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A social-cognitive model of trait and state levels of gratitude

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Abstract

Three studies tested a new model of gratitude, which specified the generative mechanisms linking individual differences (trait gratitude) and objective situations with the amount of gratitude people experience after receiving aid (state gratitude). In Study 1 all participants (N = 253) read identical vignettes describing a situation where they received help. People higher in trait gratitude made more positive beneficial appraisals (seeing the help as more valuable, more costly to provide, and more altruistically intended), which fully mediated the relationship between trait and state levels of gratitude. Study 2 (N = 113) replicated the findings using a daily process study, where participants reported on real events each day for up to14 days. In Study 3, participants (N = 200) read vignettes experimentally manipulating objective situations to be either high or low in benefit. Benefit appraisals were shown to have a causal effect on state gratitude, and to mediate the relationship between different prosocial situations and state gratitude. The three studies demonstrate the critical role of benefit appraisals in linking state gratitude with trait gratitude and the objective situation.

KEYWORDS: gratitude, personality, social-cognitive, attribution, positive psychology, emotion, trait, state, well-being.

A social-cognitive model of trait and state levels of gratitude.

Throughout history, philosophical and theological discussions have viewed gratitude as fundamental to understanding people, their relationships, and the operation of society (Emmons & Crumpler, 2000). In contemporary society gratitude seems still to play an important role, with most people reporting feeling gratitude very frequently (McCullough, Emmons, & Tsang, 2002). However it is only recently that psychological research has begun systematically to study gratitude (McCullough, Kilpatrick, Emmons, & Larson, 2001), possibly in part due to the traditional neglect of positive emotions in psychology (see Linley, Joseph, Harrington, & Wood, 2006).

Emotions can be conceptualized on state and trait levels (Rosenberg, 1998). At the state level, emotions involve temporary affects or longer duration moods, which may have associated thought and action tendencies. At the trait level, emotions are characterized by individual differences in the average frequency with which affects and moods are experienced in daily life. The study of gratitude has almost exclusively focused on one or other of these levels, and there is little knowledge about how trait and state levels of gratitude interact (McCullough, Tsang, & Emmons, 2004).

Trait gratitude has been shown to have unique associations with other prosocial traits (e.g. McCullough et al., 2002; Wood, Joseph, & Linley, 2007a; Wood, Maltby, Stewart, & Joseph, in press) and to be a causal predictor of well-being (Emmons & McCullough, 2003; Lyubomirsky, Sheldon, & Schkade, 2005; Seligman, Steen, Park, & Peterson, 2005). State gratitude is an affect which occurs after a person has been helped, and which motivates the reciprocation of aid (Bartlett & DeSteno, 2006; McCullough et al., 2001; Tsang, 2006). Using a daily process methodology, McCullough, et al. (2004) have shown that higher trait levels of gratitude is related to more frequent and intense experiences of state gratitude in daily life. However, the mechanisms which explain why trait gratitude is related to state gratitude have not yet been demonstrated. If two people receive help in an identical situation, it is intuitive

that the person higher in (trait) gratitude would feel more (state) gratitude. There is currently no explanation of why this might occur.

We propose a model where characteristic interpretive biases in appraising prosocial situations mediate the relationship between trait and state levels of gratitude. First, we suggest that after a person is helped he or she makes several attributions about the nature of the aid, and the attributions naturally group together to form a benefit appraisal. Second, we suggest that the benefit appraisals cause the experience of state gratitude. Third, we suggest that characteristic interpretive biases lead people higher in trait gratitude to make more positive benefit appraisals. Fourth, we suggest that more positive benefit appraisals explain why trait and state levels of gratitude are linked. This model is presented in Figure 1. [Figure 1]

Two previous studies suggest which attributions may compose a benefit appraisal. Tesser, Gatewood, and Driver (1968) gave participants three vignettes detailing a hypothetical situation in which they were given help by another person. The vignettes were manipulated to provide low, medium or high perceptions of (a) the value of the help, (b) how much it cost the benefactor to provide the help, and (c) to what extent the benefactor genuinely wanted to help them (as opposed to having ulterior motives). Participants rated their attributions of the situation in terms of value, cost, and genuinely helpfulness, and indicated how they would feel on a composite variable of gratitude and indebtedness. Manipulating the vignettes led to different attributions, suggesting that these attributions are in part caused by the objective situation. Complex interactions were seen between the manipulations, where manipulating one appraisal affected perceptions of other appraisals (e.g., manipulating value additionally led to higher perceptions of genuine helpfulness, and manipulating genuine helpfulness additionally led to higher perceptions of value). This suggests that these appraisals are not independent, but perhaps operate as part of a wider benefit appraisal. Manipulating perceptions of value, cost, and genuine helpfulness caused

increases in gratitude/indebtedness, and perceptions of these variables jointly accounted for between 52% and 64% of the variance in the gratitude/indebtedness variable.

Tesser et al. (1968) should be treated with caution as gratitude and indebtedness have since been shown to be distinct emotions, with different causes and associated action tendencies (Watkins, Scheer, Ovnicek, & Kolts, 2006). However, confidence in the findings is increased by Lane and Anderson (1976), who demonstrated similar findings through a similar methodology by manipulating value and the benefactor's good intentions. Taken together, these two studies present evidence for which attributions may combine to form a benefit appraisal. They also provide support for our model's predictions that benefit appraisals are in part caused by situational factors and that benefit appraisals cause state gratitude (see Figure 1).

