

Intertemporal Empathy Decline: Feeling Less Distress for Future Others' Suffering

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### Abstract

The present actions of individuals and society at large can cause outsized consequences on future generations' quality of life. Moral philosophers have explored how people *should* value the well-being of future generations. Yet the question of how people actually feel when considering the plight of others in the future compared to the present remains understudied. In four experiments ( $N = 4698$ ), we demonstrate evidence of an intertemporal empathy decline such that people feel less empathy towards another person's suffering in the future compared to the present (Study 1-4) despite predicting that the same amount of pain would be felt (Study 1-2). Despite this, imagining another person's suffering in the future leads to placing greater value on future generations' welfare (Study 2). We also show that this intertemporal empathy decline reduces the amount people donate to a future-oriented versus present-oriented charity of the same type (Study 3). Finally, we find that prompting people to more vividly imagine another person's future suffering attenuates the decline in intertemporal empathy (Study 4). Together, this research identifies empathy as a present-biased psychological obstacle impeding future-oriented prosocial behavior.

*Keywords:* empathy; future well-being; intergenerational cooperation; prosocial behavior

### **Intertemporal Empathy Decline: Feeling Less Distress for Future Others' Suffering**

Over the coming years, society faces many severe possible risks, including climate change, pandemics, nuclear war, and advanced artificial intelligence. These challenges not only impact people alive today, but may also cause even greater harm to future generations. In line with this view, several moral philosophers have argued that, given the sheer number of people who may exist in the future and be subject to these harms, reducing catastrophic risks to humanity is a key global priority (Greaves & MacAskill, 2021; Ord, 2020; Parfit, 1984). Yet, for many reasons, people may not be motivated to prioritize addressing intergenerational societal risks (Wade-Benzoni, 1999).

While many obstacles to prioritizing the well-being of future generations exist, several are of a psychological nature (Schubert et al., 2019). First, people have been shown to be poorly calibrated with respect to estimating the likelihood of any given societal risks (Yudkowsky, 2008). The less likely people believe a true risk to be, the less they presumably believe it is worth addressing. Second, and relatedly, people generally prioritize solving current societal problems (e.g., poverty, healthcare) over attempting to mitigate future risks that have uncertainty attached to them (Coleman et al., under review). That is, they prefer dedicating effort to solving known problems rather than others which might never materialize in the future. Third, people may doubt their ability to meaningfully improve the quality of the future (Syropoulos et al., under review), thus justifying inaction. This can be especially problematic as belief in one's efficacy to address others' suffering has been shown to underlie compassion (Lim & DeSteno, 2020). Yet beyond these cognitive factors involving errors in estimation or belief, affective ones might lurk as well. One possible affective explanation for people not placing greater priority on future generations is that they simply care less about their well-being. That is, people may feel less empathy for

suffering that will happen in the future compared to equivalent suffering in the present. Here, we provide the first evidence in support of this emotional barrier.

### *Present Bias in Concern for Others*

It is well established that, in general, people value the present more than the future when it comes to personal gain. That is, people are present-biased when making decisions entailing a tradeoff between benefits in the moment and equal or larger benefits in the future (Chakraborty, 2021; Mischel et al., 1989; Watts et al., 2018). Most commonly, this is demonstrated for decisions about one's *own* well-being over time, such as enduring strenuous exercise now for health benefits in the future (Hunter et al., 2018; Rutchick et al., 2018; Wang & Sloan, 2018) or saving money now to ensure a prosperous retirement (Goda et al., 2019; Greenberg & Hershfield, 2018). However, whether this extends to decisions about others' well-being is not well known.

There are reasons to suspect that present bias extends to decisions impacting future others. Intergenerational cooperation faces both interpersonal and intertemporal obstacles (Wade-Benzoni & Tost, 2009). That is, it requires people to help others who they do not know *and* may not even exist yet. And prior research has found these two forms of “psychological distance” (Trope & Liberman, 2010) are correlated (Bischoff & Hansen, 2016; Rachlin & Jones, 2008; Story et al., 2020; Yi et al., 2011). For example, the more people discounted monetary rewards for socially distant others, the more they discounted monetary rewards for themselves in the future (Rachlin & Jones, 2008).<sup>1</sup>

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<sup>1</sup> Notably, social distance and temporal distance do not necessarily compound on each other in combination (Schubert et al., under review). For example, as psychological distance increases, people show diminished sensitivity to further distance (Maglio et al., 2013). Additionally, there is evidence that people discount the future less for others than themselves (Albrecht et al., 2010).

With respect to underlying emotional mechanisms, present bias stems in part from how people feel when engaging in mental simulation for different temporal frames. It is easier to imagine nearer-term events in vivid, concrete detail. In contrast, imagining the future is comparatively vague and abstract (Trope & Liberman, 2003). The decreased clarity in simulating across greater temporal distances dampens one's emotional connection to the imagined event (Gilbert & Wilson, 2007; Trope & Liberman, 2010). But when it comes to feeling concern for others' struggles, there are two mechanisms by which this dampening could occur.

The first way in which affective processes might lead to present-biased decisions is an affective forecasting bias wherein people underestimate the intensity of their future feelings compared to the present – a phenomena referred to as “future anhedonia”. In other words, people believe that, when the future arrives, the emotional weight of a given outcome will be lessened than if it happened right now. For example, people predict that receiving a given amount of money would make them less happy in a month than receiving the same amount of money today. Importantly, this forecasting bias has been shown to lead to present-biased financial choices (Kassam et al., 2008). However, it remains an open question whether future anhedonia also applies to predictions of others' emotions, instead of just one's own. If it does, one reason for a lack of concern for the pain of future others might stem from underestimating how much pain they would feel.

The second way in which emotions could lead to present-biased decisions is via people's own emotional *experiences*, rather than predictions. That is, while they might accurately predict what future others will feel, they simply might have less concern, or empathic distress, in response to it. But if people feel more emotionally connected to their future selves, they could be expected to make less present-biased choices (Bartels & Rips, 2010; Hershfield, 2011; van

Gelder et al., 2013). Along these lines, providing participants with age-progressed renderings of themselves — a manipulation that increases emotional connection with and thus empathy for people’s future selves — decreases present-biased behavior (Hershfield et al., 2011). Unlike with future anhedonia, this work has been extended interpersonally. Recent studies have demonstrated that imagining hypothetical future events in vivid detail increased empathy towards others experiencing those events (Vollberg et al., 2021; Yuan et al., 2022). Together, this work suggests the possible existence of what we term an “intertemporal empathy decline” — the tendency to feel less empathy for others’ suffering in the future than equivalent suffering in the present.

### ***The Present Research***

In the present studies, we first examine whether one or both of the proposed affective mechanisms – future anhedonia or an intertemporal empathy decline – give rise to people’s devaluing of the suffering of future others compared to present others. We subsequently examine how any such devaluing impacts their moral beliefs and prosocial behavior toward these two types of victims, and whether an intervention based on combating the simulation paucity of future events could overcome any decreased concern.

At first glance, it may seem unsurprising for people to care less about future others than present ones. However, examining the possibility that this bias stems from affective mechanisms complements the philosophical argument that “harm is harm, whenever it occurs” and that our emotional responses to it should be similar (MacAskill, 2022; Parfit, 1984). If people predict that future others will experience less pain than present others in response to the same event (i.e., future anhedonia), it would suggest that they do not agree with the logic of this philosophical argument. But if people show less care for future others even when expecting them to feel

similar amounts of pain, it would suggest that the degree of pain experienced is less important than how much people care about future others. Critically, if there is intertemporal empathy decline but no future anhedonia, it would indicate that logical arguments against discounting future pain may have limited persuasive power.

