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BRIEF ARTICLE

Evidence for a relationship between trait gratitude and prosocial behaviour

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ABSTRACT

Prosocial behaviour towards unrelated others is communally beneficial but can be individually costly. The emotion of gratitude mitigates this cost by encouraging direct as well as “upstream” reciprocity, thereby facilitating cooperation. A widely used method for measuring trait gratitude is the Gratitude Questionnaire (GQ6) [McCullough, M., Emmons, R., & Tsang, J. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82, 112–127. Retrieved from <http://dx.doi.org/10.1037/0022-3514.82.1.112>]. Here we undertake an assessment of the external validity of the GQ6 by examining its relationship with two incentivized economic games that serve as face valid indices of generosity and reciprocity. In two studies (total $N = 501$) we find that trait gratitude as measured by the GQ6 predicts greater donations in a charity donation task as well as greater transfers and returns in an incentivized trust game. These results support the hypothesis that individuals with higher trait gratitude are more generous and trusting on average, and provide initial evidence as to the predictive validity of the GQ6.

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By facilitating cooperation, *generosity* and *trust* are essential components of human interaction (Gardner & West, 2004). While both can be individually costly, they tend to increase the payoff of others, and so can be considered forms of *prosocial behaviour*, that is, actions that contribute to others’ well-being (Brief & Motowidlo, 1986). An enduring question is how prosocial behaviours can stabilise in a population given the possibility of free-riders, who might benefit from others’ generosity without paying the costs of their own prosocial behaviour (Komter, 2010). One suggestion is that prosocial emotions, most notably gratitude, serve as psychological levers that propagate prosocial behaviour through communities (Nowak & Roch, 2007). Typically, gratitude arises in situations where an individual has benefited from costly, intentional, and voluntary effort on their behalf (McCullough, Kimeldorf, & Cohen, 2008).

Once elicited, gratitude is thought to coordinate the individual’s physiological and behavioural

responses by channelling positive emotion into prosocial behaviour (McCullough, Emmons, & Tsang, 2002) or “paying it forward” to third parties (Bartlett & DeSteno, 2006; McCullough, Kilpatrick, Emmons, & Larson, 2001; Nowak & Roch, 2007). It also signals to observers that the conferred benefit is valued (Klapwijk & Van Lange, 2009).

Past work supports a role for gratitude in motivating prosocial behaviour. For example, individuals induced with gratitude prior to participating in a prosocial task were more helpful than the control group (Tsang, 2006) and individuals were willing to spend more time helping a confederate with a tedious task if they were primed with gratitude as opposed to amusement or a neutral emotion (Bartlett & DeSteno, 2006). In addition to this experimental work, others have investigated *trait gratitude*, that is, the dispositional tendency towards experiencing life events in ways that induce gratitude. The most frequent measure to assess trait gratitude is the 6-item

Gratitude Questionnaire (GQ6; McCullough et al., 2002). In one influential study researchers found a positive relationship between trait gratitude as measured by the GQ6 and other self-reported prosocial traits (McCullough et al., 2002), and the scale is now widely used (Froh et al., 2011).

The present study contributes to this literature by assessing the predictive validity of the GQ6 using real prosocial behaviour rather than self-reports or relationships with other scales. More specifically, we examined its ability to predict contributions in incentivized economic games that are commonly used to measure generosity and trust and thus reflect the behavioural signature associated with gratitude (Johnson & Mislin, 2011). Using these tasks allows us to investigate the critical cases in which gratitude is individually costly, thereby linking our work to earlier research investigating the implications on game theory of costly behaviour (Nowak & Roch, 2007).

To achieve a measure of generality, we employed two different economic games, namely a charity donation task and a trust game. In our operationalisation of the charity donation task the participant received an allotment of money as a bonus (above and beyond their “show-up fee” for completing the study) and could donate any portion of that money to a charity of their choice, keeping whatever they did not donate for themselves. This procedure was designed to mimic the dictator game (DG; Engel, 2011). In the DG, a participant receives an endowment and is allowed to share any portion of that endowment with a random partner. The participants’ decision can be considered a measure of their basic inclination toward generosity versus thrift.

