

Praise from peers can promote empathetic behavior

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Abstract

Empathy is a powerful tool for shaping policy preferences, promoting cooperative behavior and warming attitudes towards others. Yet, engaging in empathy is costly and existing interventions to encourage it are themselves expensive and time-consuming. Across five studies, we precisely estimate the magnitude of these costs to engaging in empathy, propose and test an intervention to encourage greater empathy and trace the causal process through which our treatment works. We motivate and test a light-touch and scalable intervention based on “peer praise” to encourage empathetic behavior. Across our studies, we find that empathy is costly, that peer praise can encourage greater empathy, and that one way it operates is by boosting the positive emotions. Supplementary analyses suggest further promise for the intervention, as we document its ability to work broadly across political ideology and race to encourage empathetic behavior.

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1 Introduction

Empathy—the act of taking the perspective and understanding the experiences of others [17, 55]—is a powerful tool for shaping policy preferences, encouraging cooperative behavior, and improving attitudes towards others. Taking the perspective of others reduces prejudice, increases helping behavior and has the potential to improve attitudes about even heavily stigmatized outgroups [5, 48]. Moreover, the support generated from empathy translates into both behavior and warmer attitudes [6, 22]. Taken together, this body of research suggests the importance of understanding when and why people choose to engage in empathy. Empathy has both cognitive and affective components, with the degree to which one is emphasized over another related to whether scholars are more interested in the decision to engage in empathy—in which emotions are implicated—or in the act of thinking through another’s perspective (sometimes referred to as “perspective taking,” 60; see also 16). Regardless, across the different parts of the empathetic process, at least one significant gap in our understanding remains: what can we do to *encourage* greater empathy? We have evidence that costly perspective-taking interventions can yield benefits for subjects that participate [e.g., 11], but that only begs the question of how one might encourage greater “approach to empathy” in the first place. Previous research on this problem has focused on manipulating feedback or framing empathy as “important for moral character” and has either involved deception or been less successful than one might hope [12, 23].

We propose and test an intervention to overcome the aversion to empathy that others have found—and that we replicate—and encourage empathetic behavior using positive emotions. We focus on emotions given the natural connection between empathy and affect more generally—empathy is fundamentally “an affective response” [33, 103]—as well as its more particular role in the first part of the empathetic process, when individuals choose whether to engage in or avoid empathy [51, 428]. We propose the use of peer praise as a non-invasive, light touch method to

encourage empathy (through an affective causal path): praise because of its established ability to trigger positive emotions [18] and “peer” praise given the established benefits of peer influence across many domains [4]. Our causal model thus describes a process in which peer praise for empathy leads to positive emotions (happiness) and those positive emotions in turn increase the odds of choosing to engage in empathy. Our studies provide support for that model in whole and in its components parts.

Encouraging Empathy Through Peer Praise

Ways to encourage empathy towards an outgroup or other person abound, but such interventions are often expensive, hard to implement and difficult to scale up. Common approaches include empathy-based exercises within intergroup contact scenarios (54 offer a recent review). For example, Broockman and Kalla [11] and Kalla and Broockman [36] successfully utilize face-to-face conversations that incorporate variations of perspective-taking, a key component to empathy, to reduce exclusionary attitudes towards outgroup members. More recent work has explored moving these interventions online, either through relatively short interactive exercises [1] or more involved online role-playing games [50] or even ones requiring specialized virtual reality hardware [32]. A common thread, however, is that these interventions typically require careful training of enumerators, (almost always) additional costs in equipment, time and footwork, and do not tap into natural and preexisting resources surrounding the population of study. Given the established benefits of empathy, an eye towards encouraging it when it might otherwise be avoided, and the need for a scalable and “light-touch” intervention, we propose harnessing a more naturally-occurring phenomenon understood to have significant impact on individual behavior: peer praise.

Praise suggests itself as a useful intervention for encouraging empathy given its documented role in motivating pro-social behavior more generally (particularly in the large literature on child

development; see 56). Definitions of praise abound but generally agree that the concept centers on “positive evaluations... of another’s products, performances or attributes” (37, 181; see also 38).¹ Praise can be about behavior or personal qualities, and can occur either ex-ante or ex-post whatever is being encouraged. In line with a consensus that views behavior and effort-specific praise as more effective than “personal praise” [42], we focus on praise for engaging in empathy randomly assigned to our respondents in advance of their choice to engage in empathy or not (ex-ante in order to cleanly identify the effects of the treatment on behavior).

Peer praise is a promising candidate for such an intervention given its documented effects on pro-social behavior, but extant literature linking praise to positive emotions also suggests *how* it might work to encourage greater empathy. An early review sums up the consensus view that the “obvious and immediate outcome” of praise is “simple, positive affect” [18, 224]. In fact, the link between praise and positive emotions is taken to be a baseline expectation in much of the literature, its truth self-evident enough that most work focuses on conditions—such as obviously insincere compliments—in which praise *fails* to lead to positive emotions [41]. And while there are strong links between praise and positive emotions, there are also links between positive emotions and increased effort and motivation [21, 24], productivity [43], attention [52] and generally improved cognition along multiple dimensions [53]. In fact, recent observational work suggests a link between positive mood and pro-social behavior [2] that might operate as a feedback loop or “virtuous cycle” [39].²

And while praise itself is connected to positive emotions (which, in turn, might motivate pro-social behavior), a related literature on the positive network effects of peers suggests further how an

¹Praise is sometimes distinguished from highly similar concepts such as “encouragement” (often associated with tasks with which a person is currently struggling or in which they performed negatively) and simple acknowledgment/feedback, which is inherently neutral and non-judgmental. See Henderlong and Lepper [31, 775] and Pety et al. [45].

²As the most common positive emotion studied is happiness, we focus our attentions here on happiness [14], though note the possibility of other positive emotions at play in the causal chain.

effective intervention might be designed. Peer effects have been shown to occur across contexts, from uptake of education, future planning and emotional happiness to economic and welfare outcomes and to persist over time [20, 19, 25, 9, 13]. That peers can substantially influence one’s behavior is unsurprising; a multidisciplinary literature on peer effect processes portrays this group as increasingly important upon broaching adulthood, among respected peers, and especially for peers with whom one shares values [10]. Recent work has further emphasized that peer influence is especially relevant to the development of prosocial behaviors [4] for which empathy is often considered a precursor [3]. The peer-oriented motivation of our work aligns well with that of Paluck et al. [44], who also tap into peer networks to encourage anticonflict norms and behavior in a middle school setting (though like many interventions described earlier, requires extensive collection of network information and a large infrastructure for intervening). An important mechanism that may be at play is the desire to maintain favorable evaluation from admired peers, which can in turn support a positive sense of self [26]. While our focus on the connection between praise and pro-social behavior is not new, previous work has often centered around child-parent relationships and/or with an emphasis on adolescent populations [10].