If benefit appraisals are the proximal causal agents of state gratitude, then these appraisals are the likely mechanism with which to explain the relationship between trait and state levels of gratitude. We expect trait gratitude to be related to characteristic interpretive biases in benefit appraisals. Essentially, we suggest that people who feel a lot of gratitude in life have specific appraisal tendencies which lead them to characteristically appraise the benefits of help-giving situations more positively than less grateful people.

Previous research has suggested that people process information about others in such a way that is consistent with their own self-identity (Bargh, Lombardi, & Higgins, 1988; Markus, 1977). For example, highly masculinity is associated with a bias in information processing which emphasizes the masculine characteristics of others (Markus, Smith, & Moreland, 1985), even when the other people's behavior is irrelevant to the issue of masculinity (Higgins & Brendl, 1995). We suggest that a similar process occurs where grateful people have specific appraisal tendencies leading to gratitude relevant interpretations of the behavior of other people. Specifically we suggest that grateful people make distinct benefit appraisals, perceiving the help they receive as more costly to the benefactor, more

genuinely intended to help them (rather than ulteriorly motivated), and more valuable. Broadly, this would also be consistent with the large body of work showing that there are distinct attributional biases associated with depression (e.g. Bodner & Mikulincer, 1998), and emotions more generally (Beck, 1976). The current studies aim to test whether more positive benefit appraisals represent distinct attributional biases of grateful people, and whether these biases are the mechanism explaining why grateful people feel more gratitude in social situations. These predictions lead to the model presented in Figure 1. This model is fundamentally social-cognitive in nature (cf. Bandura, 1999; Cervone, 2004) as it integrates social situations, individual differences, and the mediating cognitive mechanisms.

Three studies are presented which test this social-cognitive model of gratitude. In Study 1 identical vignettes were presented to participants to test whether, when faced with the same situation, people higher in trait gratitude appraise the situation as more beneficial, and whether benefit appraisals mediate the relationship between trait and state levels of gratitude. Study 2 replicates the first study using a daily-process methodology, where people reported on real events which happened over a two week period. This methodology also revealed the extent to which state gratitude was determined by situational factors relative to stable individual differences. In Study 3 benefit appraisals are directly manipulated to see whether benefit appraisals are affected by objective situation, and whether benefit appraisals have a causal effect on state gratitude. Together these three studies provide a full test of the model in Figure 1.

<center>Study 1</center>

<center>*Introduction*</center>

Study 1 used structural equation modeling to test the social-cognitive model of gratitude. Benefit appraisal was defined as a latent variable, with the attributions of cost, value, and genuine helpfulness as indicators. The core test of Study 1 focused on whether benefit appraisals mediated the relationship between trait and state levels of gratitude.

Method

Participants

Two hundred fifty three undergraduates (214 females, 39 males) at a British university participated in return for course credit. Several alternate options for course credit were available for students who did not want to participate. Participants' ages ranged from 18 to 38 (M = 19. 53, SD = 2. 62), with 94% aged between 18 and 21. Participants were predominantly of a White (78%) or Indian (10.3%) ethnic background.

Design and Procedure

Each participant filled out the same questionnaire. This questionnaire contained three vignettes, each of which was followed by five questions. Each of the vignettes detailed a situation where the participant had been helped by another person. The topics of the vignettes were being assisted with coursework, requesting and receiving a job reference and being assisted by another customer in a supermarket (see the Appendix for a sample vignette). The situations described were designed to be ambiguous, and not to suggest any particular attribution.

Participants were asked to imagine that they were being helped in the way the vignette had described. They were then asked to answer the five questions that followed presentation of the vignette on the six point scales:

1. "How much benefit do you think that the person expected to get in return for helping you?" (1 = 'no benefit', 6 = 'a lot of benefit'). This item was reverse coded, and measured the extent to which participants believed that their benefactor did not expect to gain anything from providing the help, which we termed *selflessness*.

2. "How much was this person motivated by a sincere desire to help you?" (1 = 'not at all motivated', 6 = 'totally motivated'). This assessed perceptions of the benefactor's *genuine helpfulness*.

3. "How much did it cost the person to help you (in terms of time, effort, financial cost etc.)?" (1 = 'nothing', 6 = 'a great deal'). This assessed perceived *cost*.

4. "How valuable do you think that this person's help was to you?" (1 = 'not at all valuable', 6 = 'extremely valuable'). This assessed perceived *value*.

5. "How much gratitude would you feel towards this person?" (1 = 'no gratitude', 6 = 'a very lot of gratitude'). This assessed *state gratitude*.

Each of the responses to these five questions were averaged over the three vignettes, so each participant had one score for each of the study variables. The selflessness question showed a very poor pattern of correlations with all of the other variables, and was omitted from subsequent analysis.

