Undervaluing Gratitude:

Expressors Misunderstand the Consequences of Showing Appreciation

Supplemental Materials

Experiment 1: Response Rate Analysis

Table S1: Analysis of expressor predictions of whose recipients did, versus did not, respond to

complete the experimental survey for Experiment 1.

	Expressors with Recipients Who Responded (*n* = 80)	Expressors with Recipients Who Did Not Respond	t-value	*p*-value
Surprise about Receiving	*M* = 6.05, *SD* = 2.47	(*n* = 12) *M* = 5.83, *SD* = 2.33	0.29	.78
		(*n* = 27) *M* = 6.04, *SD* = 2.28	0.02	.98
Surprise about Content	*M* = 4.36, *SD* = 2.25	(*n* = 12) *M* = 3.75, *SD* = 1.66	0.90	.37
		(*n* = 27) *M* =3.70, *SD* = 1.71	1.59	.12
Recipient's Mood	*M* = 3.10, *SD* = 1.12	(*n* = 12) *M* = 3.17, *SD* = 0.72	0.20	.84
		(*n* = 27) *M* = 2.70, *SD* = 1.03	1.62	.11
How Awkward?	*M* = 2.98, *SD* = 2.50	(*n* = 12) *M* = 3.75, *SD* = 2.86	0.98	.33
		(*n* = 27) *M* = 3.63, *SD* = 2.75	1.15	.25

The first set of statistical comparisons refers to non-responses as defined by recipients who were

contacted, but did not complete the survey. The second set of statistical comparisons refers to

non-responses as defined by all recipients who received a gratitude letter, but did not complete a

survey (including those we were unable to contact).

Follow-Up to Experiment 1

We conducted a follow-up to our first experiment involving third person observers using a subset of gratitude letters written by the MBA students in Experiment 1. Participants imagined either sending or receiving these letters of gratitude, allowing us to test how well observers can simulate these different perspectives. They made ratings analogous to those made by the original participants in Experiment 1. We explore how these observers' responses compare to those of individuals who actually sent or received a gratitude letter.

Method

Participants. 701 U. S. workers from Amazon's Mechanical Turk (295 female; $M_{age} = 33.63$, $SD = 10.26$) served as participants in exchange for $0.80, allowing us to obtain multiple ratings for each gratitude letter evaluated.

Procedure. As described in the main text of Experiment 1, we had complete data from senders and recipients for 80 pairs of participants in that experiment. Expressors in Experiment 1 had the option of providing a copy of their gratitude letter to us, and 74 of these 80 letter-senders opted to do so without redacting any portion of their letter. We used these 74 letters as stimuli for this follow-up. We lightly modified the letters—only to remove any identifying information (i.e., by changing the names of people mentioned in the letter) and to clarify acronyms that might be obvious to professional students but may be less clear to participants in the online sample we recruited (e.g., changing "VC firm" to "Venture Capital firm").

Participants recruited on Mechanical Turk were given a brief description of the set-up of Experiment 1. This description indicated that a set of students in a course participated in a class exercise in which they expressed gratitude by writing a letter to someone who had touched their life. They were told that we encouraged expressors to write to other students at the university,

but that they were also free to choose anyone else they felt had a significant impact on their life.

Participants were then randomly assigned to one of two roles. They read one of the gratitude

letters and either imagined writing the letter in question or receiving it. Those who simulated

sending the letter predicted how they thought the recipient of the letter would respond after

receiving it. Those who simulated receiving the letter reported how they believed they would feel

if they actually received the letter.

Participants made ratings on the same scales used in Experiment 1. For example,

observers who imagined writing and sending the letter predicted how surprised they thought the

recipient would feel and observers who imagined receiving the letter reported how surprised they

believed they would feel if they actually received the letter on a scale from 0 (Not at all

surprised) to 10 (Extremely surprised). As in Experiment 1, participants provided responses for

the recipient's surprise about receiving the letter, surprise about the letter's content, mood, and

awkwardness. We also measured how difficult it was to understand the content of the letter, as

well as how difficult it was to imagine being in the role they simulated. Both of these ratings

were made on a scale from 0 (Not at all difficult) to 10 (Extremely difficult).

Results

Because participants were nested within both the original expressors and recipients from

Experiment 1, we averaged responses from simulated expressors and recipients for each

gratitude letter and then conducted our analyses on these average ratings. This means that we

have one observation for each original expressor and recipient, as we did in Experiment 1.