*Statement of Transparency and Openness.*

We report how we determined our sample size, data exclusions, manipulations, and measures for all studies. All data, analysis code, and research materials are publicly available at [https://osf.io/y6vgx/?view\\_only=fceff543fce343c38a2da2f814e2a60c](https://osf.io/y6vgx/?view_only=fceff543fce343c38a2da2f814e2a60c). Preregistrations are publicly available at [https://researchbox.org/1337&PEER\\_REVIEW\\_passcode=OZJGAU](https://researchbox.org/1337&PEER_REVIEW_passcode=OZJGAU). Note that the conditions presented in Study 1 and Study 2 are part of a larger study reflected in the preregistration (i.e., a subset of experimental conditions are presented here), and thus data analytic plans were altered slightly to accommodate the exclusion of certain parts of the larger studies (e.g., moving to t-tests from ANOVAs when comparing only two groups). This is not the case for Studies 3 and 4. In Studies 1 & 2, however, we continued to adhere to all noted exclusion criteria and conducted a sensitivity analysis for Study 2 to confirm that the utilized sample size was adequate to achieve power of .80 for the primary effect of interest with the reduced design. All studies were approved by the IRB at Northeastern University, #22-03-23.

## Study 1

Here, we sought to determine if people show evidence of either an intertemporal empathy decline or an affective forecasting bias regarding other peoples' pain. To do this, we used a simple event – someone breaking their ankle – and assessed people's empathic distress and predictions about the severity of the pain when it occurs either in the present or 25 years in the future.

## Methods

### *Participants*

In this preregistered study ([https://aspredicted.org/Y8M\\_2PP](https://aspredicted.org/Y8M_2PP)), a total of 401 participants were recruited from Prolific Academic and received \$0.30 for their participation. Two participants were excluded for failing the attention check, leaving a final sample of  $N = 399$  (208 female, 191 male;  $M_{\text{age}} = 36.93$ ,  $SD_{\text{age}} = 13.30$ ; 66.6% White, 14.3% Asian, 7.3% Mixed, 6.5% Black, 5.3% Other).<sup>2</sup>

### *Procedure*

Participants were randomly assigned to one of two time conditions: present or future. They read a hypothetical scenario about a person named Mary who was in pain after breaking her ankle either in the present day (present condition) or 25 years in the future (future condition). Specifically, participants were told to imagine the following: “There is a person named Mary who is living in the year [2022 (the present day) / 2047 (25 years from the present day)]. Mary is

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<sup>2</sup> For demographics data in all studies, we relied on Prolific's data and therefore did not collect these measures ourselves. The five categories follow the recommendations of the UK Office of National Statistics.

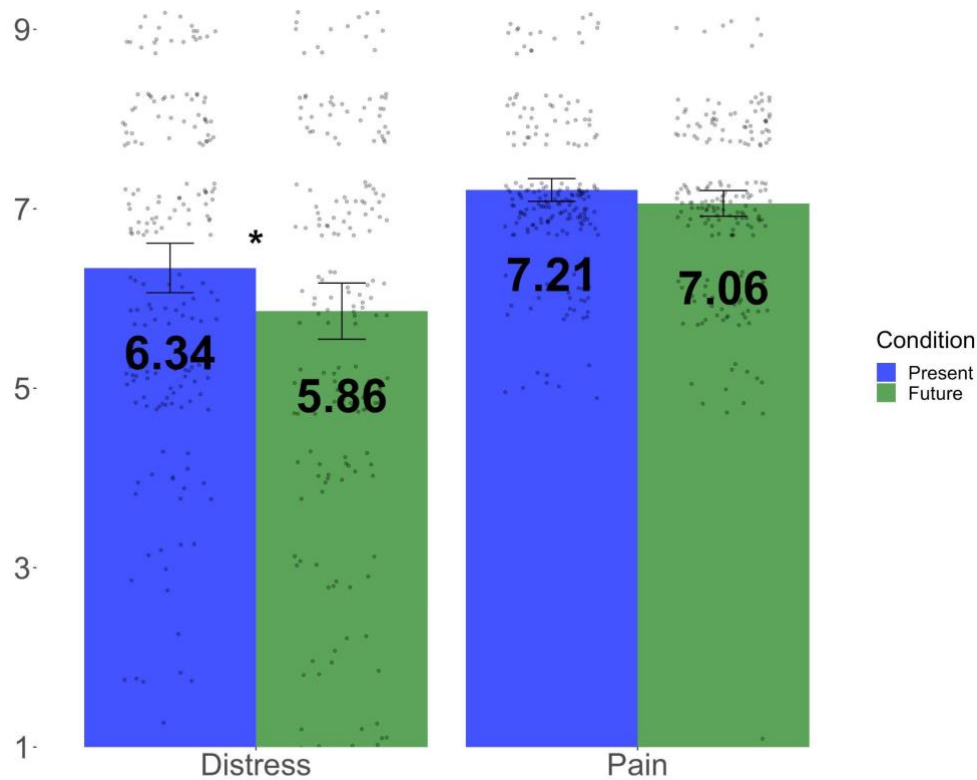


on her daily jog on a sunny day when she accidentally trips and breaks her ankle, leaving her in severe pain.”

After reading the scenario, participants indicated their empathic distress by responding to the question, “How distressed do you feel about Mary’s situation?” using a 9-point scale ranging from 1 (not at all distressed) to 9 (extremely distressed). On the next screen, they indicated their prediction for the pain Mary felt by responding to the question “How much pain does Mary experience?” using a 9-point scale ranging from 1 (no pain at all) to 9 (worst pain imaginable).

## Results

Participants felt less empathic distress in response to Mary’s injury when it occurred in the future than when it occurred in the present,  $t(397) = 2.27, p = .023, d = 0.23, 95\% \text{ CI } [0.06, 0.90]$ . However, participants did not show strong evidence of a bias in forecasting. They predicted the degree of pain Mary felt would be equal whether the injury occurred now or 25 years in the future,  $t(397) = 1.54, p = .125, d = 0.15, 95\% \text{ CI } [-0.04, 0.34]$  (see Figure 1).



**Figure 1.** Empathic distress and predicted pain in Study 1 as a function of time condition. Error bars indicate 95% confidence intervals.  $*p < .05$

## Discussion

Together, these results suggest that people feel less empathic distress in response to the suffering of future others, but do not show a bias in forecasting pain. That is, while they recognize that a person in the future will feel the same amount of pain from an injury as a person in the present, they are less bothered by that pain. However, because the order of measuring empathic distress and predicted pain were not counterbalanced, it is possible that the reporting of empathic distress impacted the reporting of pain. To rule out this possibility, we conducted a replication of Study 1 (see Study S1 in the Supplementary Online Materials) that contained only the forecasting measure (i.e., we did not first ask about distress). Once again, we found no

difference in predicted pain between the present and future time conditions, thereby ruling out future anhedonia as a potential cause of lowered empathic distress.