Participants also completed the *Gratitude Questionnaire - 6* (GQ-6; McCullough et al., 2002), as a measure of trait gratitude. The GQ-6 is a six item self-report inventory rated on a 1 ('strongly disagree') to 7 ('strongly agree') scale. Two items are reverse scored, and potential scores range from 6 to 42, with higher scores representing higher levels of trait gratitude. Items measure how frequently people feel gratitude (e.g. , "Long amounts of time can go by before I feel grateful to something or someone" [reverse coded]), the intensity of the gratitude felt (e.g., "I feel thankful for what I have received in life"), and the range of events or people that elicit gratitude (e.g., "I feel grateful to a wide variety of people"). Good internal consistency has previously been shown (alpha = .82), and the GQ-6 is comprised of a robust one factor solution (McCullough et al., 2002). The order of the presentation of the GQ-6 was counterbalanced, so participants received the GQ-6 either before or after the presentation of the vignettes.

Results

Covariance structural equation modeling (SEM) was preformed using AMOS (Arbuckle, 2006). Model fit was tested with the chi-squared test, the comparative fit index (CFI), and the standardized root-mean-square residual (SRMR). Based on their Monte Carlo

analysis, Hu and Bentler (1999) suggest that good fit is indicated when CFI > .95 and SRMR < .08, and the least sum of Type I and Type II errors is present when using a combinational rule of CFI > .95 and SRMR < .09. Full correlation/covariance tables and descriptive statistics for each study are available from the first author.

The SEM model was designed to test whether benefit appraisals mediated the relationship between trait and state levels of gratitude. The basic model is presented in Figure 2, and showed an excellent fit (χ^2 [df = 4] = 6.90; CFI = .99; SRMR = .03).

[FIGURE 2]

To test mediation, we used Baron and Kenny's (1986) three steps and Sobel's (1982) test. Baron and Kenny's (1986) first step requires the predictor to be related to the outcome. An standard univariate regression analysis showed that trait gratitude predicted state gratitude (β = .23, p < .001). The second and third steps were tested with the SEM model in Figure 2. This model shows that the predictor (trait gratitude) is related to the mediator (benefit appraisal). The model also shows that mediator (benefit appraisal) is related to the outcome (state gratitude) controlling for the predictor (trait gratitude). This fulfills Baron and Kenny's second step.

The model further shows that controlling for the benefit appraisals substantially reduced the relationship between trait and state levels of gratitude (from β = .23, p < .001 to β = .02, p = .65). Sobel's (1982) test shows whether this reduction in beta is statistically significant. This test is mathematically equivalent to testing the significance of the mediated pathway from trait gratitude to state gratitude through benefit appraisals (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The Sobel test was significant (z = 3.60, p < . 001) indicating that mediation had occurred. To test whether mediation was complete we compared the model in Figure 2 with a second model where there was no direct path from trait to state gratitude. The fit of the second model was excellent (χ^2 [df = 5] = 7.09; CFI = . 99; SRMR = .03), and not significantly worse than the basic model in Figure 2 ($\Delta\chi^2$ = .19;

$\Delta df = 1$; $p = .66$). Thus on the basis of parsimony the second model is to be preferred, and full mediation was indicated. The demonstration of full mediation completes Baron and Kenny's third step.

Discussion

Study 1 presented preliminary support for the social-cognitive model of gratitude. Cost, value, and genuine helpfulness were shown to be good indicators of a latent benefit appraisals construct. When measured without error, the benefit appraisals that people made explained 83% of the variance in state gratitude. When faced with identical hypothetical situations, people higher in trait gratitude made more positive benefit appraisals, and believed that they would feel more state gratitude. Benefit appraisals fully mediated the relationship between trait and state levels of gratitude.

Study 2

Introduction

Although widely used the vignette approach above suffers from some limitations, which we addressed in Study 2. The validity of vignette studies rests on the assumption that participants are both able to imagine the situation described, and that they have sufficient knowledge to accurately assess how they would think and feel in the given situation. Research into affective forecasting has shown that people are not always able to predict how they will feel in future situations (Gilbert, Lieberman, Morewedge, & Wilson, 2004; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998). It is therefore possible that Study 1 only assessed people's perceptions regarding the appraisals they would make and the amount of gratitude they would feel rather than the level of these variable they would actually experience in real life.

To rule out the possibility that we were only assessing perceptions of gratitude rather than actual appraisals, in Study 2 we used a daily-process methodology (Bolger, Davis, & Rafaeli, 2003), where people reported on real events which had recently occurred. Each day

for 15 days participants were asked to record a real instance where they had been helped during that day. They then rated the help in terms of cost, value, and genuine helpfulness, as well as rating the amount of gratitude they had felt when the event occurred. A daily process methodology also enabled the estimation of the proportion of the variance in state gratitude that was due to within person (situational) variability, and the proportion of variance due to between person (individual difference) variability (Nezlek, 2001). This will demonstrate whether most of the variance in state gratitude is situational variability (which may be partially predicted from benefit appraisals) or whether most of the variance is between person variability (which may be partially predicted by personality). The results were analyzed with multilevel data techniques, which permitted the examination of the interactions between trait gratitude and the daily experience of benefit appraisals and state gratitude (Luke, 2004; see also McCullough et al., 2004).

Method

Participants

One hundred and thirteen (85 females, 28 males) first year undergraduates from a major British university participated in the study as part of training in research methods. Participants were not penalized if they chose not to participate in the study. Ages ranged between 18 and 26 years ($M = 18.68$, $SD = 1.23$). Participants were predominantly of a White (84.1%) or Chinese (5.3%) ethnic origin.

