tire and helps you change your tire.					
7. You are trapped in a burning building. [Target] decides to enter the building and saves your life.					
8. [Target] sees that a large truck is about to hit you and pushes you out of the way.					
9. [Target] sees you accidentally drop your wallet, picks it up, and returns it to you.					
10. [Target] tells you that you left your car headlights on.					
11. [Target] cooks a meal for you.					
12. [Target] gives you a ride to the airport.					
13. Someone is mugging you. [Target] steps in and defends you.					
14. Someone is insulting you. [Target] steps in and defends you.					
15. You are sick. [Target] offers to pick up your prescriptions.					
16. [Target] gives you $1.					
17. [Target] gives you $10.					
18. [Target] gives you $100.					
19. [Target] gives you $1000.					
20. You have a middle seat on an airplane. [Target] switches seats with you so that you could be more comfortable.					

* Scenario was displayed twice.

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