The trust game (TG) is a two-player game. The player in role A receives an endowment and can send some or all of that endowment to the player in role B. Any money sent to the player in role B is tripled; they can then return any portion they would like the Player A, keeping the rest for themselves (Berg, Dickhaut, & McCabe, 1995). Under conditions of complete trust, the player in role A can maximise earnings by transferring the whole endowment (which would be tripled) to the player in role B, who would then send back 50%, thereby increasing the return for both players. However, once player A has made a decision they no longer have any ability to influence player B, giving player B an opportunity to keep the entire endowment. In addition to these general trust dynamics, the experimental design allows for two data collection opportunities by

asking participants to make decisions corresponding to both roles, that is, in role A and role B. The TG is widely used to measure general trust and confidence in future reciprocity (Johnson & Mislin, 2011).

While the GQ6, DG, and TG are independently well-established, past research has not investigated their relationship (though see Tsang, Schulwitz, & Carlisle, 2012, who found no relationship between GQ6 and a monetary transfer during an ongoing interpersonal interaction). By combining tools from positive psychology and behavioural economics, we hope to demonstrate the external validity of the GQ6 scale and introduce a more objective method for investigating the role of trait gratitude in prosocial behaviour.

Study 1

Sample size determination, all data exclusions, manipulations, and measures are fully reported here. Anonymized data are available at <https://osf.io/t2fwh/>.

Participants

A total of 251 adults with US IP addresses (60% male, mean age = 34.6 years) were recruited through an online labour market, Amazon’s Mechanical Turk (MTurk), a data source which generally returns results comparable to lab studies (Paolacci & Chandler, 2014; Raihani, Mace, & Lamba, 2013). Target sample size of 250 was determined by that necessary to detect an effect size $|r| > .15$ with 80% power. Participants were compensated with a show-up fee of \$0.50, but they also had the opportunity to earn additional money through the economic game described below.

Materials and methods

Participants completed the charity donation task and the 6-item Gratitude Questionnaire (GQ6) in counter-balanced order, followed by demographic items.

In the DG participants were given an \$0.80 bonus, which they could allocate to themselves and a charity however they would like. Past research on stake size suggests that \$0.80 should produce interpretable results in this kind of economic game (Amir, Rand, & Gal, 2012). Participants could choose between five well-known charities chosen to avoid strong political or ideological views which might lead a given individual to be disinclined to donate: The American Red Cross, Meals on Wheels, Teach for

America, The Humane Society, and UNICEF. The survey emphasised that money would actually be donated according to participants' instructions, and summed contributions were donated after data collection was completed.

Trait gratitude was measured with the GQ6 (McCullough et al., 2002). It consists of six items such as "I have so much in life to be thankful for" and "I am grateful to a wide variety of people." As in prior work we summed items (after inverting two reversed items) to form a single index of trait gratitude.

Participants also completed single items assessing their liberal to conservative political views, income, and religiosity, all measured on 5-point Likert-like scales. These items were collected in order to confirm whether any relationships between gratitude and generosity remained after controlling for demographic factors which have previously been shown to correlate with the GQ6 (McCullough et al., 2002). Finally, participants reported their income bracket on a 5-point scale with cut-offs at \$25 k, \$50 k, \$75 k, and \$100 k.

Results and discussion

Descriptive statistics

The GQ6 exhibited high internal consistency, Cronbach's $\alpha = 0.91$ (95% CI = .86; .96). Descriptive statistics and zero-order correlations between primary variables are presented in supplementary online materials (SOM). The average gratitude score was 31.8 out of 42 ($SD = 7.5$). Preliminary analysis did not reveal an effect of task order (DG versus GQ6 first), $t(249) = .87$, $p = .38$, so this factor was dropped from subsequent analyses. However, an effect of gender was evident, $t(248) = 3.84$, $p < .001$, $d = .49$, with men ($M = 30.3$) scoring lower on the GQ6 than women ($M = 34.0$). Trait gratitude also showed modest positive correlations with political conservatism, family income, and religiosity.

In the dictator game participants donated an average of \$0.18 ($SD = \0.24) out of their bonus of \$0.80, bootstrapped 95% CIs = [$\$0.15$; $\$0.21$]. The values donated spanned the entire available range from \$0–0.80. Responses were not impacted by task order, $t(249) = 1.33$, $p = .18$. Neither income, political orientation, or religiosity significantly predicted donations. However, there was an effect of gender, $t(248) = 2.25$, $p = .03$, with women ($M = 0.22$) donating more than men ($M = .15$), Cohen's $d = .29$.