Design and procedure

The study used a diary methodology, where participants were asked to complete a questionnaire each day for 15 days. Diary studies allow people to report on real events that have happened to them, within a time frame that limits retrospective bias. Given the high response burden on participants, it is particularly important to ensure compliance, particularly regarding whether people complete the questionnaires on the correct day, rather than completing all questionnaires at the end of the study (Bolger et al., 2003). To address this

issue we created an internet page on the university network. Participants logged onto this page each day using their university e-mail address as an unique identifier. Computers are readily available throughout the campus, and participants could additionally log on remotely using the internet. The time and date of the daily questionnaire submission was automatically encoded by the server following submission, making false reporting of the time of submission near impossible.

Participants were asked to try and complete an entry for every day, but told that if they forgot or were unable to complete a daily entry, then they should continue as normal the next day. The number of days participants completed ranged from 1 to 15 days ($M = 8.92$, $SD = 3.87$). This represents a 59.4% compliance rate, which is comparable with other diary studies where submission time was collected electronically. For the data techniques used it was not necessary for all participants to complete the same number of days, so no participant was excluded for low response rate (Nezlek, 2001).

Measures

On the day immediately before the start of the diary study participants completed the measure of GQ-6 measure of trait gratitude, as in Study 1. On each subsequent day participants were first asked to provide a paragraph that would "describe one event that occurred today where someone did something for you (e.g., lent you money, given you a lift)". These responses were not coded, but rather were intended to act as a cue for the participants to better remember the event. Participants were then asked the same four questions as in Study 1, designed to measure the state appraisals of cost, value, and genuine helpfulness. They were also asked how much gratitude they had felt when the event had occurred.

Data analysis

The data had a hierarchical structure, where each of the daily observations are nested within individuals. Multilevel modeling was preformed using the HLM 6 software (Raudenbush,

Bryk, Cheong, & Congdon, 2004). Multilevel modeling allows the simultaneous modeling of within person (Level 1) daily models, between person (Level 2) models of individual differences, as well as the interactions between the levels (Nezlek, 2001). Conceptually, multilevel modeling computes separate regression intercepts and slopes for each of the participants, on each of the days. The average (between person estimates) of these intercepts and slopes is estimated and modeled as a function of between person variables (for a description of the mathematical process see Luke, 2004). As HLM does not model latent variables, we restricted the analysis to a path model of observed variables.

Results

We first examined what proportion of the variance in state gratitude and the appraisals could be accounted for by (a) within person (state or situational) determinants, and (b) between person (stable or dispositional) determinants. The interclass correlation coefficient (ICC) was obtained for state gratitude and each of the appraisals by dividing the between person variance by the sum of the between and within person variance. The ICC for state gratitude was .22 (so 22% of the variance in state gratitude is attributable to between person factors, and 78% of the variance is within person, situational variability). The ICC was .18 for value, .16 for cost, and .25 genuine helpfulness. It seems that the vast majority of variance in state gratitude and in the attributions are accounted for by situational factors, with a moderate proportion of variance (between 16% and 25%) accountable to between person differences.

Path model

Multilevel modeling was used to test mediation, using the Baron and Kenny (1986) steps and the Sobel (1982) test. The application of these tests to multilevel designs is outlined by Krull and MacKinnon (2001). A multilevel regression showed that trait gratitude predicted daily experiences of state gratitude following help ($b = .03$, $SE = .01$, $\beta = .12$, $p < .01$),

fulfilling Baron and Kenny's first step. Further multilevel regressions were preformed to create the path diagram presented in Figure 3.

[Figure 3]

Trait gratitude led to appraisals of value and genuine helpfulness. Appraisals of value and genuine helpfulness led to state gratitude, controlling for trait gratitude. This fulfills the Barron and Kenny's second step. Controlling for value and genuine helpfulness reduced the relationship between trait and state gratitude from a significant β of .12 ($p = .03$) to a non-significant β of .02. This fulfills Baron and Kenny's third step, and indicated full or very substantial mediation. The Sobel (1982) test indicated that the mediated pathway from trait gratitude to state gratitude through value was significant ($z = 2.12, p = .03$), as was the mediated pathway through genuine helpfulness ($z = 2.05, p = .04$).

Discussion

Study 2 provided further support for the social-cognitive model of gratitude by fully replicating Study 1 using real events rather than hypothetical scenarios. Additionally, the vast majority of the variance in benefit appraisals was shown to be due to within person (situational) causes, rather than between person individual differences. It seems that state gratitude is largely determined by situations (and their interpretations), with trait gratitude being a smaller but robust determinant of state (through the mediating mechanism of benefit appraisals). The convergence of the results from Study 1 and 2 support the use of a vignette methodology for gratitude research.

Study 3

Introduction

Study 1 presented cross-sectional support of the social-cognitive model. Study 2 provided support for the predicted direction of the relationship between trait gratitude and both benefit appraisals and state gratitude, as the measurement of trait gratitude temporally preceded the events on which the appraisals and emotional reaction was based. Study 3

completed the test of the social-cognitive model, through experimentally manipulating the objective situation to test whether situations have a causal effect on benefit appraisals, and whether benefit appraisals have a causal effect on state gratitude. The latent benefit appraisal was manipulated by presenting two groups of participants with vignettes that were either high or low in each of the factors of cost, value, and genuine helpfulness.