### **Study 2**

Having found initial evidence of an intertemporal empathy decline, but not a forecasting bias, with respect to the suffering of present versus future people, we set out to conceptually replicate these findings using a different domain of suffering and examine their impact on the moral worth people attach to the suffering of people at two different points in time. More specifically, we aimed to again find evidence of an intertemporal empathy decline in order to demonstrate that the phenomenon appears with respect to a more general type of suffering (i.e., discomfort from a disease as opposed to a specific injury), as well as determine whether people's emotional connection to others' decreases moral discounting of future generations.

On the one hand, imagining a future emotionally-laden event might predispose people to be more favorable toward remediating it. Indeed, work has shown that asking people to consider future events reduces the degree to which they discount its rewards (Hershfield & Bartels, 2018). On the other hand, Study 1 suggests that people feel less empathic distress for another person's future suffering relative to present suffering. Thus, any increase in empathic distress for simulated suffering might be offset by its temporal distance. The present study allows an examination of each possibility.

## Methods

### *Participants*

In this preregistered study ([https://aspredicted.org/SQL\\_JV1](https://aspredicted.org/SQL_JV1)), a total of 682 participants were recruited from Prolific Academic and received \$0.50 for their participation. Ten participants were excluded for failing the attention check, leaving a final sample of  $N = 672$  (341 female, 331 male;  $M_{\text{age}} = 36.66$ ,  $SD_{\text{age}} = 12.78$ ; 74.1% White, 8.2% Asian, 8.1% Black, 6.6% Mixed, 3.0% Other).

### *Procedure*

Participants were randomly assigned to either the present or future time condition. They read a similar scenario to that used in Study 1, except the hypothetical person was suffering from respiratory symptoms instead of a broken ankle. The scenario was described as taking place in the present or 25 years in the future. It read: “There is a person named Mary who is living in the year [2023 (the present day) / 2048 (25 years from the present day)]. Mary is on her daily walk around her neighborhood when she starts wheezing, experiencing shortness of breath, chest tightness, and a dry cough. Feeling ill, she sits down at the closest bench.” As in Study 1, participants were then asked to indicate how distressed they felt about the situation, ranging from 1 (not at all distressed) to 9 (extremely distressed) and, this time on the same page, how much pain they believe Mary experienced, ranging from 1 (no pain at all) to 9 (worst pain imaginable).

To assess moral discounting, participants were asked to indicate their agreement with the statement “Morally speaking, we should put a lot of emphasis on the well-being of people who will be born 25 years from now, even to the point of valuing their lives equally with the lives of people today” for people born at three different time points (25, 50, and 100 years from now),

using a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Responses were averaged across the three questions to calculate a single measure of moral discounting (Cronbach's  $\alpha = .95$ ).

To assess preferences for acting on their moral beliefs, participants were asked to indicate to what extent they preferred to treat 3 people now or 300 people in 50 years from now to alleviate a respiratory disease. The scale ranged from 1 (definitely 3 people now) to 7 (definitely 300 people in 50 years from now). Pre-testing was used in the development of this question to ensure that responses followed a roughly normal distribution.

## Results

### *Empathic Distress and Predicted Pain*

Replicating Study 1, we found evidence of an intertemporal empathy decline,  $t(670) = 3.58, p < .001, d = 0.28, 95\% \text{ CI } [0.23, 0.80]$ . As shown in Figure 2, people felt less distress for the suffering of a future person compared to a present person. As noted in the Transparency Statement, the original sample size determination was based on a larger study. Therefore, we conducted a sensitivity analysis to ensure that the sample used here was adequate to achieve acceptable power. This analysis showed that the current sample size provides a power of .80 to detect small effects ( $d = .21$ ). Across Studies 1 & 2, the effect size estimates for the intertemporal empathy decline were relatively consistent ( $d = .23$  and  $d = .28$ ), suggesting that the true effect size is slightly greater than returned by the sensitivity analysis, and, therefore, that the study is adequately powered.

With respect to a forecasting bias for future pain, no evidence again emerged,  $t(670) = 1.79, p = .075, d = 0.14, 95\% \text{ CI } [-0.02, 0.43]$  (see Figure 2). Note that the effect size was again

consistent with those found previously, but of a magnitude that would be small (average  $d = 0.14$ ) relative to the magnitude of the intertemporal empathy decline, even if it could be reliably distinguished from zero.

### *Moral Discounting and Preferences*

As hypothesized, participants in the future condition reported lower moral discounting ( $M_{future} = 4.33$ ,  $SD_{future} = 1.59$ ) than participants in the present condition ( $M_{present} = 3.81$ ,  $SD_{present} = 1.63$ ,  $t(670) = 4.17$ ,  $p < .001$ ,  $d = 0.32$ , 95% CI [0.27, 0.76], see Figure 3). This suggests that imagining the future suffering of another person increased the degree to which people believed future generations' well-being is as valuable as people alive today. The effect of time condition on moral discounting also held for each of the three items separately (i.e., 25, 50, and 100 years in the future; see Supplementary Online Materials).

For prosocial behavioral intentions, participants showed a general present-biased preference in favor of helping fewer people now over a greater number of people in the future, as indicated by a one-sample t-test from the scale midpoint ( $M = 3.20$ ,  $SD = 1.95$ ;  $t(671) = 10.60$ ,  $p < .001$ ,  $d = 0.41$ , 95% CI [3.05, 3.35]). However, this effect was attenuated in the future time condition such that they were relatively more favorable toward helping 300 people in 50 years from now than 3 people in the present day,  $t(670) = 4.46$ ,  $p < .001$ ,  $d = 0.34$ , 95% CI [0.37, 0.95] (see Figure 3).

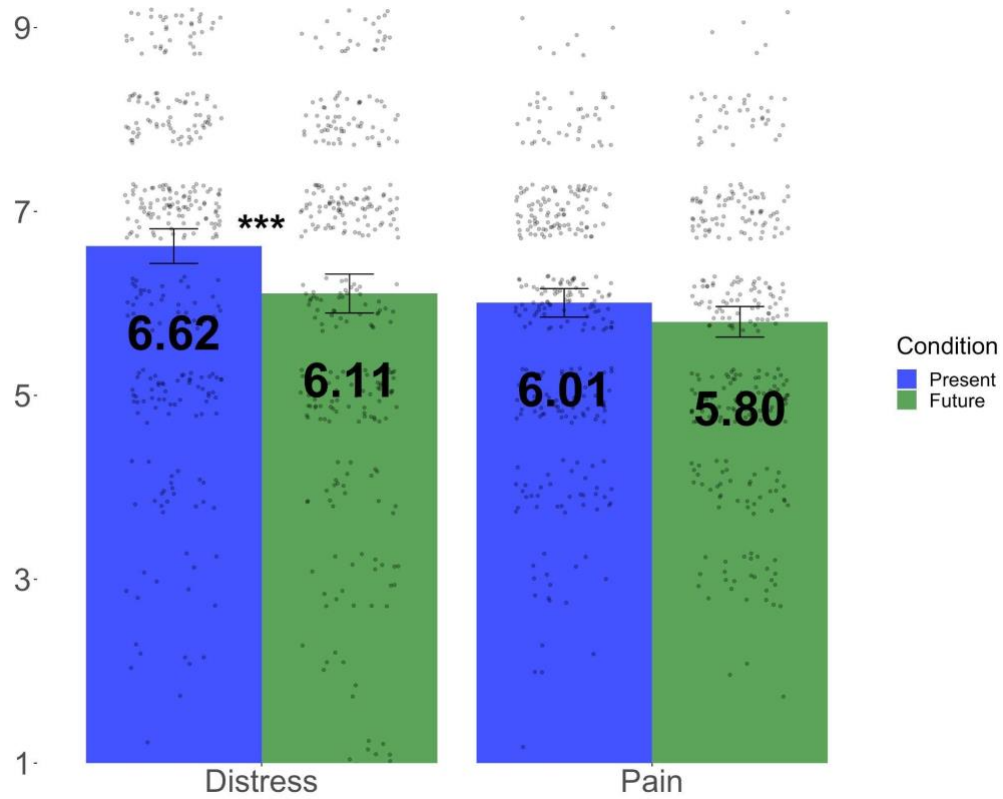
To understand how the intertemporal empathy decline impacts the effect of time condition on moral discounting and subsequent preferences, parameters were estimated for the path model depicted in Figure 4.<sup>3</sup> This model allowed for assessing the direct effect that

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<sup>3</sup> Although this analysis was not specified in the preregistration, it reflects a common way to analyze links among variables in accord with expectations for how they would relate.