Relationship between gratitude and donations in the DG

There was a statistically significant zero-order correlation between trait gratitude and generosity in the DG, $r(249) = .17$, $p = .006$, Figure 1 (left panel), indicating that each 1 SD difference in gratitude corresponded to a difference in average donations of \$0.04. In a regression predicting donations, the relationship between gratitude and donations remained significant and at a similar magnitude ($t = 2.26$, $p = .02$, $\$0.036$) when controlling for the three demographic correlates, namely political orientation, religiosity, and income. As noted above, gender was a predictor of both trait gratitude and donations, with women scoring higher on the GQ6 and donating more in the DG. When gender was included (Model 3) the effect of trait gratitude remained marginally significant, $t = 1.93$, $p = .055$, accounting for \$0.031 for each 1 SD unit of gratitude, and no other predictors, including gender, reached conventional levels of significance. Full regression tables are provided in SOM. Thus, gratitude appeared to reliably predict donation behaviour in the DG.

Given the robust zero-order correlation between gender and both our primary predictor and outcome, we conducted an exploratory analysis examining the interactive effect of gender and gratitude on donations. This model revealed a significant interaction between gender and trait gratitude, $t = 2.01$, $p = .046$. Examining each gender separately revealed the expected relationship between gratitude and donations in women, $t = 2.93$, $p = .0042$, but not in men, $t = .62$, $p = .53$. However, because this analysis was exploratory and not motivated by any a priori hypothesis, we withhold discussion of this finding until the general discussion.

Study 2

Study 2 conceptually replicates Study 1 with an economic game geared at assessing cooperative tendencies rather than generosity. We retained most aspects of Study 1 while including the trust game instead of the dictator game. Given the correlation between gender and gratitude in Study 1, Study 2 also gave us the opportunity to evaluate this relationship in a confirmatory design. In terms of specific hypotheses, we expected transfers as player A in the trust game to be associated with trait gratitude. We also expected returns by player B following non-zero transfers from

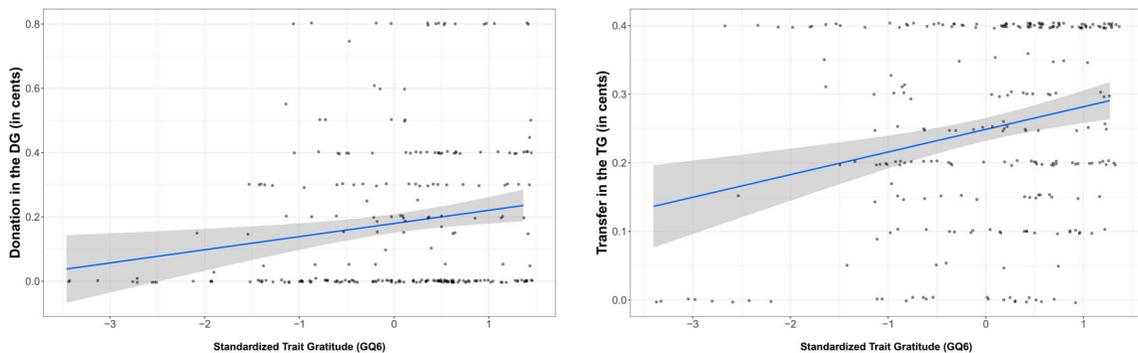


Figure 1. Fitted relationship between trait gratitude and economic behaviour. Left panel: Relationship between trait gratitude and donations in the charity Dictator Game (Study 1). Grey band represents the 95% confidence band around the linear regression. Jitter added to reveal overlapping data points. Right panel: Relationship between trait gratitude and initial transfer in the Trust Game (Study 2). Grey band represents the 95% confidence band around the linear regression. Jitter added to reveal overlapping data points.

player A to be associated with gratitude, and in particular returns following higher initial transfers, which should increasingly elicit gratitude as the amount of the initial transfer (and so the trust it implies) increases.

Participants

The demographics of this sample were similar to those of participants in Study 1. We collected responses from 250 adults with US IP addresses (60% male, mean age = 34.6 years) again recruited through MTurk. Participants were given a show-up fee of \$0.30 but had opportunities for further compensation based on their decisions in the study.

Materials and methods

The method and measures were identical to Study 1 except a trust game (TG) was substituted for the dictator game. The TG and the GQ6 were presented in counterbalanced order, followed by the same demographic items as in Study 1.

In the TG participants were told that they had the opportunity to earn up to \$1.20 in additional bonuses depending on their decisions as well as the decisions of a partner, an anonymous MTurk worker. The trust game had two roles: role A and role B. In role A, participants were given \$0.40, and told they could give any portion of that endowment to their partner. They were informed that whatever amount they sent to their partner would be tripled. Furthermore, their partner would then have the opportunity to return any amount of funds back to them, if they

wished. All participants indicated the amount they would like to transfer in role A.