In Study 3 we also aimed to see whether trait gratitude had an unique relationship with the benefit appraisals, or whether this relationship was due to a third personality variable. Gratitude has been shown to correlate moderately with the Big Five personality traits (McCullough et al., 2001), which appear to represent personality at the highest level of abstraction (Costa & McCrae, 1995; Goldberg, 1993; McCrae & Costa, 1999). The Big Five traits of extraversion and agreeableness both represent outgoing and prosocial tendencies (Costa & McCrae, 1995), which could be the real explanation of why grateful people make positive benefit appraisals after they have been helped. Alternatively, the appraisals of grateful people may lie in trait positive or negative affect, given the effects of mood on cognition (see Eich, Kihlstrom, Bower, Niedenthal, & Forgas, 2000). If this were the case, then the relationship between gratitude and state appraisals should not exist independently of the Big Five traits of extraversion, which includes trait positive affect, or neuroticism, which includes trait negative affect (Costa & McCrae, 1995). In Study 3 we administered the Big Five Inventory (John & Srivastava, 1999) along side the measure of trait gratitude, with the purpose of assessing whether trait gratitude was related to state gratitude and benefit appraisals above and beyond the effect of other broad personality variables.

Method

Participants

Two hundred participants (102 male, 98 female) were recruited from a local college of further education. Participants were aged between 18 and 59 ($M = 32.52$, $SD = 9.79$), and were predominantly White (63%), Indian (5%), or Black Caribbean (7%).

Design and procedure

Participants were randomly assigned to one of two groups. Both groups completed a questionnaire packet and read six vignettes. The vignettes that the participants received differed by group. We used a uni-factorial design where participants received vignettes either high or low in each of the factors of cost, value, and genuine helpfulness. Manipulating these factors together produced the largest possible difference between groups. A multi-factorial design was not viable, as each of the factors were shown in the first two studies to be indicators of the same latent construct, and the theoretical interest is in the causal effect of the latent construct and not in the unique effects of its constituent factors. Additionally, Tesser et al. (1968) showed that manipulating one factor (e.g., value) lead to changes in another factor (e.g., genuine helpfulness), suggesting that a multifactorial design would be confounded.

In Group 0 each of the vignettes detailed a situation with objectively low benefit, and in Group 1 each of the vignettes detailed a situation with objectively high benefit. All of the vignettes followed the same form. Both groups received the same first sentence describing a general hypothetical situation in which the participants were helped. The second sentence manipulated value (Group 0 = low, Group 1 = high). Both groups received the same third sentence, which was simply a filler sentence. The fourth sentence manipulated genuine helpfulness (Group 0 = low, Group 1 = high), and the fifth sentence manipulated cost (Group 0 = low, Group 1 = high). An example of the vignettes given to both groups is presented in the Appendix. In essence, participants in Group 0 received six vignettes which each described a situation low in objective benefit (operationalized as low in value, cost, and genuine helpfulness) and participants in Group 1 received six vignettes which each described a situation high in objective benefit (operationalized as high in value, cost, and genuine helpfulness). Any difference between the groups should be directly attributable to the objective value of the situation described.

Measures

Measures from Study 2. All participants completed the GQ-6 (McCullough et al., 2002), and following presentation of the vignettes answered the same questions on benefit appraisals and state gratitude as in Study 2.

Big Five. The Big Five Inventory (BFI; John & Srivastava, 1999) was used to measure the traits of neuroticism, agreeableness, extraversion, openness, and conscientiousness. The 44 item BFI has between 8 and 10 items for each trait, and for each trait Cronbach's alpha and test-retest reliability have been shown to range from .79 to .90 (John & Srivastava, 1999). The BFI also has very high convergent validity with other measures of the Big Five. Correcting for unreliability, each of the sub-scales correlates with the corresponding scales of the other widely used measures at between $r = .83$ and $r = .99$ (mean $r = .94$).

<div align="center">

Results

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Experimental Analysis

We tested whether (a) the situational manipulation had increased state gratitude, (b) whether the manipulation had successfully increased benefit appraisals, and (c) whether the manipulation had led to increased state gratitude because of increased benefit appraisals. Essentially Step *a* represents a test of the experimental effect of the IV (between group manipulation of the objective benefit of the situation) on the DV (state gratitude), Step *b* represents a manipulation check, and Step *c* represents a test of whether the experimental effect was due to the intended manipulation. Conceptually, this test is equivalent to testing whether benefit appraisals mediate the relationship between the objective situation and state gratitude.

The group variable was dummy coded 0 (low benefit) or 1 (high benefit). A standard univariate regression analysis showed that the manipulation had increased state gratitude ($\beta = .53, p < .001$), fulfilling Barron and Kenny's (1986) first step of mediation. The second part

of the analysis is presented in the structural equation model in Figure 4a. The fit of this model was excellent (χ^2 [df = 4] = 3.2; CFI = .99; SRMR = .01).