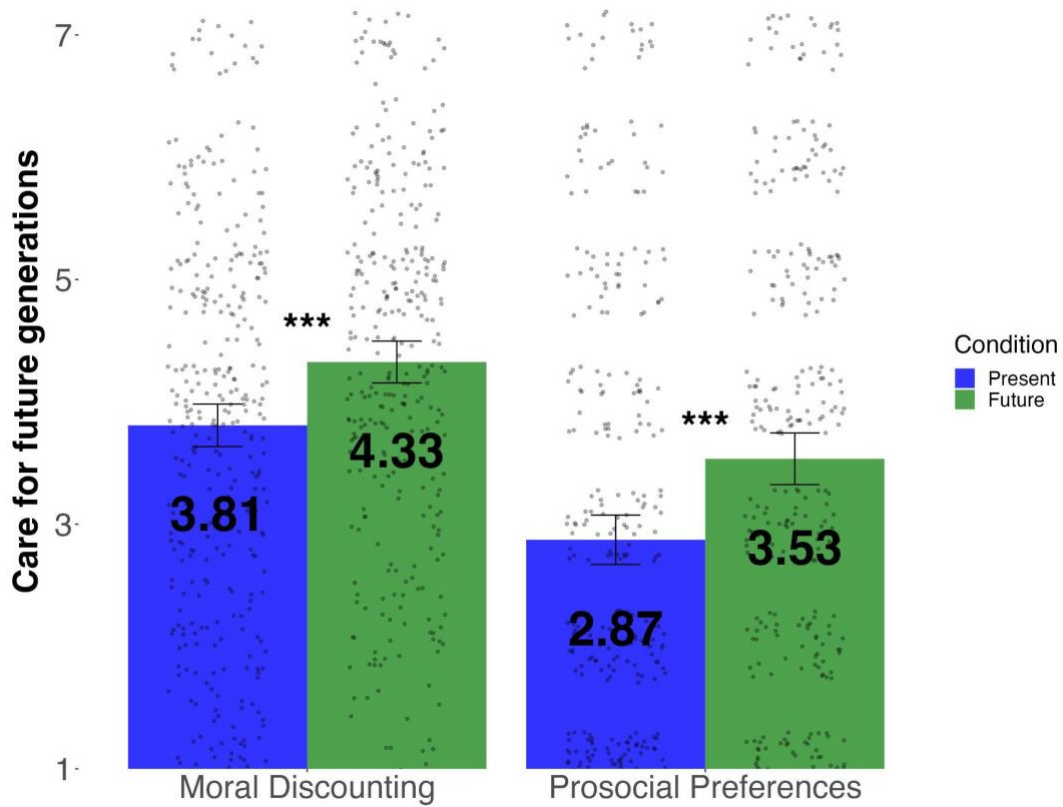
imagining the suffering of a future person had on moral discounting, as well as any indirect effect mediated by the identified intertemporal empathy decline.

Parameters were estimated using AMOS, and resulted in a model with acceptable fit, RMSEA = .068, 95% CI [.010, .142, PCLOSE = .234] (see Figure 4). As can be seen, time condition has both a direct and indirect effect on moral views. While consideration of a future person suffering nudges people toward endorsing a view that the pain of future people is as important as is the pain of present people, it also produces a suppressor effect via the identified intertemporal empathy decline. This indirect path, mediated by the amount of empathic distress a person feels when considering suffering, lessens moral concern for the value of future people's pain relative to present people's pain due to lowered felt distress from the intertemporal empathy decline (PROCESS estimated indirect effect =  $-.07$ ,  $p < .01$ , 95% CI  $[-.12, -.02]$ ). The resulting moral view to value the pain of future people as equal to the pain of present people directly predicts greater intentions to dedicate resources to save a greater number of people in the future relative to a smaller number in the present. However, the inhibitory path of time condition, through serial mediation of the intertemporal empathy decline and moral discounting, lessens the intent to help greater numbers of people in the future than smaller numbers today (PROCESS estimated indirect effect =  $-.02$ ,  $p < .01$ , 95% CI  $[-.05, -.01]$ ).

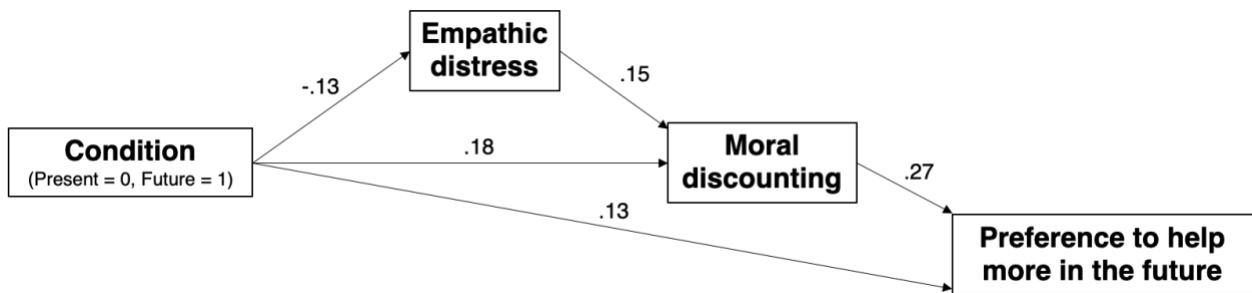


**Figure 2.** Empathic distress and predicted pain as a function of time condition in Study 2. Error bars indicate 95% confidence intervals. \*\*\* $p < .001$





**Figure 3.** Moral discounting and prosocial decision preferences regarding care for the pain of future people relative to present people in Study 2. Higher numbers indicate greater care for future people. Error bars indicate 95% Confidence Intervals. \*\*\* $p < .001$



**Figure 4.** Path model showing partial sequential mediation by the intertemporal empathy decline and moral views regarding the value of future versus present suffering on preferences to

remediate the pain of a greater number of future people relevant to a smaller number of present people. Path coefficients are presented in standardized form. All coefficients are significant at  $p < 05$ .

## **Discussion**

In this study, we again replicated the intertemporal empathy decline while failing to find evidence for an affective forecasting bias in predicted suffering.