We field five studies—summarized in Figure 1—using an incentive-compatible design that allows us to verify a general preference towards avoiding empathy, propose and test a light-touch intervention designed to encourage empathy through the use of peer praise, and investigate the affective mechanisms through which praise works. Our first set of studies provide motivation for our intervention by demonstrating a marked preference for avoiding empathy using a choice task (“main choice task”) in which online respondents make decisions about whether to empathize with (FEEL) or simply describe (DESCRIBE) the appearance of randomly presented photos of peoples’ faces. There—in keeping with many other studies [46, 12]—we find that the empathy task was 39.7% less likely to be chosen by respondents than the descriptive task. Modifying the choice task

to include an incentive compatible reservation wage-elicitation stage (“wage task”), we estimate that the empathy task required a 10% premium in wages compared to the descriptive task to motivate our respondents. Our subjects also reported that empathy felt more demanding, more costly and difficult and made them more anxious compared to pure description.

Studies 2-5 provide evidence for the beneficial effects of peer praise in encouraging empathy. Our (non-experimental) Study 2 sets the stage by eliciting naturalistic praise from online respondents that we use in subsequent studies, obviating the need to use deception and increasing the verisimilitude of our intervention. Study 3 uses the collected peer praise to encourage empathy in respondents—using the same choice task as Study 1—and we find here that the peer-praise group was 20% more likely to choose empathy compared to a control group that didn’t receive praise. Studies 4 and 5 replicate the effectiveness of our praise intervention and extend our results through a focus on causal mechanisms. We focus on the link between peer praise \Rightarrow happiness \Rightarrow empathy. Ultimately, we find support across both studies for praise operating through an emotional pathway (happiness) to encourage greater empathy. We conclude with a discussion focusing on the scope conditions to the effectiveness of our peer praise intervention, highlighting its limits but also noting that it is broadly effective across demographic and ideological categories.

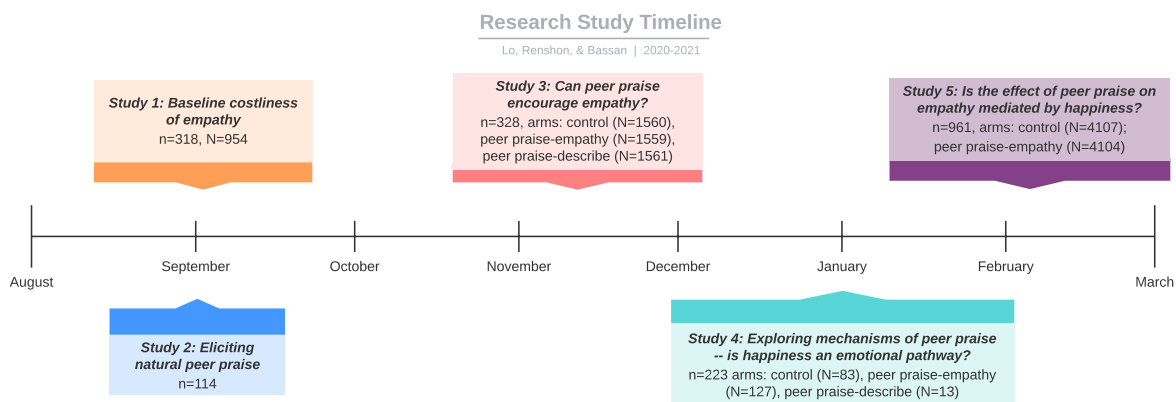


Figure 1: **Research study timeline.** n denoted refers to # of sampled respondents, N refers to the # of respondent-trial observations. For a table summarizing respondent sample size, numbers of trials, and observations by experimental arms see SI A.

2 Results

Study 1 verifies that empathy is comparatively costly (or has fewer “benefits”) and provides a baseline against which to evaluate the effectiveness of our peer praise intervention. Preference against empathy is established in three ways. First, the empathy task had a lower likelihood of being chosen (39.7%) than the descriptive task. Second, the reservation pay for empathy was higher than for the descriptive task: if the description task pay is \$1.00, then the average respondent needed the empathy task to be raised to \$1.098 to shift to the latter ($p < 1e - 13$).³ Finally, our post-task questions (elicited post-treatment) verify that subjects perceived empathy as more difficult and more costly: they described the empathy task (on a scale from 1 to 5) as more demanding (0.234, $p = 0.02$), harder (0.377, $p = 0.0001$), felt more insecure/anxious (0.234, $p = 0.03$) about it and less successful at it (-0.19 , $p = 0.04$) than the objective task and were more likely to report preferring the DESCRIBE task than the FEEL task.⁴

Having established that empathy is costly from both the subjective experience of our subjects and our estimates of the cost of incentivizing it, we turn to the question of how we might reduce those costs and encourage empathetic behavior. Using the elicited sincere praise from Study 2, Study 3 tests whether peer praise is able to overcome the costs of empathy and encourage people to choose to engage in empathetic behavior. Using the main choice task from Study 1, we find that respondents choose FEEL over DESCRIBE more frequently when exposed to the praise treatment (compared to a control condition of no praise). Specifically, the odds ratio of respondents choosing the FEEL task over the DESCRIBE task for peer-praised respondents was 0.128 ($p = 0.02$) higher

³This is only a fourth of the pay needed to shift respondents found by Cameron et al. [12] (\$0.39); thus we find that while a substantial ten percent increase in wage is required to shift a respondent towards the empathetic task from the objective task, our incentive-compatible real wage design elicits a one fourth wage difference compared to the hypothetical choice task used by Cameron et al. [12]. The design randomized subjects into a real or hypothetical incentive condition, allowing us to explore differences between real/hypothetical incentives: we find no significant difference between our real cost and hypothetical cost conditions.

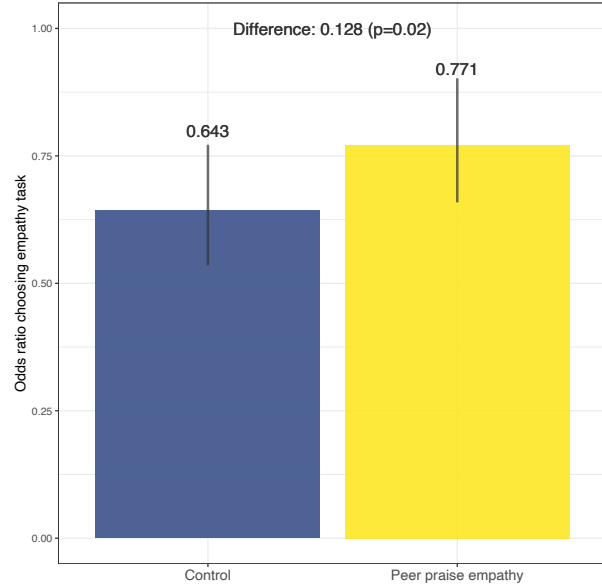
⁴28.9% preferred DESCRIBE compared to 18.9% preferring FEEL. For details on task load summaries see SI D.

Peers of yours on this platform have said they hold favorable feelings towards people who engage in **empathetic behavior**, with an average “feeling thermometer” score of 7.9, on a scale of 0 (least favorable) to 10 (most favorable).