[Figure 4]

The group manipulation led to higher levels of benefit appraisals, showing that the manipulation was successful. Whilst controlling for the group manipulation, benefit appraisals led to state gratitude. This fulfils Barron and Kenny's second step. The model further shows that controlling for benefit appraisals substantially reduced the relationship between the group manipulation and state gratitude (from β = .53, p < .001 to β = -.06, p = .32). This reduction in β was statistically significant (z = 6.87, p < .001) according to Sobel's (1982) test. To test whether mediation was complete we compared the model in Figure 4a with a second model where there was no direct path from the group manipulation to state gratitude. The fit of the second model was excellent (χ^2 [df = 5] = 4.2; CFI = .99; SRMR = .01), and not significantly worse than the basic model in Figure 4a ($\Delta\chi^2$ = 1.0; Δdf = 1; p = .32). Thus on the basis of parsimony the second model is to be preferred, and full mediation was indicated. The demonstration of full mediation completes Baron and Kenny's third step.

Moderation

We tested whether trait gratitude moderated the relationship between the group manipulation and state gratitude or the benefit appraisals. Moderation would occur, for example, if people lower (or higher) in trait gratitude were more susceptible to the effect of the situational manipulation. Moderation was not predicted by the model, but would invalidate the mediational findings if present. Using the procedures described by Aiken and West (1991), four multiple regressions were preformed to sequentially test whether different levels of trait gratitude (the moderator) changed the magnitude of the relationship between the manipulation (the predictor) and the outcome variables of state gratitude, cost appraisals, genuine helpfulness appraisals, and value appraisals. In each of these analyses the outcome was regressed on the predictor (which was effects coded), the moderator (which was

standardized), and an interaction variable formed by multiplying the predictor and the moderator. In each of the tests the interaction variable was not significant (largest $\beta = -.04$, $t = -.670$, $p = .50$). Additionally, removing the interaction variable from the multiple regression lead to non-significant decreases in R^2 (largest $\Delta R^2 = .001$, $\Delta F = .45$, $p = .50$). These analysis indicated that moderation had not occurred.

Testing the full model

We tested whether benefit appraisals still mediated the relationship between trait and state levels of gratitude with the effects of the Big Five covaried. Gratitude was significantly correlated with extraversion ($r = .35$, $p < .001$), agreeableness ($r = .49$, $p < .001$), and neuroticism ($r = -.18$, $p = .01$), showing the importance of covarying these variables. We first conducted a standard univariate multiple regression, regressing state gratitude on trait gratitude and each of the Big Five. With the effects of the Big Five controlled, trait gratitude still predicted state gratitude ($\beta = .47$, $p < .001$), fulfilling Barron and Kenny's first step. The remaining steps were tested with the full model presented in Figure 4b. Each of the Big Five were included as observed variables, and paths from each of the Big Five led to trait gratitude, state gratitude, and benefit appraisals. As such all of the results in Figure 4b are independent of the effect of the Big Five. The fit of this model was very good (χ^2 [$df = 23$] = 44.53; CFI = .98; SRMR = .04).

As shown in Figure 4b trait gratitude was related to benefit appraisals. With trait gratitude controlled, benefit appraisals were still related to state gratitude. This fulfils Barron and Kenny's second step. Controlling for benefit appraisals substantially reduced the relationship between trait and state levels of gratitude (from $\beta = .47$, $p < .001$ to $\beta = .23$, $p = .32$), a reduction in beta which Sobel's (1982) test showed was statistically significant ($z = 5.30$, $p < .001$). This indicated substantial or complete mediation. Demonstrating partial mediation completes Barron and Kenny's (1986) third step. To test whether mediation was complete we compared the model in Figure 4b with a second model where there was no

direct path from trait to state gratitude. The fit of the second model was good (χ^2 [df = 24] = 64.85; CFI = .95; SRMR = .04), but was significantly worse than the basic model in Figure 4b ($\Delta\chi^2$ = 20.32; Δdf = 1; p < .001). It was concluded that mediation was substantial but not complete. To test whether the use of the Big Five as covariates substantially changed the results, all analysis was repeated without including the Big Five. Each of Barron and Kenny's steps were still met, Sobel's test remained significant, and the betas reported in Figure 4b changed by a maximum of .08. It appears that including the Big Five as covariates did not substantially change the model.

Discussion

Three studies provided support for the social-cognitive model of gratitude in Figure 1. Studies 1 and 3 showed that following help, people's appraisals of cost, value, and genuine helpfulness combined to form a latent benefit appraisal variable. In each of the studies trait gratitude was robustly associated with benefit appraisals, and in Study 3 this relationship was shown to be distinct from the Big Five personality traits. In each study, benefit appraisals were shown to substantially or completely mediate the relationship between trait and state levels of gratitude. This suggests that benefit appraisals are the generative mechanism which explain why grateful people feel more gratitude after they receive aid. Study 2 shows that this finding is method invariant, occurring both after people considered hypothetical vignettes, and following real events which occurred over a two week period. Finally, Study 3 showed that experimentally manipulating the objective benefit of the situation caused changes in state gratitude as the result of altered benefit appraisals. Together, the three studies provided full support for the social-cognitive model in Figure 1, where individual differences in trait gratitude and situational factors lead to benefit appraisals, and benefit appraisals lead to the experience of state gratitude.