Participants' responses did not vary significantly by imagined role on all but one of the

measures collected. As can be seen in the right panel of Supplemental Figure 1, we observed a

nonsignificant difference on predicted surprise at receiving the letter, *paired t(73) = 0.69, p*

$= .49$, $d = 0.08$. Imagined expressors ($M = 6.01$, $SD = 1.13$) did, however, believe that recipients would be more surprised about the content of the letter than imagined recipients ($M = 6.76$, $SD = 1.36$), *paired t(73)* $= 4.16$, $p < .01$, $d = 0.49$. Observers thinking about sending the letter ($M = 3.27$, $SD = 0.91$) anticipated that recipients would be in a similar mood as observers asked to consider how they would actually feel if they received the letter in question ($M = 3.29$, $SD = 0.98$), *paired t(73)* $= 0.13$, $p = .90$, $d = 0.02$. Simulating sending the letter ($M = 3.15$, $SD = 1.40$) resulted in similar predictions of awkwardness as simulating receiving the letter ($M = 3.25$, $SD = 1.45$) as well, *paired t(73)* $= 0.48$, $p = .63$, $d = 0.06$. These results are displayed in the right panel of the figure below. In addition, observers did not report much difficulty understanding the content of the letters or imagining sending/receiving the letter (Ms all < 2.1), and these responses did not vary by role, ts < 1.7, ps $> .1$.

The figure below also displays the results from the original expressors and recipients in Experiment 1 using data from only the participants whose letters are included in this follow-up. As this makes clear, all of the results from Experiment 1 hold when looking at this subset of participants (all ps still $< .01$). One interesting pattern in these data is that observers tend to look more like actual recipients on measures of surprise. This is consistent with the notion that expressions of gratitude involve sharing knowledge known solely by expressors. Third parties, like recipients, are not completely privy to this information and thus are more likely to report greater surprise than actual senders expect to elicit from their letters. The pattern of results also suggests that third party observer ratings of mood and awkwardness are closer to ratings of actual senders than of actual recipients, indicating that it may be challenging to effectively simulate the positive jolt experienced by those who receive gratitude letters. Because imagined expressors and imagined recipients did not differ on these measures, it is informative to

investigate how these observers compare to actual expressors and recipients. And indeed, collapsed ratings of observers on the measures of mood ($M = 3.28$, $SD = 0.68$) and awkwardness ($M = 3.20$, $SD = 1.11$) do not differ from those of actual expressors on these measures ($M_{mood} = 3.11$, $SD_{mood} = 1.08$, $M_{awkward} = 2.95$, $SD_{awkward} = 2.40$), ts < 1.3, ps $> .2$, ds < 0.2. They do, however, differ from those of actual recipients on both mood ($M = 4.12$, $SD = 1.08$), *paired t(73) = 5.64*, $p < .0001$, $d = 0.96$, and awkwardness ($M = 1.95$, $SD = 2.35$), *paired t(73) = 4.62*, $p < .0001$, $d = 0.59$. It thus appears that people may underestimate the positive impact of expressing gratitude because of a systematic difference in perspective, an empathy gap that stands in the way of expressors appreciating the uniquely positive experience of recipients.

Figure S1. Simulated Expressors and Recipients (right panel) in the Experiment 1 Follow-up compared to predicted and actual reactions from Expressors and Recipients in Experiment 1 (left panel).
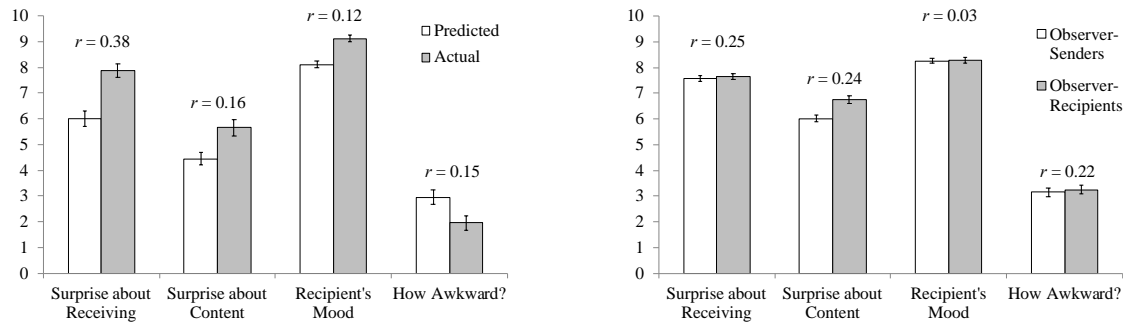
Actual expressors' predictions of actual recipients' experiences receiving a letter of gratitude from a subset of 74 pairs of participants in Experiment 1 (Left Panel) and third person predictions of these responses from the follow-up experiment (Right Panel). The correlation between ratings is reported above the columns for each item. Note that all items were answered on response scales ranging from 0-10 except for mood, which was made on a scale ranging from -5 to 5. We rescaled this item for use in this figure by adding 5 to each participant's response. Error bars reflect standard errors.