Additionally, we identified the oppositional effects that imagining the suffering of an identifiable future person have on the moral discounting of future generations' well-being. Imagining a future person's pain increased endorsements that the well-being of future generations is of equal moral importance to that of present generations.<sup>4</sup> It also attenuated the general preference for helping fewer people now instead of a far greater number of people in the future. However, because empathic distress was lower when imagining another person's future (vs. present) suffering, the effect of empathic distress on valuing lives equally is reduced when considering future suffering.

As much research has shown, any experienced emotion can be applied equally to any applicable target (Schwarz & Clore, 1996). Thus, any felt distress would be expected to nudge people toward valuing the suffering of future people to the same degree as that of present people. However, due to the identified intertemporal empathy decline, the distress people feel when imagining a future person in pain is somewhat less than when imagining a present person in pain.

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<sup>4</sup> In Study S2 (see Supplementary Online Materials), we conducted a replication of the moral discounting effect, adding a control condition that only answered the moral discounting questions and found that this effect is driven by the future condition lowering moral discounting of future generations.

The result is that the impact of felt distress on morally valuing the suffering of future people is diminished.

### Study 3

Having demonstrated that the intertemporal empathy decline attenuates the valuing of future suffering relative to present suffering and related behavioral intentions to intervene, we next wanted to see if it would explain differences in charitable giving. That is, we wanted to determine if it would dissuade people from directing money that they could keep themselves toward a charity focused on relieving future suffering relative to one focused on the present. We expected that people would, on average, donate more to a charity when it is described as benefiting people living in the present relative to people living in the future. However, we hypothesized that this bias would be explained by the intertemporal empathy decline.

## Methods

### *Participants*

In this preregistered study ([https://aspredicted.org/3S6\\_MZJ](https://aspredicted.org/3S6_MZJ)), a total of 2868 participants were recruited from Prolific Academic and received \$0.40 for their participation. Four hundred twenty participants were excluded for either failing to complete the entirety of the study or failing at least one of the two attention checks, leaving a final sample of  $N = 2448$  (1539 female, 895 male,  $M_{\text{age}} = 35.59$ ,  $SD_{\text{age}} = 12.86$ ; 66.9% White, 10.7% Black, 10.1% Asian, 7.9% Mixed, 4.4% Other).

As noted in the pre-registration, we set the sample size to be able to detect a directional (i.e., one-tailed) test of small magnitude ( $d = .10$ ) on charitable giving with a power of .80. The

reason for this is that even small differences in charitable giving across millions of people could have a meaningful effect in the aggregate.

### *Procedure*

Participants were randomly assigned to either the present or future time condition, as in both of the previous studies. However, the future time condition used a time frame of 200 years from now.

Participants were told they have the opportunity to donate up to \$20 to charity and then read a brief description about a real charity (described below). Participants were then told that five participants will be randomly selected to have their donation decisions honored. They then indicated what percentage of the \$20 they would like to donate to the charity (from 0%-100% on a slider bar), with the remainder being paid out as a bonus to the five selected participants. The charity will be described as follows:

*The Clean Air Task Force is an expert-recommended, highly effective nonprofit that reduces air pollution globally. Donations to this organization, even small amounts, make a very big impact for the many people living [in the present day / 200 years from now] who [currently / will] experience significant suffering from respiratory illnesses such as asthma and emphysema.*

On a separate screen, participants completed measures of empathic distress and empathic concern, which were averaged into an aggregate measure of empathy. Participants were asked to imagine another person's suffering from a respiratory illness either in the present day (present condition) or 200 years from now (future condition). To rule out the confound of improved medical treatment in the future, participants were asked to imagine the person before they sought treatment. The scenario was similar to Study 2 but without the scenario being about a specific

hypothetical person in order for the measure to be more directly pertinent to the charity described on the prior screen. We also extended the time frame to 200 years so that it would not include benefits for anyone known to be alive or expected soon (e.g., impending children, grandchildren). Participants then rated how distressed they felt when imagining the person's suffering from 1 (not at all distressed) to 9 (extremely distressed) and how concerned they were when imagining the person's suffering from 1 (not at all concerned) to 9 (extremely concerned). The latter measure was added to include empathic concern as another dimension of empathy. Responses were averaged to produce a measure of empathy (Cronbach's alpha = .93).

## Results

### *Empathy*

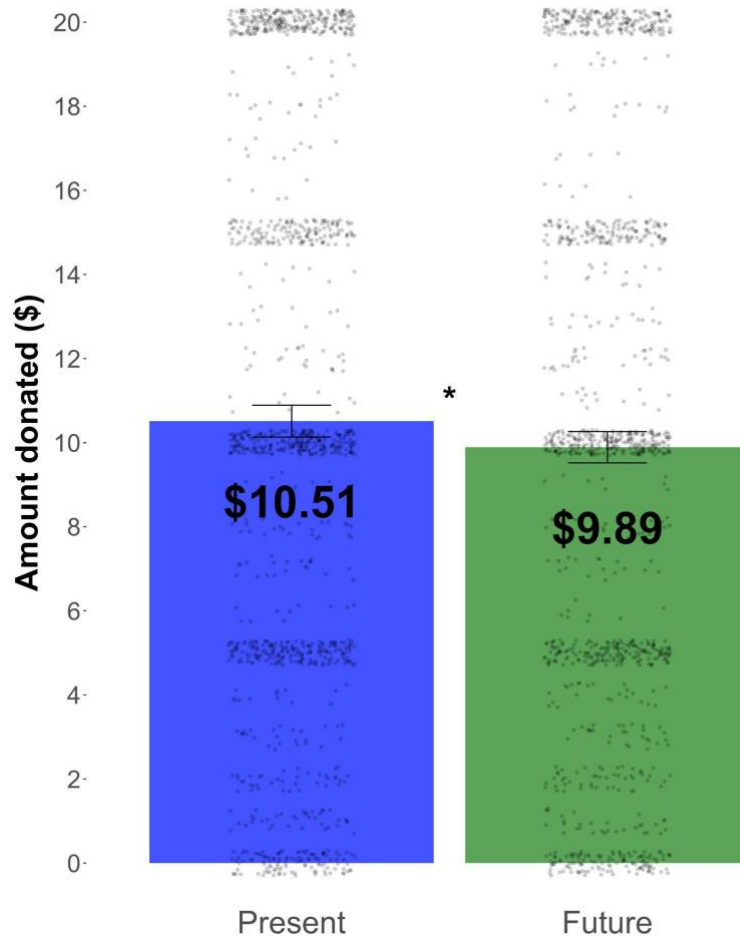
Replicating Study 1 and Study 2, we found evidence for the intertemporal empathy decline ( $M_{present} = 6.03$ ,  $SD_{present} = 1.87$ ;  $M_{future} = 5.33$ ,  $SD_{future} = 2.25$ ;  $t(2357) = 8.40$ ,  $p < .001$ ,  $d = 0.34$ , 95% CI [0.54, 0.87]). Participants again reported less empathy towards the suffering of a future target compared to a present target. The effect of time also held for each of the two empathy measures individually ( $p$ 's  $< .001$ ) with nearly identical effect sizes.