Participants then completed a series of items indicating their decisions in role B, that is, how much they would send back to the player in role A in response to all four levels of possible transfer. They indicated the amount they would return if the player in role A sent \$0.10 (tripled to \$0.30), \$0.20 (tripled to \$0.60), \$0.30 (tripled to \$0.90), or \$0.40 (tripled to \$1.20). All participants played both roles A and B, and were informed that one role would be selected at random to determine their bonus.

To pay out bonuses, participants were matched with the participant who completed the study in closest temporal proximity, with odd-numbered respondents assigned to role A and even-numbered respondents assigned to role B; thus, the actual choices made by the two participants determined each player's bonus.

Results

Descriptive statistics

The GQ6 again exhibited high internal consistency, Cronbach's $\alpha = 0.90$ (95% CI = .88; .92). Descriptive statistics and zero-order correlations between primary variables are available in SOM. The average gratitude score was 32.2 (SD = 7.7). Preliminary analysis did not reveal an effect of task order (TG versus GQ6 first), $t(253) = .06$, $p = .95$, and so this factor was dropped from subsequent analyses. However, an effect of gender was again evident, $t(249) = 3.48$, $p < .001$, $d = .44$, with men ($M = 30.5$) scoring lower on the GQ6 than women ($M = 33.9$). Trait gratitude also showed a modest positive correlation with religiosity,

but the correlations between gratitude and income and political conservatism that were significant in Study 1 did not replicate in this sample.

In the trust game participants in the role A transferred an average of \$0.25 ($SD = \0.14) out of their initial endowment of \$0.40, bootstrapped 95% CIs = [\$0.23; \$0.27]. The values spanned the entire available range from \$0.00 to \$0.40. There was no effect of task order on amount transferred, $t(248) = .88, p = .38$ and transfers did not correlate with any other variables. In role B, participants returned \$0.09 (.08), \$0.21 (.13), \$0.35 (.19), and \$0.48 (.26) on average when they received transfers of \$0.10, \$0.20, \$0.30, and \$0.40, respectively (multiplied to a final amount received of \$0.30, \$0.60, \$0.90, and \$1.20).

Relationship between gratitude and initial transfers in the TG

There was a statistically significant zero-order correlation between trait gratitude and transfers in role A in the TG, $r(248) = .24, p < .001$, [Figure 1](#) (right panel), indicating that every 1 SD increase in gratitude score corresponded to an additional \$0.033 transferred. In a regression predicting transfers, this relationship survived the inclusion of political orientation, religiosity, income, and gender; in fact, the estimate associated with the effect of gratitude was numerically larger with the inclusion of these controls, amounting to an increase of \$0.036 for each 1 SD unit on the GQ6. Full regression tables are provided in SOM. Thus, replicating the primary result of Study 1, trait gratitude reliably predicted prosocial behaviour in an economic game.

Study 1 suggested that the effect of gratitude on donations in the DG was driven by female participants. To determine whether this pattern appeared here, we again regressed transfers in the TG on gender, gratitude, and their interaction. However, neither the effect of gender nor the interaction between gender and trait gratitude approached significance, both $t < .13, p > .22$. Thus the effect of trait gratitude on transfers in the TG was not moderated by participant gender.

Relationship between gratitude and returns in the TG

Participants also participated in role B in the trust game, indicating how much they would send back for each level of transfer received, in \$0.10 increments

between \$0.10 and \$0.40 (multiplied to \$0.30–\$1.20). To analyse the influence of gratitude on transfers we fit a mixed linear model with responses clustered on participant, predicting amount sent back as a function of trait gratitude and the amount transferred by the partner in role A. This analysis revealed the expected main effect of trial type, $F(3, 735.96) = 679.38, p < .001$, a main effect of trait gratitude, $F(1, 248.62) = 7.92, p = .005$, and an interaction between trial type and gratitude, $F(3, 735.75) = 8.71, p < .001$, suggesting that the relationship between gratitude and returns increased as the amount sent increased ([Figure 2](#)). Decomposing the interaction by fitting an independent linear model for each level of initial transfer demonstrated that while gratitude did not reliably effect returns following an initial transfer of \$0.10 ($p = .10$), it did affect returns following initial transfers of \$0.20 ($p = .03$), \$0.30 ($p = .02$), and \$0.40 ($p = .001$). These results were robust to the inclusion of gender, income, religiosity, and political orientation, none of which reached conventional standards of significance. Thus, as with initial transfers, trait gratitude robustly predicted returns, consistent with our hypothesis that for individuals high in trait gratitude receiving an initial transfer in the trust game elicited greater feelings of gratitude and thus higher returns. Interestingly, this result did not appear when participants received the minimum non-zero transfer of \$0.10, perhaps because this transfer amount seemed selfish or untrusting. Importantly, individuals high in trait gratitude are not simply more generous across the board, but rather tune their responses to the behaviour of their interaction partners (cf. Ma, Tunney, & Ferguson, 2014, for related findings with state gratitude).