Experiment 2: Response Rate Analysis

Table S2: Analysis of expressor predictions whose recipients did, versus did not, respond to complete the experimental survey for Experiment 2.

	Expressors with Recipients Who Responded (*n* = 80)	Expressors with Recipients Who Did Not Respond	t-value	*p*-value
Surprise about Receiving	*M* = 7.29, *SD* = 2.04	(*n* = 34) *M* = 7.65, *SD* = 1.41	0.98	.33
		(*n* = 42) *M* = 7.48, *SD* = 1.61	0.50	.62
Surprise about Content	*M* = 3.55, *SD* = 2.44	(*n* = 34) *M* = 3.82, *SD* = 2.25	0.53	.60
		(*n* = 42) *M* = 3.74, *SD* = 2.20	0.39	.70
Recipient's Mood	*M* = 3.10, *SD* = 1.29	(*n* = 34) *M* = 2.97, *SD* = 1.49	0.45	.60
		(*n* = 42) *M* = 2.81, *SD* = 1.50	1.05	.30
How Awkward?	*M* = 2.64, *SD* = 2.80	(*n* = 34) *M* = 3.94, *SD* = 3.08	2.07	.04
		(*n* = 42) *M* = 3.74, *SD* = 3.05	1.87	.07

The first set of statistical comparisons refers to non-responses as defined by recipients who were contacted, but did not complete the survey. The second set of statistical comparisons refers to non-responses as defined by all recipients who received a gratitude letter, but did not complete a survey (including those we were unable to contact).

Experiment 4 Introductory Pilot Experiment

A preliminary experiment explored what attributes of the experience of expressing gratitude come to mind for potential expressors when deciding to write a letter of gratitude. To investigate this, we had participants report which thoughts were primary by having them choose between options related to warmth and competence. This method allows us to better understand what considerations people have when deciding to engage in gratitude expression. We hypothesized that initial decisions about expressing gratitude were more likely to be impacted by concerns about competence.

Method

Participants. 200 U.S respondents were recruited to participate in a pre-registered experiment administered online through Amazon's Mechanical Turk platform, in exchange for $0.40. Two participants did not complete the experiment, leaving a final sample of 198 participants (86 female; $M_{age} = 34.93$, $SD = 10.50$).

Procedure. Participants were recruited for an online experiment about gratitude expression. As in Experiment 3a, they were first asked to consider the experience of expressing their gratitude to another person via a gratitude letter. Here, however, they only thought of one person who had done something meaningful for them. After indicating this individual's initials and the general reasons for why they felt grateful to him or her, they were asked to think about actually writing a letter to this person.

They were then instructed to reflect on making the decision to write a gratitude letter to the person they had mentioned. They were told, "Whether or not you would write a letter likely depends on many different factors. We would like to know what thoughts come immediately to mind when making a decision about whether or not to write such a letter. To do this, we would

like you to think about deciding whether or not to write a gratitude letter to the person who came to mind *right now*."

Before participants responded to our primary dependent variable, we measured the extent to which they cared about each of four considerations on 11-point scales, ranging from 0 (Not at all) to 10 (A great deal). Two of these items were about warmth ("How warm will my letter seem to this person? That is, how friendly and kind will my letter appear to be?" and "How sincere will my letter seem to this person?") and two were about competence ("How, exactly, will I express my gratitude to this person? That is, what will I actually write?" and "Will I be able to express my gratitude using 'just the right words'? That is, how articulate will I be?"). This was primarily to engage participants with thinking about these issues before indicating which thought mattered the most to them. We randomized whether participants were initially presented with the warmth items or the competence items. We also counterbalanced the presentation of the two items within each set. Participants then completed our primary dependent measure: a discreet choice between which of these four issues came to mind *first*.