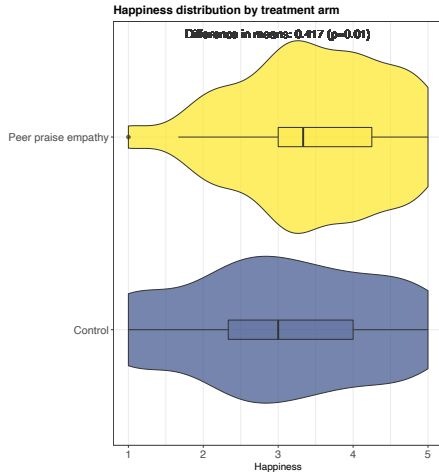
That same peer group provided real feedback for **empathetic behavior**, which is pictured in the word cloud below.



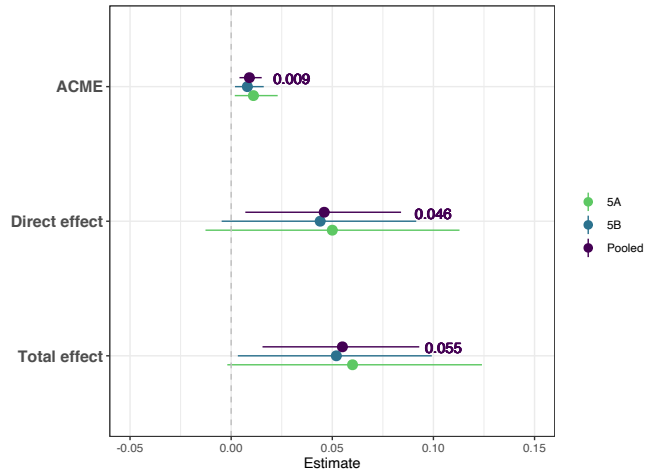
(a)



(b)



(c)



(d)

Figure 2: **Peer praise effect on empathy.** (a) presents the main peer praise treatment, formed from eliciting naturalistic praise in Study 2. (b) plots the odds ratios (exponentiated log-odds) of choosing the empathy task for control and peer praise for empathy groups from Study 3. (c) plots distributions and barplots of the happiness index for control and peer praise for empathy groups from Study 4. (d) presents mediation estimates of interest (on log-odds of choice task) from Study 5 (which included to two fielded days of surveys, referred to as 5A and 5B), including the average causal mediation effect (ACME) of respondent happiness.

than the control group. This translates to 1.20 times the odds of choosing the FEEL task for the control group. In other words, the peer-praised group had a 20% greater likelihood of choosing the empathy task over the objective task compared to the control group.⁵ We find convergent evidence from the real wage task, where praise for empathy lowered respondents’ reservation value compared to both control (no praise) and the placebo (praise for description), though the differences were not statistically significant.

Studies 1-3 demonstrated that empathy was costly, and designed and tested a promising light-touch intervention to encourage empathy. We turn now to the question of *how* peer praise encourages empathy. Several candidate mechanisms are possible—none mutually exclusive—though they can be grouped into two “families” of explanations. The first family of mechanisms focuses on cost, while the second focuses on norms. The “norms explanation” for how praise encourages empathy is that it may do so by changing respondents’ beliefs about what is normatively “good” behavior (behavior valued by others). Evidence from Study 3 suggests that a broad interpretation of the norms mechanism is unlikely to be at play: if praising a behavior worked simply by changing respondents’ beliefs about how valued that behavior is by others, our placebo condition (“peer praise for description”) should have led to a higher likelihood of choosing objective description relative to our control (no praise) condition. That it did not (the change in odds of choosing the empathy task over the objective task was 0.05 ($p = 0.37$); see Figure 3b), despite adequate power, suggests the utility of focusing on the “costs” family of potential mechanisms instead.

We focus our efforts on the cost/benefit mechanisms, beginning with suggestive evidence from Studies 1 and 3 that respondents do in fact see empathy as more costly relative to objective description. Our evidence for this comes from our task difficulty questions administered to respondents after they completed the choice task (odds for the empathy task are lower, reservation wage is

⁵See SI F for table with log odds and odds ratio estimates.

higher, and the task is more demanding, harder, and more anxiety-inducing than the objective task). Additionally, Study 3 showed that respondents had a higher reservation price for empathy compared to description. However, those results suggest only that there may be a cost to empathy, not what the cost is or how it operates. Since we have evidence from other work on the relationship between affect and empathy, we focus in Study 4 on the emotional pathway and, specifically, the extent to which praise causes happiness. In Study 4, we show that peer praise increases respondents' reported happiness, as one would expect if peer praise encouraged empathy through an emotional pathway. Figure 2a (c) presents the distribution of the measured happiness index for respondents who received peer praise for empathy and respondents in control; peer praise is associated with a 0.417 ($p = 0.01$) bump upwards in a five point happiness scale, or more than a one third standard deviation increase in happiness.⁶

Further corroboration for the argument that peer praise encourages empathy *through an emotional pathway* is provided by Study 5, in which subjects participated in the same choice task as earlier studies—for either 3 or 20 trials⁷—combined with measurement of happiness described earlier. We follow Imai et al. [34] and conduct a mediation analysis to find that the effect of peer praise on choosing an empathetic task is mediated by how happy the receiver feels. The average causal marginal effect (ACME) of respondent happiness is 0.009 for the log-odds of the choice task, or 16.4% of the total effect of the peer praise treatment as presented in Figure 2d.

⁶While our focus throughout is on happiness, we also test and find similar results for a related dimension of positive affect, pride, and present results in SI Figure G.21. Pride may be a promising related positive affect to explore for future work.

⁷We calibrated design for Study 5 based on power calculations designed to reduce trials and increase overall observation sample size directly from findings in Study 3 which suggested some tapering off of peer praise effects over many trials.

3 Discussion

Though empathy is widely recognized as normatively and instrumentally important, significant gaps remain in understanding *why* empathy is difficult and what we can do to encourage it. Most extant work on encouraging empathy involves resource-intensive perspective taking exercises, often requiring trained interlocutors or complicated online simulations. Our innovation was to introduce a low-cost, light-touch intervention based on praise from peers. Across five studies, we were able to first verify and precisely estimate the cost of empathy and then demonstrate the utility of a novel “peer praise” intervention that lowers the barriers to empathetic behavior. We also provided evidence suggesting that norms may not be the main mechanism through which this process operates, instead showing that praise works through an affective pathway by boosting happiness in our treated respondents. In our discussion below, we focus on several scope conditions to the effectiveness of our intervention. Among the limiting factors, we note that peer praise does not work as well for other behaviors as it does for motivating empathy, that it works best for the most attentive respondents and that its effectiveness seems to decline over time in the longer versions of our experiments. We conclude this section by highlighting broad evidence that peer praise does motivate empathy across demographic and ideological categories.