### *Donations*

Participants donated significantly more to charity in the present condition ( $M = 10.50$ ,  $SD = 6.77$ ) than in the future condition ( $M = 9.89$ ,  $SD = 6.62$ ;  $t(2446) = 2.30$ ,  $p = .011$  (one-tailed),  $d = 0.09$ ; see Figure 5).<sup>5</sup>

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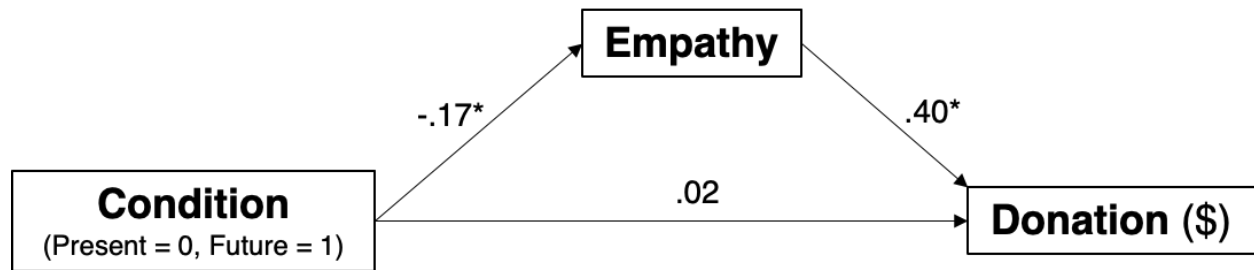
<sup>5</sup> Note that a directional (i.e., one-tailed) test for this measure was specified in the pre-registration. Of course, the finding also holds for a nondirectional (i.e., two-tailed) test ( $p = .022$ ).



**Figure 5.** Donations to charity (\$0-\$20) in Study 3 as a function of time condition. Error bars indicate 95% confidence intervals.  $*p < .05$

To determine if the intertemporal empathy decline partially explains the decrease in giving to a future-oriented charity, we estimated parameters for the path model depicted in Figure 6 using AMOS. As can be seen, the intertemporal empathy decline completely mediated the effect of time condition on donation. That is, the decreased empathy people felt for the

suffering of a future target explained their reductions in financial donations (indirect effect =  $-.91, p < .01, 95\% \text{ CI } [-1.14, -0.69]$ ).



**Figure 6.** Path model depicting the effect of time condition on donation as mediated by empathy. Path coefficients are presented in standardized form. Parameters marked with asterisks are significant at  $p < .001$ .

## Discussion

In this study, we replicated the intertemporal empathy decline using a longer future time horizon. More importantly, we found that this decline in empathy partially underlied decreased donations to a charity helping future beneficiaries compared to a charity helping present ones.

While it is true that the reduction in giving to future oriented charities is of a small magnitude ( $d = .09$ ), the aggregate impact would be expected to be substantial. At this level, one out of every 38 people could be expected to give less to a future oriented charity in this admittedly stringent comparison (i.e., where the focus of the present and future charities is exactly the same).<sup>6</sup> Given that 56% of the US adult population typically gives to charity

<sup>6</sup> Calculation based on visualization from <https://rpsychologist.com/cohend/>

(Papandrea, 2021), such a difference would correspond to 3.8 million people choosing to donate less to causes meant to help future generations.

### Study 4

Having demonstrated the existence of the empathy decline and its influence on prosocial behavior, we next tested a potential intervention to remediate it.

The vividness with which people simulate the suffering of others is intrinsically tied to the degree of care they feel for them (Loewenstein & Small, 2007; Small & Loewenstein, 2003). We hypothesized that the tendency to feel less empathy towards future (vs. present) others was at least partially explained by decreased vividness of mental simulation when imagining the future. This hypothesis also follows from previous research showing that imagining the future is usually more abstract and less vivid than imagining temporally close events (Trope & Liberman, 2003) and that vivid simulation of the future decreases present-biased behavior for one's self (e.g., Hershfield, 2011). Here, we test whether the same mechanism extends towards imagining the suffering of others.

## Methods

### *Participants*

In this preregistered study ([https://aspredicted.org/GZD\\_SWF](https://aspredicted.org/GZD_SWF)), a total of 1224 participants were recruited from Prolific Academic to achieve a power of .80 for an estimated effect size of  $f = 0.10$ . Each received \$0.50 for their participation. Forty-five participants were excluded for failing the attention check, leaving a final sample of  $N = 1179$  (695 female, 476



male;  $M_{\text{age}} = 35.77$ ,  $SD_{\text{age}} = 12.44$ ; 59.5% White, 16.3% Black, 10.5% Asian, 9.2% Mixed, 4.5% Other).

### *Procedure*

Participants read a short scenario about a person suffering from respiratory symptoms, similar to Study 2 & 3. They were randomly assigned to one of three conditions: present, future, and vivid future. In the present condition, the scenario took place in the present day. In the future condition, the scenario took place 200 years from the present day. In the vivid future condition, the scenario also took place 200 years from the present day. Participants in this condition also underwent a vividness manipulation in which they were asked to imagine the person in the situation with as much detail as possible. Specifically, the manipulation read:

*Please take the next 30 seconds to imagine this situation taking place 200 years from the present day. Try to imagine Mary in this situation in **as much detail as possible**.*

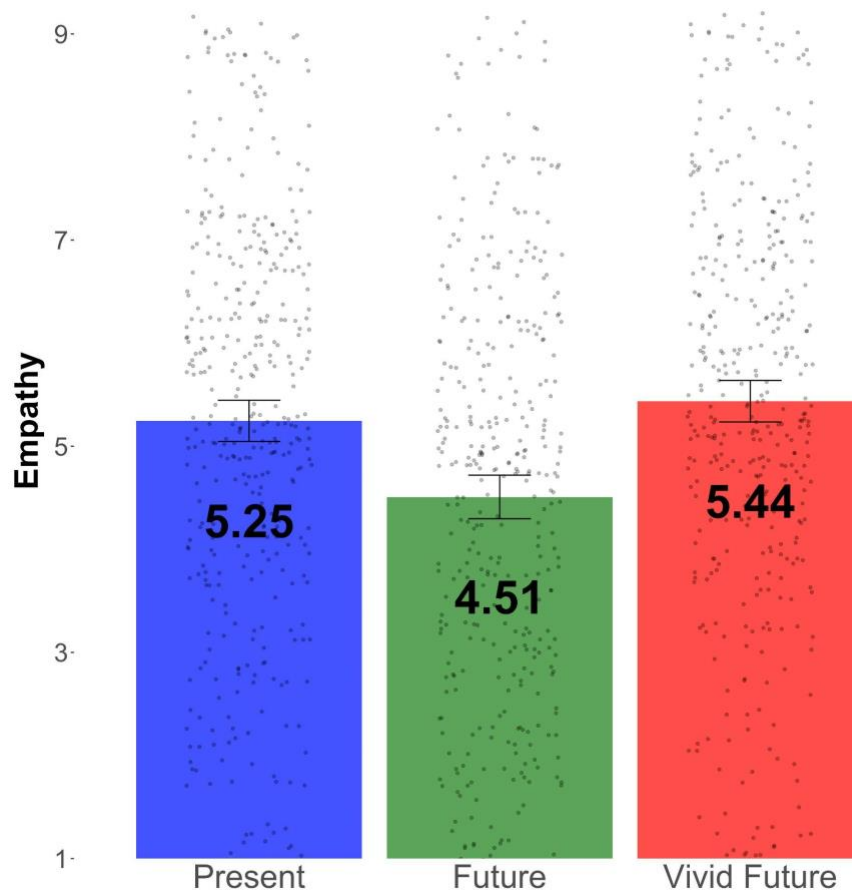
***What expression is on her face? What sounds do you hear from her?***

Once the 30 seconds passed, a button appeared on the screen for participants to proceed to the next screen. The participants had a countdown timer on the screen to indicate when the 30 seconds elapsed. Finally, participants completed the same measures of empathic distress and empathic concern as in Study 3, with the two items averaged as a measure of empathy.