Results

Scale ratings on the two warmth items were highly correlated ($r = 0.75$, , $p < .0001$), as were responses on the two competence items ($r = 0.66$, , $p < .0001$), and so we averaged them to form composite indices of warmth and competence. Participants indicated that they cared similarly about issues pertaining to both warmth (M = 7.42, SD = 2.49) and competence (*M* = 7.62, SD = 2.23), repeated measures $t(197) = 1.30$, $p = .19$. With respect to which issue first came to mind, however, participants clearly distinguished the two. 7.07% of participants chose the option pertaining to the consideration of how warm their letter would seem, 18.18% chose the option pertaining to how sincere their letter would seem, 29.29% chose the option pertaining

to how exactly they would express their gratitude, and 45.46% chose the option pertaining to whether they would be able to express their gratitude in just the right words. That is, a significantly greater proportion of participants indicated that their initial thoughts were about competence (74.75%) than about warmth (25.25%) when deciding to express gratitude, χ^2 (1, N = 198) = 48.51, $p < .0001$, $\phi = 0.49$. These results suggest that concerns about competence, such as how well one believes they would be able to articulate their grateful feelings, are primary for potential gratitude expressors.

Experiment 4: Response Rate Analysis

Table S3: Analysis of expressor predictions whose recipients did, versus did not, respond to complete the experimental survey for Experiment 4.

	Expressors with Recipients Who Responded (n = 78)	Expressors with Recipients Who Did Not Respond	t-value	p-value
Surprise about Receiving	$M = 7.14, SD = 2.35$	$(n = 18)$ $M = 6.89, SD = 2.37$	0.41	.68
		$(n = 49)$ $M = 7.04, SD = 2.14$	0.24	.81
Surprise about Content	$M = 4.28, SD = 2.52$	$(n = 18)$ $M = 3.67, SD = 2.09$	0.96	.34
		$(n = 49)$ $M = 4.31, SD = 2.15$	0.06	.96
Recipient's Mood	$M = 2.99, SD = 1.04$	$(n = 18)$ $M = 2.67, SD = 1.19$	1.15	.25
		$(n = 49)$ $M = 2.98, SD = 1.16$	0.04	.97
How Awkward?	$M = 2.50, SD = 2.85$	$(n = 18)$ $M = 2.22, SD = 2.58$	0.38	.71
		$(n = 49)$ $M = 2.57, SD = 2.74$	0.14	.89
Words Just Right	$M = 6.79, SD = 1.90$	$(n = 18)$ $M = 6.72, SD = 2.05$	0.14	.89
		$(n = 49)$ $M = 6.59, SD = 1.87$	0.59	.56
Articulate	$M = 7.19, SD = 1.71$	$(n = 18)$ $M = 7.33, SD = 1.61$	0.32	.75
		$(n = 49)$ $M = 6.98, SD = 1.69$	0.68	.49
Warm	$M = 8.33, SD = 1.39$	$(n = 18)$ $M = 8.56, SD = 1.34$	0.61	.54
		$(n = 49)$ $M = 8.29, SD = 1.44$	0.18	.85
Sincere	$M = 8.47, SD = 1.42$	$(n = 18)$ $M = 9.11, SD = 1.18$	1.76	.08
		$(n = 49)$ $M = 8.53, SD = 1.73$	0.20	.84

The first set of statistical comparisons refers to non-responses as defined by recipients who were contacted, but did not complete the survey. The second set of statistical comparisons refers to non-responses as defined by all recipients who received a gratitude letter, but did not complete a survey (including those we were unable to contact).

Figure S2. Expressors' predictions of Recipients' warmth and competence ratings in

Experiment 4.
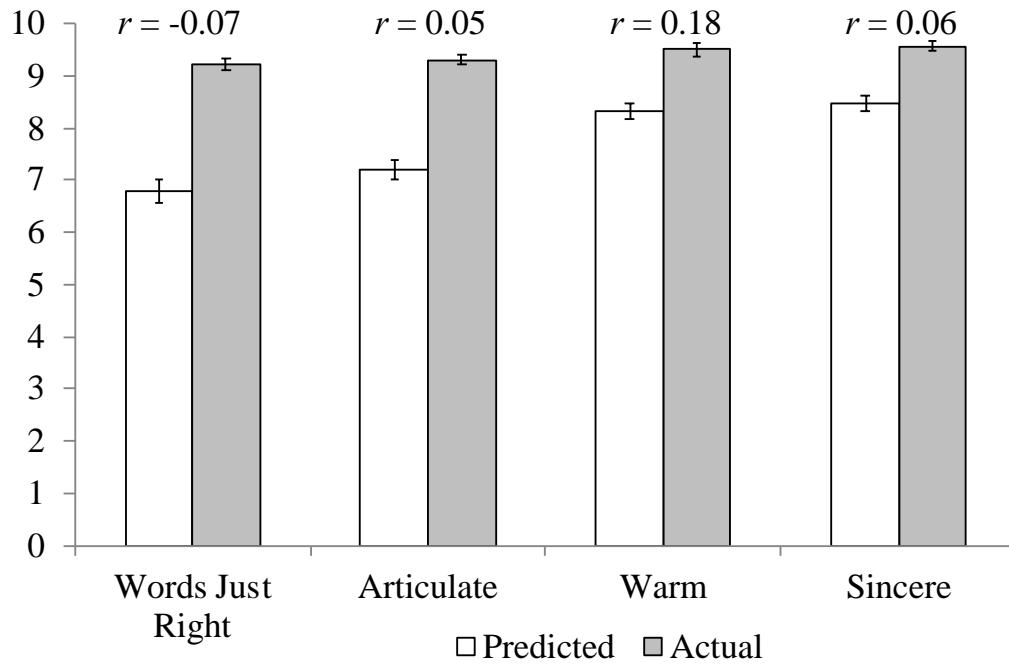
Note. The correlation between predicted and actual ratings is reported above the columns for