The Limits of Peer Praise

We offer evidence of peer praise working (through happiness) to lower barriers to empathetic behavior; but does peer praise work to move behaviors on whatever is praised? We find that peer praise for objective behavior is not an effective intervention for increasing respondents’ willingness to choose the objective task. We do this by eliciting naturalistic praise for objective behavior (see (a) in Fig. 3) and randomizing respondents to receiving the peer praise for objective behavior. If peer praise works similarly for objective behavior as it does for empathy, we should see the likelihood

of choosing the empathy task *drop* for respondents treated with “praise for description” compared to their control counterparts. In Fig. 3 (b) we see that the odds increase by 0.05 and is not statistically significantly different ($p = 0.37$). This suggests something about the potential limits of a peer praise intervention—it does not necessarily shape any and all categories of behavior—as well as helping us to pinpoint *why* praise does motivate empathetic behavior.

Peers of yours on this platform have said they hold favorable feelings towards people who engage in **objective behavior**, with an average “feeling thermometer” score of 7.2, on a scale of 0 (least favorable) to 10 (most favorable)."

That same peer group provided real feedback for **objective behavior**, which is pictured in the word cloud below.

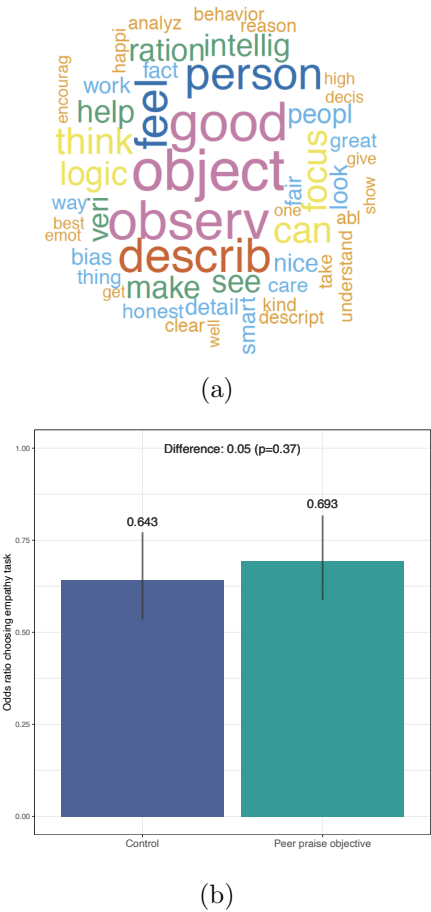


Figure 3: (a) Peer praise for objective behavior. (b) Odds of choosing the empathy task over the objective task under Control and Peer praise for objective behavior groups.

Above, we note that peer praise is not a universal motivator of behavior, but our results also suggest specific boundaries for how it motivates empathy. Two factors seem to shape the efficacy

of the intervention: attentiveness and repetition. In Study 5, subjects were asked to participate in either 3 or 20 trials of the choice task.⁸ From this, we can see the efficacy of peer praise in the first three trials across both versions of the study, but also clearly see in the longer choice task that the effect of praise declines over trials (Figure I.35 in SI I), such that after the first four or five trials the total effect of peer praise and the ACME of peer praise through happiness become indistinguishable from zero. In Figure I.34 (SI I), we examine subgroup effects by respondent attentiveness in Study 5, as measured by our two sets of attention checks (a combination of grid and multiple choice questions, as suggested by Berinsky et al. 7). We find that peer praise works least well for the small number of our least attentive respondents: the 6% of our sample who “failed” both types of attention checks. The two most plausible (though not mutually exclusive) explanations for this are either that subjects who are least attentive in online survey are also least responsive to peer praise, or that our intervention requires some minimal amount of focus or attention in order to work.

Peer Praise Works Broadly Across Groups in Encouraging Empathy

Finally, our experiments provide an opportunity to wade into a larger debate on individual differences in empathy. It is relatively old-hat to note that individuals differ in their levels of baseline empathy [15] and that there is a distinction to be made between ability—or, empathic accuracy [47] and proclivity to engage in empathy [61]. More recent work has suggested that liberals and conservatives might differ in baseline empathy, with one notable study concluding that “liberals wanted to feel more empathy and experienced more empathy than conservatives did” (57, 1450, see also 30, 49).

The raft of similar findings [30, 49] suggest some consensus on this point, though we note that these studies are by and large premised on measurement of *baseline* empathy that is self-reported

⁸This was not randomized but represent slightly different versions of the study fielded on different days of the same week).

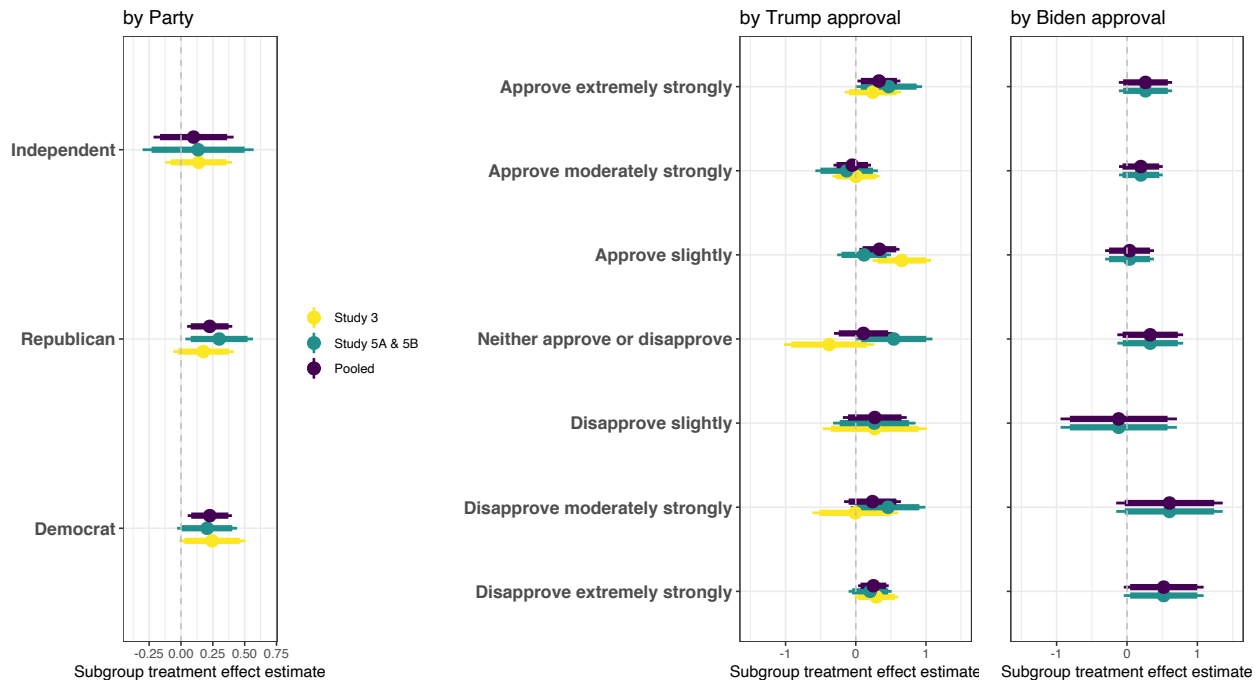


Figure 4: **Subgroup effects by party (left), Trump approval (middle), and Biden approval (right).** At the time of fielding for Study 3, President Trump was in office (and therefore approval was measured as “presidential approval”), but by Study 5, President Biden had taken office and thus we separately and explicitly measured “Trump approval” as well as “Biden approval” (“presidential approval [for Biden]”).

by respondents, not empathetic behavior. Given that empathic accuracy and proclivity seem to be largely orthogonal, it is worth considering if the gulf in empathy between liberals and conservatives is as wide as it seems. In fact, analyses in Figure 4 (and detailed in SI I) shows that peer praise works to encourage empathetic behavior broadly across ideological boundaries, whether measured as Party ID, or support for President Trump or Biden. Further analyses show that peer praise is also effective in motivating empathy across education, sex and racial identity categories.