### **Results and Discussion**

As specified in the preregistration, we conducted a linear contrast with the following weights: (1) for present target, (-2) for future target, and (1) for future vivid target. This contrast specifies a pattern of means such that there is an empathy decline for the future target compared to the present target, but that the addition of a vividness intervention remediates this decline,

bringing empathy back to the baseline (i.e., present) level. The contrast confirmed this prediction ( $F(1, 1177) = 42.62, p < .001, d = 0.40$ , see Figure 7); the residual was not significant thereby indicating that the mean of the future target condition was the sole mean differing from the other two.



**Figure 7.** Empathy by condition in Study 4. Error bars indicate 95% confidence intervals.

Therefore, strategies which give people explicit guidance to increase the richness of their mental simulations of people suffering in the future stand as a prime candidate to enhance the care they feel for them.

### General Discussion

With the present studies, we demonstrate that people feel less empathy towards another person's suffering when it takes place in the future than in the present. This "intertemporal empathy decline" was found despite people predicting an equivalent degree of pain for the same event in the present and the future. That is, people anticipate the same amount of pain regardless of when it occurs — they just care more when it happens now. The intertemporal empathy decline also explained decreased donations to a charity benefiting future (vs. present) generations. Of import, findings from Study 4 show that the intertemporal empathy decline can be overcome by increasing the vividness of imagining the future other's suffering.

Beyond the intertemporal empathy decline, we found that merely imagining the suffering of a hypothetical individual in the future decreased moral discounting. Specifically, after imagining future versus present suffering, people placed greater moral value on the well-being of future generations and were more willing to help a far greater number of people living in the future over a fewer number of people living in the present day. This effect of imagining a future other's suffering on moral discounting occurred as an oppositional influence of empathic distress. In many ways, this finding makes great sense given the results of Study 4. Simply asking someone to imagine the pain of a future person is a type of vividness manipulation in and of itself – a simulation that would not usually occur when considering whether to act in a way that benefits future sufferers. However, its effect is suppressed due to the intertemporal empathy decline. Yet, when the nature of this simulation is enriched through specific instructions, the decline in empathy can be reversed, similar to what occurs in the "identifiable victim effect" (Small & Loewenstein, 2003). Thus, this finding demonstrates a communication strategy that can be used as an intervention to increase the prioritization of the welfare of future generations.

Importantly, people *do* empathize with others' suffering in the future, as evidenced by self-reports near or above the scale midpoint. Yet, their empathy diminishes over time. We consistently replicated this finding despite using a highly constrained study design with only the time horizon varying between conditions, controlling for plausibly relevant contextual factors such as the quality of medical treatment for the sufferer's pain and cost-effectiveness of the charity. Together, these studies have theoretical implications not only in social psychology (Bloom, 2017; Trope & Liberman, 2010), but also moral philosophy (Greaves & MacAskill, 2021; Mogensen, 2022; Purves, 2016; Schramme, 2023) and economics (Frederick, 2006; Schelling, 1995). For example, descriptive evidence that people empathize less with future generations complements normative philosophical arguments and economic delay discounting models about how individuals and institutions should engage in intergenerational cooperation. The findings are also practically relevant in at least two ways. First, the vividness intervention suggests a concrete psychology strategy for overcoming intertemporal empathy decline. Second, imagining an identifiable future sufferer lowers moral discounting towards future generations more broadly.

Understanding the psychological barriers for helping future generations is a critical step for shifting our collective behaviors towards the common good for the humanity of today, tomorrow, and years to come.

### ***Constraints on Generality***

The present research has three key constraints that might limit the generality of the findings. First, it could be argued that the use of hypothetical vignettes might limit ecological validity. By knowing that the scenarios are fictitious, participants might be less emotionally

connected to the sufferer. Yet, this limit seems unlikely to have impacted the effect found here for two reasons. The hypothetical nature of the scenarios applies to both the present and future scenarios; therefore, it is unlikely to be responsible for the identified differences as a function of time. Additionally, when it comes to considering the suffering of future people, hypotheticals are part and parcel of people's decision-making, as the future remains unwritten. In that way, all predictions about future suffering are uncertain and perhaps hypothetical to some degree.

Second, while asking about empathy toward specific events provides a stringent test for empathy differences and forecasting biases, it might not adequately capture the fullness of intertemporal empathy decline. It might well be that more complicated types of suffering lend themselves more readily to differences in the complexities of simulation and thus empathy. For example, it may be especially difficult to imagine the harms and/or benefits of advanced technology that doesn't yet exist on future generations' well-being, in large part because it is harder to draw from past experience.

Third, while recent evidence suggests that discounting of future rewards is fairly robust across cultures (Ruggeri et al., 2022), some evidence for cultural and economic heterogeneity exists. Our samples, while being more diverse than the often-used undergraduate samples of convenience, were drawn from U.S. participants. Therefore, it is possible that cultures which put a greater emphasis on intergenerational living and care, ancestor worship, and the like might well show diminished evidence of intertemporal empathy decline. This remains an important question for future research.

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### **Author Contributions**

M.C. developed the study concept, formulated the hypotheses, and collected the data for all studies. Both authors contributed to the study design and data analyses. M.C. drafted the manuscript with D.D. providing critical revisions. Both authors approved the final version of this manuscript for submission.

## SUPPLEMENTARY MATERIALS

### Study S1

In this study, we addressed the possibility that the empathic distress measure anchored responses to the subsequent measure of pain forecasts. In other words, we sought to rule out the possibility that the lack of a difference in predicted pain between present and future others' suffering was not due to a study design artifact. To test this, we conducted an exact replication of Study 1 using only the pain measure as the dependent variable.

### Methods

#### *Participants*

A total of 401 participants were recruited from Prolific Academic and received \$0.30 for their participation. Eight participants were excluded for failing the attention check, leaving a final sample of  $N = 393$  (189 female, 204 male;  $M_{\text{age}} = 39.68$ ,  $SD_{\text{age}} = 14.13$ ; 79.1% White, 7.4% Asian, 5.6% Black, 4.1% Mixed, 3.1% Other).

#### *Procedure*

The procedure was identical to that used in Study 1, with the exception that the empathic distress measure was removed.