each item. All items were answered on response scales ranging from 0-10. Error bars

reflect standard errors.

Follow-Up to Experiment 4

We conducted a follow-up experiment to Experiment 4 in order to test whether likelihood to express gratitude is related to how well people believe they would be able to articulate their grateful feelings. In other words, we were interested in whether thoughts about one's competence at writing a gratitude letter would predict interest in doing so. We tested this in a correlational experiment similar to Experiment 3a, by having participants consider multiple targets to whom they could write a gratitude letter. We predicted that expectations about competence would be correlated with intentions to express gratitude. In addition, this experiment offered a replication test of the findings from Experiment 3a concerning mood and awkwardness.

Method

Participants. 100 U.S respondents were recruited to participate in a pre-registered experiment administered online through Amazon's Mechanical Turk platform, in exchange for $1.10. One participant began the experiment, but did not complete it, leaving a final sample of 99 participants (31 female; $M_{age} = 35.63$, $SD = 11.53$).

Procedure. This experiment closely followed the procedure of Experiment 3a. The details matched those of Experiment 3a, except the two surprise items (which were not related to interest in expressing gratitude as we initially predicted) were replaced with two items about competence. These measures involved participants predicting the extent to which they would be able to get the words *just right* if they really wrote a gratitude letter to a given person, on a scale from 0 (Not at all able) to 10 (Definitely able), and reporting how well they thought they'd be able to express their gratitude, on a scale from -5 (I think I'd do a very bad job) to 5 (I think I'd do a very good job). Participants also made predictions about each target's anticipated mood and expected feelings of awkwardness, as in Experiment 3a. After providing these ratings, they

indicated how likely they would be to actually write and send a gratitude letter to the potential recipient in question, on the same scale as in Experiment 3a.

<div align="center">**Results**</div>

We again computed the average correlations across targets for each measure and the reported likelihood of sending a gratitude letter. We excluded eight participants from all analyses who did not indicate any variance in their likelihood of sending a letter across targets. As in Experiment 3a, we excluded additional participants on an item-by-item basis who did not indicate any variance across prospective recipients on the other measures, as a lack of variance makes calculating a correlation impossible. These exclusions are reflected in slight differences in the degrees of freedom for each analysis below.

Replicating the results of Experiment 3a, the reported likelihood of writing a gratitude letter was positively correlated with the recipient's predicted positive mood ($M_{correlation}$ = .44), $t(81)$ = 8.78, $p < .001$, $d = 0.97$, and was negatively correlated with the recipient's predicted feeling of awkwardness ($M_{correlation}$ = -.31), $t(86)$ = -4.58, $p < .001$, $d = 0.49$. Willingness to express gratitude was also significantly related to expectations that one would be able to competently compose a letter. Believing one would be able to get the words just right was positively correlated with the likelihood of expressing gratitude ($M_{correlation}$ = .30), $t(84)$ = 5.07, $p < .001$, $d = 0.55$, as was the belief that one would be able to express gratitude well ($M_{correlation}$ = .33), $t(82)$ = 6.04, $p < .001$, d = 0.66. These results suggest that people are more likely to express their grateful feelings when they think they will be able to do so in a competent manner, without fumbling to find exactly the right words. Experiment 4 demonstrates that expressors misunderstand how recipients will judge their competence. Taken together, these studies support our contention that mistaken beliefs about competence serve as a barrier to the expression of gratitude.