Study 2 indicated the relative importance of situational factors and individual differences in determining state gratitude. Over 14 days, 78% of the variance in daily reports

of state gratitude was due to unique, within person, situational variability on the individual days. Accordingly, 22% was due to stable, between person, individual differences in the experience of state gratitude. These findings explain the magnitude of the effects seen across the three studies (cf. Luke, 2004; Nezlek, 2001). If most of the variance in state gratitude is situational, then appraisals should be the primary predictor of state gratitude, in that they capture both the objective situation, and the individuals' perceptions of the objective situation. This is the pattern that was seen over the three studies, with benefit appraisals accounting for a very substantial amount of the variance in state gratitude (between 64% and 83% when measured without error). In a related vein, the situational manipulation had a large effect on state gratitude ($r = .53$).

If a small but reliable amount of variance in state gratitude is due to between person differences, then individual differences in gratitude should be a small but robust predictor of benefit appraisals and consequently of state gratitude. Across the three studies, trait gratitude was seen to be a small to moderate predictor of benefit appraisals and state gratitude. These findings add detail to the model in Figure 1, suggesting the relative importance of the variables. The most variance is accounted for by the situation and benefit appraisals, with individual differences playing a small but important role through exerting a characteristic bias over the appraisal of the situation. This relative importance is consistent with recent findings in the debate regarding the relative importance of personality and situation in determining behavior (Fleeson, 2004). Personality traits are now seen to be only a small predictor of behavior at any given moment, but they exert a subtle effect on behaviour, which when averaged across days, reliably distinguishes the person from others (Fleeson, 2001).

The results supported a mediational but not moderational model of gratitude. This is an important distinction (Baron & Kenny, 1986). Each study showed that benefit appraisals mediated trait and state levels of gratitude. Mediation suggests that benefit appraisals are *why* grateful people experience more state gratitude following help. Mediation is based on the

assumption of linear relationships between the variables (where, for example, gratitude is equally as strongly related to benefit appraisals irrespective of whether a person has high, medium, or low gratitude). Study 3 ruled out that trait gratitude was a moderator between the objective situation and state gratitude. Moderation would occur if trait gratitude had a different relationship with benefit appraisals and state gratitude dependant on the objective situation. It was possible, for example, that people high in trait gratitude only saw situations as more beneficial only when the situation was low in objective benefit, but when the situation was high in objective benefit everyone made the same benefit appraisals irrespective of their levels of trait gratitude. Study 3 ruled out this possibility, and showed that gratitude leads to a positive bias in appraising benefit and experiencing state gratitude irrespective of the objective situation.

In Studies 1 and 3 the appraisals of cost, value, and genuine helpfulness were shown to form a robust latent variable. These variables appear to co-occur in a constellation. Future research is needed to investigate exactly what this constellation represents. Cost, value, and genuine helpfulness could be independent appraisals which naturally group together, lower-order indicators of a super-ordinate appraisal, or part of a gratitude schema. It is unlikely that the variables are independent appraisals, as Tesser et al. (1968) showed that manipulating one of the appraisals (e.g., value) led to changes in another appraisal (e.g., genuine helpfulness). It is not however clear whether the constellation of variables meet a definition of a schema, which would exist in only some people, involve individual difference in availability, and have unique perceptual, memory, and interpretive effects which would apply to a variety of perceptual and cognitive measures[1]. Such a question has applied significance for the increasingly prevalent clinical interventions to increase gratitude (e.g., Seligman et al., 2005). The existence and malleability of a grateful schema would be an important consideration in therapeutically increasing gratitude. Potentially, such research could lead to a new schema focused therapy for increasing gratitude, with associated well-being benefits. Such an

approach would have to be evaluated alongside the current successful approach of 'counting your blessings' (Emmons & McCullough, 2003).

The studies had a number of limitations. Principally the studies relied on self-report of gratitude, and future research may consider using direct behavioral measures of gratitude (cf. Tsang, 2006). However, McCullough et al. (2002) provide strong support for the use of self-report measures of gratitude, showing that the GQ-6 is correlated with peer-reports, and that the measure is not confounded by social desirability. Whilst benefit appraisals substantially mediated trait and state levels of gratitude in Study 3, unlike the other studies mediation was not complete. Although partial mediation is the norm rather than the exception in personality psychology research (Baron & Kenny, 1986), this does raise the question of what other appraisals could mediate trait and state levels of gratitude. Another plausible appraisal regards the successfulness of the help (for example, if a friend attempts to help but failure still ensues).

Research into trait gratitude is just beginning, and there is vast scope for future study. Future research will likely focus on whether grateful people are more likely to help others, whether they have better social relationships, and the mechanisms by which trait gratitude is related to better well-being (see McCullough et al., 2002; McCullough et al., 2001; Wood, Joseph, & Linley, 2007b). From a social-cognitive point of view (Bandura, 1999) it will be important to consider these questions within a framework whereby individuals interact with their environments.

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Appendix

Sample Vignette From Study 1

You are queuing at a supermarket till and are late in meeting someone. Noticing that you appear to be in a hurry the person in front of you let you go first. You realize that this person is on your course, and although you do not know them personally you have seen them around the department. You accept the person's offer and leave the store faster than you would have otherwise. You meet the person you had arranged to without being late.

Sample Vignette From Study 3

High benefit version. You receive an unexpectedly high bill. You do not have the money to pay the bill and will get into a lot of trouble when the company contacts a debt collection agency. Your receive a visit from your aunt, and tell her about your situation. She later phones you and offers to pay the bill. Your aunt is a generous woman and she genuinely wants to help you. Your aunt relies on her state pension and paying the bill will represent a considerable amount of money to her.