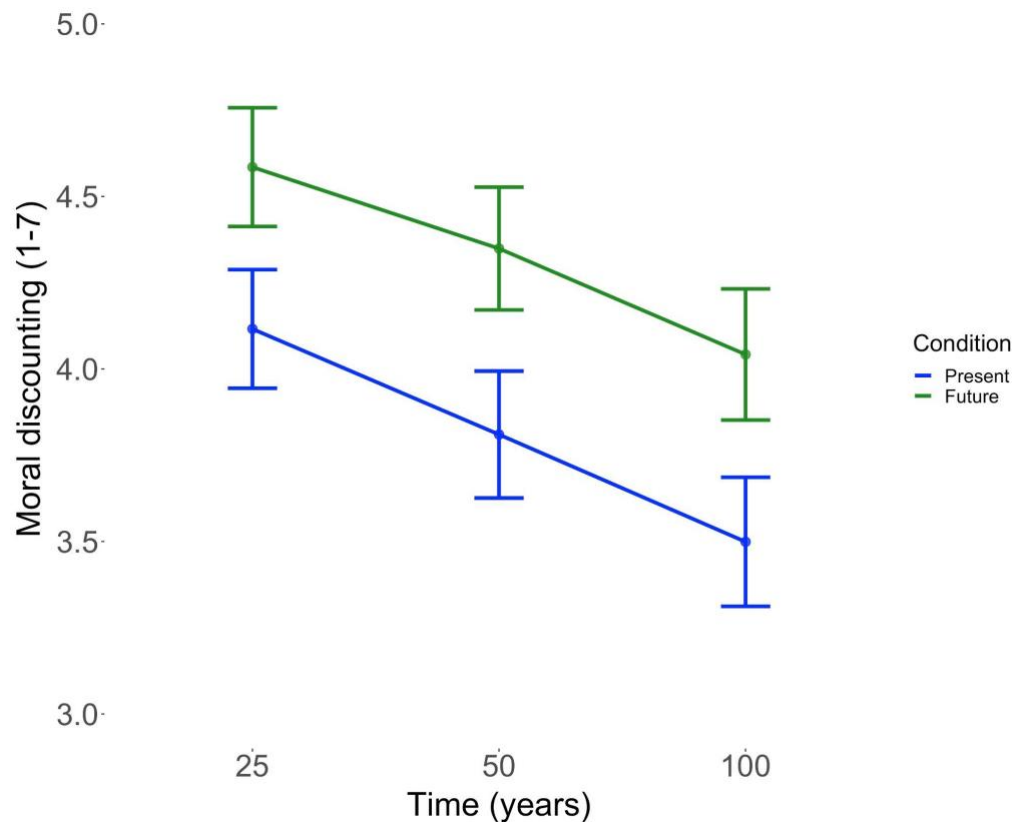
### Results & Discussion

Replicating Study 1, there was no difference in predicted pain between the present condition ( $M_{\text{present}} = 7.51$ ,  $SD_{\text{present}} = 0.81$ ) and future condition ( $M_{\text{future}} = 7.41$ ,  $SD_{\text{future}} = 0.84$ ;  $t(391) = 1.19$ ,  $p = .235$ ,  $d = 0.12$ , 95% CI = [-0.06, 0.26]).

In both Study 1 and Study S1, people predict that the intensity of pain stemming from an identical event to be invariant across time. Of note, the obtained miniscule effect sizes found are consistent, suggesting that the lack of randomization of question order in Study 1 had no effect on responses.

### Study 2: Additional Analyses

Using a 2 (present vs. future condition) x 3 (moral discounting at 25, 50, and 100 years) mixed ANOVA, we found main effects of condition ( $F(1, 2004) = 46.49, p < .001$ ) and the three moral discounting items ( $F(2, 2004) = 19.94, p < .001$ ) but no interaction ( $F(2, 2004) = 0.10, p = .90$ ). This demonstrates that the future condition reported less moral discounting than the present condition across all three time points (see Figure S1).



*Figure S1.* Moral discounting by condition across each time point (Study 2). Error bars indicate 95% confidence intervals. Higher numbers indicate less moral discounting of future others.

## Study S2

In this study, we addressed the possibility that the relative difference of future versus present condition on moral discounting in Study 2 was driven by increased moral discounting for future generations in the present condition, rather than decreased moral discounting for future generations in the future condition. To test this, we added a control condition that did not imagine another person's suffering before completing the moral discounting measures.

## Methods

### *Participants*

A total of 1018 participants were recruited from Prolific Academic and received \$0.20 for their participation. Six participants were excluded for failing the attention check, leaving a final sample of  $N = 1012$  (506 female, 506 male,  $M_{\text{age}} = 37.27$ ,  $SD_{\text{age}} = 33.63$ ; 70.0% White, 9.4% Black, 9.3% Asian, 6.1% Mixed, 4.8% Other).

### *Procedure*

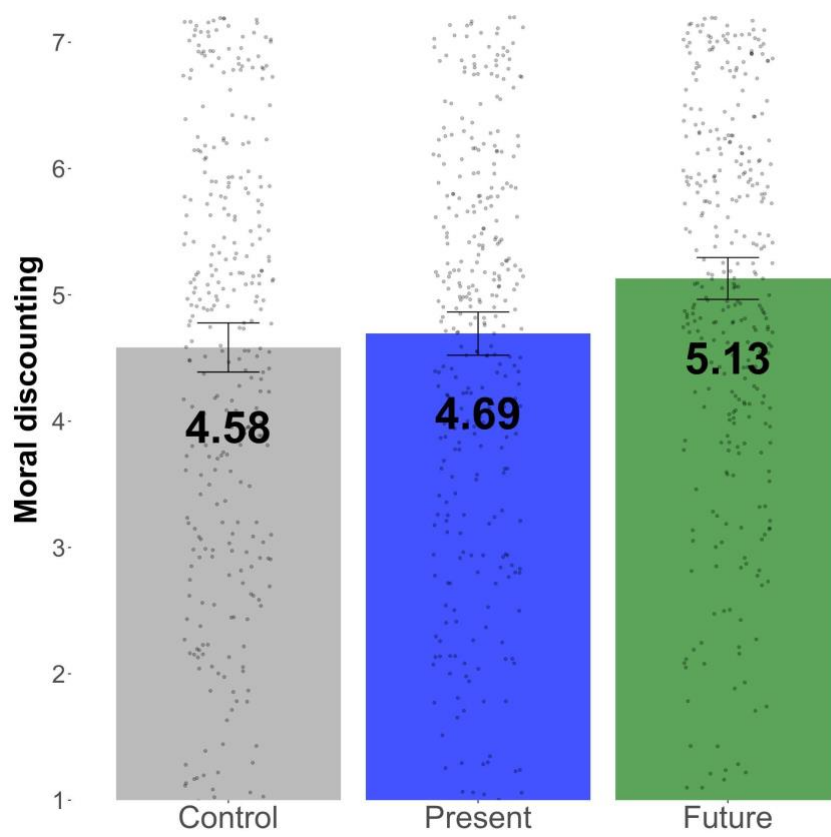
The procedure was identical to that used in Study 2, except the empathic distress and predicted pain measures were removed. Additionally, a control condition was added in which participants did not read a scenario about a person suffering.

## Results & Discussion

Using a one-way ANOVA, we found a significant effect of condition on moral discounting ( $F(2, 1009) = 10.29, p < .001$ ). Note that higher scores signify *lower* moral discounting. Replicating Study 2, Bonferroni-corrected pairwise comparisons revealed that participants in the future condition morally discounted future generations less ( $M = 5.13, SD = 1.55$ ) than those in the present condition ( $M = 4.69, SD = 1.60; p = .002$ ). Crucially, participants in the future condition also showed lower moral discounting than those in the control condition ( $M = 4.58, SD = 1.81, p < .0001$ ), while the present condition and control condition did not differ from each other ( $p > .05$ ; see Figure S2).

This study replicates the finding that imagining a future person suffering lowers moral discounting of future generations. Meanwhile, imagining a present person's suffering has no effect on moral discounting compared to not imagining another person at all.





**Figure S2.** Moral discounting by condition (Study S2). Error bars indicate 95% confidence intervals. Higher numbers indicate less moral discounting of future others.