We also find that pre-treatment differences in baseline empathy—our respondents’ “taste for empathy”—do *not* predict susceptibility to our praise treatment (see Figure I.33, SI I). In other words, our intervention does not seem to be simply working by motivating people already inclined to engage in empathy. Finally, respondents “peer-praised into empathy” show no evidence of shortcutting or using less effort compared to those who chose empathy under the control condition

(Table F.10 in SI F). We take the sum of these results to show both the overall effectiveness of the proposed peer praise intervention, but also evidence suggesting that we may have been too quick to categorize ideological groups as more or less empathetic.

While we establish a general effect of peer praise in this work, we leave for follow-up research the important question of whether the identity of the praiser (e.g. a co-gender or co-partisan) might differentially affect the recipient’s willingness to engage in empathetic behavior. In addition, we have also set aside explorations of the, likely meaningful, impact of the *target* of empathy for future work; we do not experimentally manipulate these targets prior to our respondents’ choosing whether to engage in the objective or empathetic task in lieu of focusing here on the first order question of whether peer praise for empathy can, in general, motivate empathetic behavior.

4 Methods

All studies in this research comply with relevant ethical regulations and was approved by the University of Wisconsin Madison Institutional Review Board. Informed consent was obtained from all participants, and participants in any of the studies described in the paper were prevented from re-enrolling in any other empathy-related study run by authors. Participants were paid according to the highest minimum wage across U.S. states (Washington) in 2020 on the online platform from which they were recruited (Amazon Mechanical Turk (MTURK)).

Overall measures and estimating models We measure the aversion to empathy, the effects of peer praise for encouraging it, and the extent to which peer praise is mediated by positive emotions, with a series of five online randomized controlled survey experiments on over two thousand adults from August 2020 to January 2021. Overall, attrition was quite low across all studies and uncorrelated with assignment to treatment condition (see discussion in SI A). We avoided negative

affect as much as possible (by designing our studies without negative peer feedback or eliciting of negative emotions), did not use deception and established wages via the highest current minimum wage per hour in the U.S. at the time the studies were fielded (see SI K for more on ethical considerations).

Our estimating model of choice for the binary main task choice outcome is a logistic regression, and for numeric continuous outcomes—such as reservation wage or (mediator) happiness index value—we estimate ordinary least squares models, both with robust standard errors and clustered at the respondent level in the cases of multiple observations per respondent. Figure 1 provides an overview of our studies. All studies were fielded on Amazon MTURK using Qualtrics. Studies 1 and 2 lay the groundwork for our contribution by establishing a baseline cost to empathy and eliciting naturalistic peer praise from online respondents. Study 3 provides the first evidence that peer praise (designed from collected peer praise in Study 2) encourages empathetic behavior. Studies 4 and 5 explore mechanisms for our peer praise intervention, focusing on how peer praise reduces the barriers to empathy by increasing positive affect (happiness, specifically).

Study 1: empathy is costly as a baseline. Experimental design overview. Study 1 asked respondents to do a main experimental task adapted from Cameron et al. [12], which is designed to explicitly measure motivated empathy avoidance with behavior-based revealed preferences. This type of forced-choice scenario mimics many everyday occurrences of empathy regulation, where people might similarly choose to scroll quickly past charity-based ads or opt for walking around non-profit volunteers on the street. Respondents were asked to choose to do a task of either empathizing with or describing a person, and then proceed to do their chosen task. Notably, in our design (and across all studies that utilize the main experimental task), all respondents completed a practice round in which they engaged in both empathy and description, so that our experimentally-

assigned praise was for something they had already done and could choose to do more of in the future. They also completed an incentivized wage-elicitation version of the task where they were asked for different pairs of wages what they would prefer to do (empathize/describe). This is referred to throughout as the “main choice task” and is featured in all studies.

Participant recruitment method and use of MTURK All respondents across studies were recruited from MTURK, an online marketplace operated by Amazon where employers can hire users to complete short tasks and/or surveys. We focus on an adult U.S. citizen sample. In establishing pay scales for each study, we conducted pilots to establish average times for pre-treatment, task and post task portions of each study design and paid based on the state with the highest minimum wage in the U.S. in mid 2020 (Washington, at \$13.50 per hour). Our intention was to offer fair wages especially in the context of work showing the median wage of MTURK workers is ~\$2/hour [27]. This approach may also have directly contributed to extremely low levels of participant attrition across all five studies (an average of 14.6%).

Sample size determination. We conducted power calculations off of conservative assumed effects from Cameron et al. [12] studies 3 and 5, which suggested a minimum of 250 respondents to achieve a power of 0.8. We requested a sample size of 300 from MTURK and allowed for some trailing observations given initial concerns that some respondents might attrite within the survey.

Participants. We recruited a total of 318 adult U.S. respondents on MTURK (mean age, 36.45; sd 11.4; range, 20-77). The demographic breakdown of the sample was: 30.5% female, 48.7% male, 20.8% unknown gender; 61.3% white, 0.3% Asian, 10.4% African American, 4.1% Native Hawaiian or Pacific Islander, 23.9% unknown or other. 78.6% completed at least high school, 61.1% had graduated at least from college. Full summary statistic tables for each study’s sample as well as information on attrition are provided in the SI.

Procedure. Each study immediately began with a consent form describing the study as interested

in American attitudes and opinions generally. All studies are described with consort diagrams in the SI. The main choice task that appears throughout Studies 1, 3, 4 and 5, entails a practice round, where respondents practice both FEEL and DESCRIBE activities.

Respondents were presented with the below text of instructions, followed by an image of two decks of cards (Figure 5):

In the following, you will complete a task. You will first complete a practice trial, which will help you become familiar with the task.

On the trial, you will see two decks of shuffled cards: the deck on the left will always be labeled FEEL and the deck on the right will always be labeled FEEL. You should choose between these decks. Once you choose a deck, you will then see an image of a person. The decks include the same images. Depending on which deck you have chosen, you will be given one of two possible sets of instructions. If you choose from the deck labeled DESCRIBE, you will be told to be objective and focus on the external features and appearances of the person in the image. When completing this kind of trial, try to be as objective as possible. To be objective, do not let yourself get caught up in imagining what this person feels. On these trials, describe the **age**, **gender** and **race** of the person.