Low benefit version: You receive an unexpectedly high bill. You can afford to pay the bill with the money in your bank account without much of a problem. Your receive a visit from your aunt, and tell her about your situation. She later phones you and offers to pay the bill. She does not really care about helping you, but rather wants to raise your family's opinion of her, and will no doubt remind them of it for some time to come. Your aunt is very rich and the cost of the bill will seem like a very small amount of money to her.

Footnotes

[1] The authors gratefully acknowledge Piotr Winkielman, University of California at San Diego, for making this observation in a personal communication.
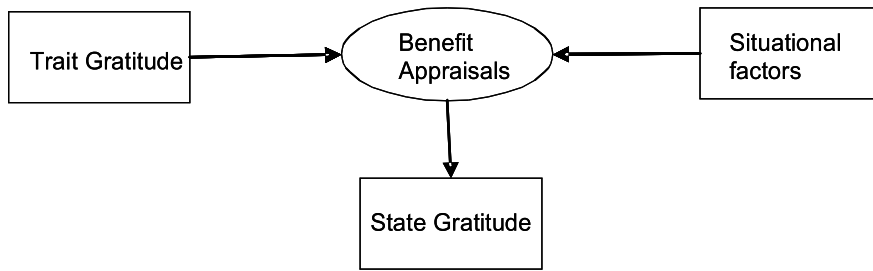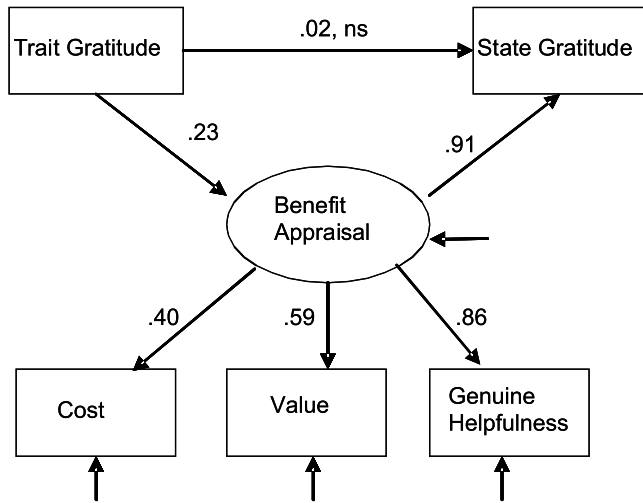
Figure Captions

Figure 1. A theoretical model of trait and state levels of gratitude.

Figure 2. A structural equation model, Study 1. All values are standardized. *ns* = non significant, all other paths significant at $p < .001$. Model fit: χ^2 ($df = 4$) = 6.09; CFI = .99; SRMR = .03.

Figure 3. A path diagram based on multilevel modeling, Study 2. *$p < .05$, *** $p < .001$.

Figure 4. Two structural equation models, Study 3. All values are standardized. *ns* = non significant, all other paths significant at $p < .001$. Model 4a fit: χ^2 ($df = 4$) = 3.23; CFI = .99; SRMR = .01; Model 4b fit: χ^2 ($df = 23$) = 44.5; CFI = .98; SRMR = .04.
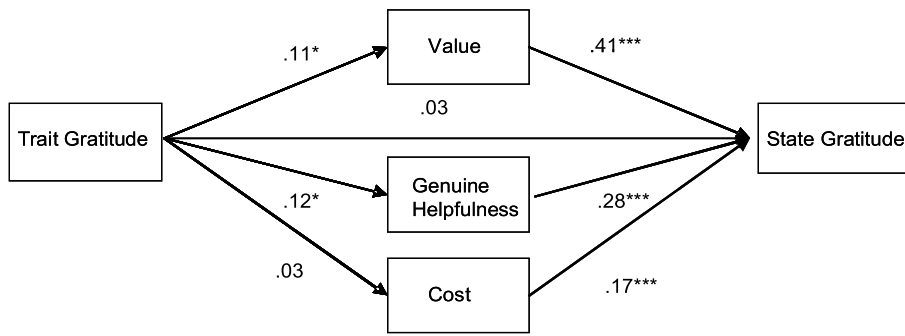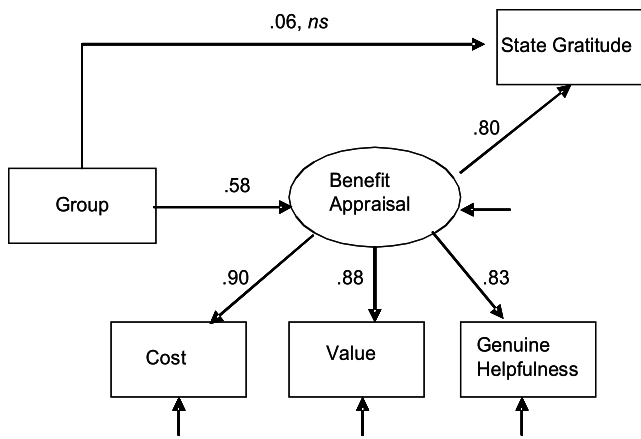
Trait Gratitude → Benefit Appraisals ← Situational factors

Benefit Appraisals → State Gratitude

Figure 4a

Figure 4b