General discussion

We explored the relationship between generosity, trust, and trait gratitude as assessed by the GQ6. Many researchers have found support for this relationship when relying on self-report measures, but this is the first study to address it using incentivized economic behaviour with real stakes. Our results reinforce the predictive validity of the GQ6 by demonstrating that it is an indicator of both generous and trusting behaviour: participants with higher trait gratitude tended to give more to charity and to make larger transfers in both roles of the trust game.

A handful of demographic factors also predicted trait gratitude, though these findings were not wholly consistent across our two studies. In Study 1

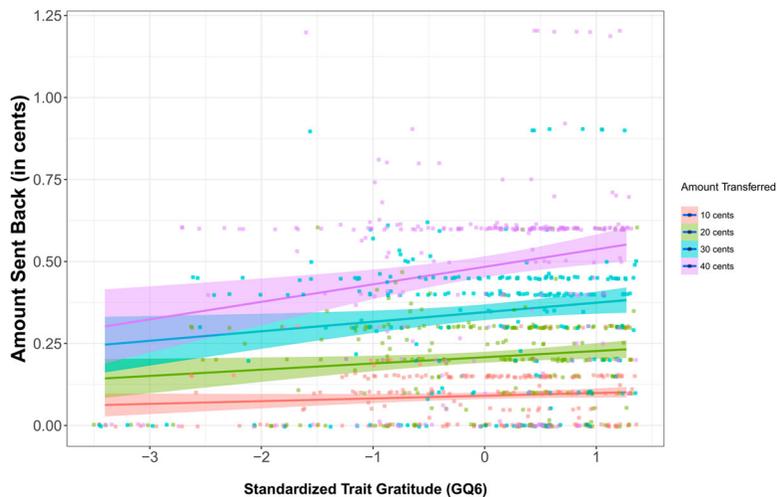


Figure 2. Fitted relationship between trait gratitude and amount sent back in role B in the Trust Game for four levels of initial transfer (Study 2). Coloured bands represent 95% confidence bands around the linear regression. Jitter added to reveal overlapping data points.

gratitude as measured by the GQ6 was correlated with gender, with women scoring higher than men. The GQ6 also correlated positively with political conservatism, income, and religiosity. A similar trend was observed for gender and religiosity in Study 2, but relationships with conservatism and income did not appear in that sample. Most critically, however, our key findings were robust to including these factors as control variables, suggesting that the relationship between gratitude and prosocial behaviour is not an artifact of demographic factors.

One interesting difference across studies was the interactive effect of gender; in Study 1 the relationship between gratitude and donations in the DG was driven by female participants. While this interaction exceeded conventional levels of significance in Study 1, we do not offer a rich interpretation of this finding because we did not predict it, and it did not reappear in the confirmatory context of Study 2. However, we do briefly note that some studies find that women are more generous in the DG (Eckel & Grossman, 1998), and that the DG is a purer measure of unilateral generosity. By contrast, the TG is a bilateral game more closely linked to reciprocity. It is possible that gender differences are more likely to appear on the former type of task than the latter. Additional work would be necessary to settle this matter.

While our results support the hypothesis that gratitude and prosocial behaviour are positively correlated, more research would bolster this conclusion. Repeating these experiments using additional economic

games would better characterise the extent of the relationship between prosocial behaviour and gratitude. It would also be useful to probe the effects of task order further; while the order in which participants completed the gratitude questionnaire and economic games had no effect on our results, Tsang (2006) found that inducing gratitude in participants led to greater generosity in the dictator game. Thus, the absence of a priming effect suggests that simply completing a gratitude questionnaire does not induce gratitude.

More generally, our results support rich interpretations of the results of past work that depended on self-report measures: The GQ6 reliably predicts generous and cooperative behaviour, even when it comes at a cost.

Disclosure statement

No potential conflict of interest was reported by the authors.

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