If you choose from the deck labeled FEEL, you will be told to have empathy and focus on the internal feelings and experiences of the person in the image. When completing this kind of trial, try to feel as much empathy as possible. To be empathetic, let yourself get caught up in imagining what this person feels. On these trials, describe the **feelings** and **experiences** of the person. You are free to choose from either deck on any trial, and

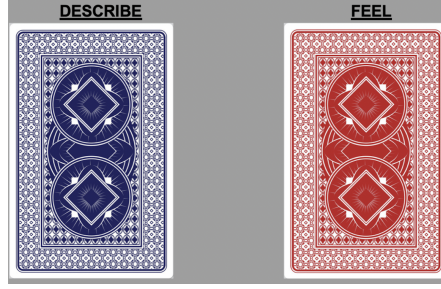


Figure 5: DESCRIBE and FEEL decks presented to respondents.

should feel free to move from one deck to the other whenever you choose.

If one deck begins to seem preferable, feel free to choose that deck more often. Overall, this task will take the same amount of time regardless of which deck you choose.

Now you will complete a practice trial of the task; later on, you will turn over to the task. Please click on one of the decks.

Respondents were then presented with two decks to pick from:

Respondents then chose a deck and answered the corresponding questions to that deck, and are then asked to choose the other deck and answer its corresponding questions – ensuring practice with both decks. Upon choosing a deck (for practice, main choice and reservation wage tasks), images are drawn from the **Faces Data** in Chicago Faces and Harvard Faces Databases [40], randomized within-respondent among the following features: Race=Black/White, Gender=Male (no variation), Valence=Angry/Fearful; images are randomized *without replacement* within respondent. See the SI for example draws of faces.

The corresponding questions for the FEEL deck are an open-ended question, three short word answers, and a feeling thermometer, as follows:

1. Please write a sentence describing the **feelings** and **experiences** of this person.

2. Please write three words that describe the **feelings** and **experiences** of this person.
3. How do you feel about this person?

The corresponding questions for the DESCRIBE deck are an open-ended question, three short word answers, and a feeling thermometer, as follows:

1. Please write a sentence describing the **age**, **gender** and **race** of this person.
2. Please write three words that describe the **age**, **gender** and **race** of this person.
3. How do you feel about this person?

The above main choice task was given three times (3 trials), before turning to an across-and-within subject randomized reservation wage task, where each respondent was equally likely to be randomized into a group that did an incentive-compatible wage elicitation for the FEEL versus DESCRIBE tasks first (referred to throughout as “real wage task”, REAL) followed by its hypothetical equivalent (“hypothetical wage task”, HYPOTHETICAL) or reverse-ordered.

The REAL/HYPOTHETICAL task was simply a modification of the main choice task. Respondents completed an incentivized wage-elicitation version of the task in which 12 pairs of decks were presented sequentially on one page, each with wages associated with them—DESCRIBE task was pegged at \$1.00 and FEEL deck ranged from \$0.90 to \$2.00.⁹ For each pair, subjects chose which wage-task they would prefer; the incentivized aspect of the task manifested in a random draw of one of the pairs of wage-task choices, and respondents were paid the associated wage to conduct the associated task. The HYPOTHETICAL version of the task simply asked subjects their preferred deck for under each pair of wage options, without needing to actually do the task. Subjects were

⁹Later studies adapted this range to a maximum of \$1.30 based off of the observed variation in this outcome.

randomly assigned to either a REAL or HYPOTHETICAL version of the wage elicitation task.¹⁰

Following the wage elicitation tasks, subjects answered questions about: 1) how they chose between decks, 2) questions about task load (adapted from Hart & Staveland’s 1988 NASA task load index) and 3) empathy (adapted from Interpersonal Reactivity Index (collectively referred to as “post task questions”); 15) and finally filled out demographic information.

Analyses. We ran a logistic regression that predicted respondent choice of the FEEL (always coded as 1) or DESCRIBE deck (coded as 0) with respondent-clustered robust errors. The FEEL task had a 39.7% lower likelihood of being chosen (odds ratio -0.51 , $p = 1.7e - 8$). We conduct a two-sided t-test on the real elicited reservation wage for the FEEL task, with a null hypothesis of the comparison wage \$1.00, and find further evidence of FEEL as more costly with a reservation wage of 1.10, ($p = 1.3e - 13$). Finally we conduct two-sided t-test differences in the NASA task load questions for FEEL and DESCRIBE and find that subjects find the empathy task more demanding (0.234 , $p = 0.02$), harder (0.377 , $p = 0.0001$) and felt more insecure/anxious (0.234 , $p = 0.03$) about it and less successful at it (-0.19 , $p = 0.04$) than the objective task and were more likely to report preferring the DESCRIBE task than the FEEL task.

Study 2: gathering genuine praise from online peers for empathy task to form the peer praise treatment. Design overview. Study 2 asked respondents to review the main choice task,

which was described in full, and offer motivating praise to real peers on the MTURK platform to encourage more empathetic behavior such as is exhibited in the FEEL portion of the main choice task.

Emphasis was placed on the real peers who would receive such praise and encouragement, on the

¹⁰Previous studies such as Cameron et al. [12] use hypothetical settings to elicit wage preference, but the literature on wage elicitation suggests that often hypothetical scenarios can lead to under or over-stating of true preferences, whereas incentive-compatible designs that credibly tie respondents to real wage payouts do not suffer from such bias [8]. As such, we chose to measure reservation wage with both types of designs first; while we find suggestive evidence that there is no statistically significant difference in reported wage preferences in REAL or HYPOTHETICAL settings in Study 1, our findings differ from a similar hypothetical scenario posed in Cameron et al. [12] as the literature might predict, and so, as a conservative approach, we continue in Studies 3-5 to follow to use the REAL design whenever wage preferences are measured.

task itself being tied to empathetic behavior, and the survey itself periodically asked respondents to review and edit their own answers to assess genuineness as perceived by peers. A similar approach was taken to solicit natural and genuine peer praise for descriptive/objective behaviors.

Sample size determination. No statistical methods were used to predetermine Study 2 sample size, rather we guided sample size based off of a large enough sample to qualitatively have variation in gathered peer praise answers. As such, we set the sample size for the study at 100 at the beginning and allowed for trailing participants based off of ex ante concerns of attrition.

Participants. Study 2 had a total of 115 respondents on MTURK (mean age, 34.6; sd 10.9; range 19 to 72). Other demographics of the sample were: 33.9% female, 66.1% male; 70.4% white, 1.7% Asian, 13% African American, 7.8% Native Hawaiian or Pacific Islander. 76.5% of the sample had graduated at least from college or an associate degree.

Procedure. Respondents were asked to provide feedback on the main choice task that real adult peers on the platform performed, (FEEL and DESCRIBE), and walked through an actual example of the task instructions as well as what the task entailed. They were then presented with the following text and accompanying questions (three words, a sentence, feeling thermometer):

If the participant chose from the deck labeled FEEL, the participant was told to have empathy and focus on the internal feelings and experiences of the person in the image and to write a sentence imagining the feelings and experiences of the person, as well as a few words about the feelings of the person. Think of language that would encourage or admire the participant for choosing and doing the FEEL task. What are some positive things you can say about people who choose to empathize with another person that can encourage them?

What are three words you might use to admire and encourage **empa-**

thetic behavior in the participant?

Please write a sentence that admires/encourages choosing and engaging in **empathetic** behavior in the participant.

How do you feel about people who choose and engage in **empathetic** behavior? Please place your attitudes on a feeling thermometer. According to the thermometer, higher numbers indicate more positive feelings. Please indicate your feelings where 0 means extremely negative, 10 means extremely positive, and 5 is neutral.

Respondents were then reminded that sometimes praise might be seen as genuine and other times not. They were asked to evaluate their own written peer praise, asked how others might view it, and given the opportunity to go back and update their answers. A similar procedure is conducted to elicit peer praise for the DESCRIBE task. The survey concluded with demographic questions.

Analyses. We utilized the open-source R package **quanteda** to collect respondent sentence and word answers to the peer praise questions, stem and remove stopwords, and create a wordcloud of the fifty top occurring tokens. We then calculated the mean of the thermometer question (7.9) and generated the main peer praise treatment for the subsequent studies (see Figure 2a). For more details on the types of words and phrases that constitute Study 2 respondents' praise, see SI.

Our peer praise intervention was designed with two features in mind. First, we sought to intervene as lightly as possible, both to avoid demand effects as well as to satisfy the requirement that our treatment be low-cost and scalable. Second, we designed the intervention to accord with extant theories and empirical guidance that provide scope conditions for *when* praise is an effective motivator. Prime among those conditions are that the praise is perceived as sincere, that it encourages something that is controllable by the recipient (effort, rather than ability or

personal attributes, for example; 31) and that it conveys information about norms and/or social comparisons [58]. In order to satisfy the first requirement, the praise intervention was as “light-touch” as possible, consisting merely of a word cloud of praise and a favorability rating for those that engage in it, displayed for only a few seconds.¹¹ The second set of requirements was satisfied by fielding a non-experimental survey (Our Study 2 in Figure 1) designed to elicit actual praise and verify that it was perceived as genuine by online respondents.¹² Combining the language elicited from respondents, we created a “peer praise empathy” wordcloud that presents the most commonly used unique words sized by their likelihood of usage, presented in Figure 2a.¹³ Moreover, the phrasing of our intervention (in Studies 3-5) emphasized the social norm aspect of the praise (“peers of yours. . .”). Finally, in all studies in which peer praise for empathy was administered as an intervention, we included an additional placebo treatment arm in which peer praise for *description* was treated as well.¹⁴

Study 3: praise from peers increases respondent likelihood of choosing the empathy

task. Experimental design overview. Study 3 tested whether praise from peers on the same platform (taken from Study 2) could encourage respondents to choose the empathy task (FEEL) more often in the main choice task. The methods were identical to Study 1, except that prior to presenting the FEEL and DESCRIBE decks in each of the three trials, respondents were randomly, with equal probability to receive the treatment arms (1) peer praise for empathy, (2) peer praise for

¹¹“Peers of yours on this platform have said they hold favorable feelings towards people who engage in empathetic behavior, with an average feeling thermometer score of 7.9, on a scale from 0 (least favorable) to 10 (most favorable). That same peer group provided real feedback, which is pictured in the word cloud below.”

¹²After eliciting the praise for others in Study 2, respondents rated how genuine it seemed to them and were given the option to go back and edit their praise to make it more sincere. Respondents were asked to rate the praise they gave for how sincere they believed it would be perceived by others receiving the praise on a scale from 0 (not genuine at all) to 100 (very genuine); average ratings for the peer praise for empathy was 71.90 (SD=20.90) and for objectivity it was 72.32 (SD=21.14).

¹³We similarly create a “peer praise for objective behavior,” found in Figure 3a. SI Figure ?? presents words that are most likely to differentially occur for empathy and objective tasks.

¹⁴In the praise for description, the instructions were identical to the praise for empathy treatment, with only slight differences in the feeling thermometer score (7.2 instead of 7.9) and a very subtly different word cloud.

objectivity, (3) or a pure control for 2-3 seconds before they could choose their preferred deck.

Sample size determination. We conducted power calculations on a single hypothesis of whether peer praise affects choice of the FEEL deck, based off of a estimated baseline likelihoods taken from Study 1 and assuming a treatment effect of $\tau = 0.25$ with s.d. 0.2, which suggested a minimum of 250 respondents and 15 trials to achieve a power of 0.8. We requested a sample size of 300 from MTURK and allowed for some trailing observations given initial concerns that some respondents might attrite within the survey.

Participants. There were a total of 328 respondents in Study 3 (mean age, 36.3; sd 10.5; range 21 to 71). Other demographics of the sample were: 30.1% female, 46.6% male, 23.1% preferred not to say or ticked other; 54.9% white, 0.3% Asian, 14.6% African American, 3.1% Native Hawaiian or Pacific Islander, 0.6% Hispanic or Latino, and 26.5% preferred not to say or other. 61.3% of the sample had graduated at least from college or an associate degree.

Procedure. Like Study 1, respondents were provided with instructions and a practice round for the main choice task; this was then followed by 15 trials of the main choice task, where the difference was that for each trial respondents were randomly assigned to arms (1), (2) or (3) prior to choosing which deck exercise they preferred. After the 15 main choice task trials, respondents were presented with the real wage task as well as one more randomized assignment of treatment prior to choosing their preferred wages for each deck pair. This was followed by post task questions and demographic questions. Study 3 also asked respondents to rate their emotional state following the treatment and the task using a modified version of the Discrete Emotions Questionnaire [28].¹⁵

Analyses. We conducted a logistic regression that predicted respondent choice of the FEEL or DESCRIBE deck with the peer praise for empathy treatment (baseline control) and using respondent-clustered robust standard errors. As hypothesized, there was a significant effect of peer praise

¹⁵Specifically, we removed items relating to “desire” and “relaxation,” lowered the number of items per emotion from 4 to 3 to ease burden on respondents and added items clustering around the emotion of “pride,” based on work by Webster et al. [58] and Williams and DeSteno [59].

(log odds was 0.182, $p = 0.023$ 95% CI=(0.025,0.339)). This translates to an odds ratio in the control group of 0.643, versus 0.771 in the peer praise treatment group, a difference of 0.128 ($p = 0.02$), as presented in Figure 2b. We also conducted a similar analysis for the treatment effect of peer praise for the objective task compared to the control; there is no similar effect found for peer praise for the objective task (log odds was 0.076, $p = 0.370$). For completeness, we report the estimated reservation wage difference under an ordinary least squares (OLS) model of the reservation wage regressed on the peer praise for empathy treatment (baseline control) and find that the reservation wage is lower under peer praise than under control arms (-0.02) though the estimate is not statistically significantly different from zero ($p = 0.37$).

Study 4: receiving praise from peers for being empathetic increases respondent happiness. Experimental design overview. Study 4 considered whether there was evidence for our hypothesized affective emotional mechanism. It tested whether peer praise for empathy leads to increased *in the moment* respondent happiness. The methods were identical to Study 3 with the exception that between randomization of treatment and the choice of deck task, respondents were asked about their current happiness via a happiness index.

Sample size determination. We conducted power calculations for a single hypothesis of whether peer praise affects respondent happiness, based off of estimated baseline likelihoods taken from Studies 1 and 3, and assuming a treatment-on-mediator effect of $\tau = 0.1$ with s.d. 0.2 which suggested a minimum of 200 respondents and a single trial to achieve a power of 0.8.

Participants. We sampled a total of 223 respondents for Study 4 (mean age, 37.04; sd 10.05; range 20 to 69). These respondents were explicitly randomized into the sample for which we tested the happiness mediator hypothesis. Other demographics of the sample were: 43.0% female, 56.5% male, 0.4% preferred not to say or ticked other; 70% white, 0.9% Asian, 13% African American,

6.7% Native Hawaiian or Pacific Islander, 4% preferred not to say or other. 80% of the sample had graduated at least from college or an associate degree.

Respondents were asked about their happiness *only* developed from an emotion scale by [28]. We specifically focus on the measurement of respondent emotion *in the moment*, so as to avoid conflating emotions across the experience of the overall survey with the emotions related to the treatment. Below is the phrasing of the happiness measure:

- This scale consists of a number of words that describe feelings and emotions. Read each item and then mark the appropriate answer in the space next to the word. Indicate to what extent you feel this way RIGHT NOW.
- scale: very slightly or not at all/ a little/ moderately/ quite a bit/ extremely
- emotions: happy/enjoyment/liking

The happiness index scale was constructed from the above by taking the mean score of the three words associated with happiness in the emotions scale.¹⁶

After measuring deck choice, respondents were then asked post-task questions and demographic questions such as in Studies 1 and 3.

Analyses. We estimated an ordinary least squares model with the outcome as the happiness index value and the main regressor the randomized treatment of peer praise versus control. The estimated coefficient on peer praise is 0.4175 ($p = 0.00774$) (or more than a one third standard deviation increase in happiness), as expected from our hypothesis, and presented in Figure 2c.

¹⁶For the phrasing of the pride measure, please see the SI G.

Study 5: praise from peers increases respondent likelihood of choosing the empathy task via raised levels of happiness. Experimental design overview. Study 5 investigates our posited causal mediated pathway of peer praise \Rightarrow happiness \Rightarrow empathy. Our measurement approach to the mediation effect of happiness does not include randomization of both the treatment (peer praise) and the mediator (happiness) in a parallel design, but rather only randomization of the treatment and direct measurement of the mediator after treatment. This is after careful consideration of the well-known difficulties of meaningful and valid experimental manipulation of mediators [35] (and for which emotions can be particularly tricky). We conduct sensitivity analyses of our mediation approach in the SI H. Study 5’s design closely mirrored that of Study 4, though respondents repeated the main choice task multiple times.

Sample size determination. We conducted power calculations for a single hypothesis of whether peer praise increases the likelihood of choosing the empathy task through increased respondent happiness (an average causal mediation effect, ACME), based off of estimated baseline likelihoods taken from Studies 1, 3 and 4; assuming a treatment-on-outcome effect taken from Study 3, and a proportion of total effect mediated of 0.8, which suggested a minimum of 300 respondents with 3 trials to achieve a power of 0.8. We conducted two sub designs for Study 5, whereby for Study 5A we favored a higher trial vs respondent ratio (20 trials, 300 respondents) to additionally explore treatment differences as trials increase, and for Study 5B we favored a higher respondent to trial ratio (3 trials, 600 respondents), all sampled from MTURK.

Participants. We sampled a total of 338 respondents for Study 5A (mean age, 37.2; sd 10.5; range 20 to 73) and 624 respondents for Study 5B (mean age, 37.6; sd 10.5; range 19 to 73), for a total of 962 respondents for Study 5. Other demographics of Study 5A’s sample were: 35.5% female, 63.3% male, 1.2% preferred not to say or ticked other; 64.5% white, 22.2% African American, 4.1% Native Hawaiian or Pacific Islander, 9.2% preferred not to say or other. 75.7% of the sample had

graduated at least from college or an associate degree. For 5B these were: 36.4% female, 62.7% male, 1% preferred not to say or ticked other; 72.9% white, 0.8% Asian, 15.4% African American, 4.0% Native Hawaiian or Pacific Islander, 6.9% preferred not to say or other. 75.0% of the sample had graduated at least from college or an associate degree.

Procedure. Study 5 mirrored Study 4 in allowing respondents to conduct a practice main choice task with instructions, then were equally likely to be randomized into peer praise for empathy or a control arm. This was followed by our measure of respondent happiness, and then the deck choice (and related deck questions). The main choice task was repeated for 20 trials in 5A, and 3 trials in 5B; this was followed by post-task questions and demographic questions, much like Study 4. We focus on measuring only respondent happiness (rather than a battery of different emotions) as the positive emotion of interest for mediation given our hypothesized causal pathway, as well as design concerns over creating overly long timing between treatment and outcome measures and the nuisance costs to respondents of continuously answering the same emotion index questions over the multiple trials of the main choice task.

Analyses. We conducted a mediation analysis using Imai et al. [34]’s mediation approach, where we first run an OLS regression of the happiness index on the peer praise treatment, and then run a separate logistic regression of choosing the empathy task on both the peer praise treatment and happiness mediator. Both models are stored and incorporated into the `mediate` function in Imai et al. [34]’s associated R package `mediation`, with errors clustered at the respondent level and with 10,000 simulations. Study 5, in both sub-studies and pooled samples¹⁷, confirms a peer praise effect (Total effect = 0.055, $p = 0.0058$), and further provides evidence that this total treatment effect can be broken into a direct effect (0.04558 ($p = 0.0238$)) and indirect, mediated effect (0.009, $p < 2e - 16$) through respondent happiness; this is presented in Figure 2d. For sensitivity tests

¹⁷Samples focused on only trials 1-3, following Study 3’s design and power calculations.

conducted on the mediation analyses, see SI H.

Data availability

Data of all participants included in the samples for all studies are available on <https://github.com/adeline10/Praise-and-Empathy>.

Code availability

Custom code that supports the findings in this manuscript are publicly available on <https://github.com/adeline10/Praise-and-Empathy>.

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Author contributions

All authors designed the study, collected the data, analysed the data, and wrote and revised the manuscript.

Competing interests

The authors declare no competing interests.

Additional information

Supplementary information is available for this paper at <https://github.com/adelinelo/Praise-and-Empathy>.

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