

RUNNING HEAD: DELIBERATION SUSTAINS COOPERATION

LETTER: Wise Deliberation Sustains Cooperation

Igor Grossmann^{1*†}

Justin P. Brienza^{1*†}

&

D. Ramona Bobocel¹

University of Waterloo, Canada

in press in Nature Human Behaviour

Author Note

¹Department of Psychology, University of Waterloo, Canada, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1

* Igor Grossmann, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, Tel. +1 519 888-4567 ext. 31793, e-mail: igrossma@uwaterloo.ca or Justin P. Brienza, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: jbrienza@uwaterloo.ca

The present draft is not a final post-refereeing copy of the manuscript. Final manuscript is available at <http://www.nature.com/articles/s41562-017-0061>

Humans are intuitively cooperative¹. Humans are also capable of deliberation, which includes social comparison², self-reflection³, and mental simulation of the future⁴. Does deliberation undermine or sustain cooperation? Whereas some studies suggest that deliberation is positively associated with cooperation⁵, other work indicates that deliberation (vis-à-vis intuition) impairs cooperation in social dilemmas^{6,7}. Do some aspects of reasoning qualify the effects of deliberation – that is whether deliberation sustains cooperation or impairs it? Here we propose that wise reasoning⁸⁻¹⁰ – i.e., taking a bigger picture perspective on the situation, including sensitivity to temporal and social interdependence between events – helps to integrate self-protective and cooperative goals, thereby sustaining cooperation when deliberating. Study 1 demonstrated that individual differences in wise reasoning about personal conflicts moderated the impact of naturalistic and experimentally manipulated deliberation time on cooperation. Studies 2-3 manipulated an observer perspective, the key aspect of wise reasoning, which eliminated the negative effect of deliberation time on cooperation. Under these circumstances, participants reported being guided by interdependent goals when making their decisions; thus in these conditions, deliberation sustained cooperation. Combining scholarship on wisdom and behavioral economics, the present insights qualify the relationship between deliberation and prosociality, and highlight conditions under which wisdom promotes prosociality.

Psychological scientists have recently observed individual differences in some unique aspects of deliberation, which philosophers and cognitive scientists have characterized as central to wisdom⁹⁻¹². Such aspects of deliberation include intellectual appreciation of contexts broader than the issue, sensitivity to the possibility of change in social relations, intellectual humility, and search for a compromise between different points of view. Common to these aspects of deliberation is the ability to see the “bigger picture” by transcending beyond one’s habitual

vantage point^{9,13,14}. Individual differences in wise deliberation are distinct from domain-general cognitive abilities and executive functioning¹⁵⁻¹⁷ and are only weakly related to dispositional empathy and perspective-taking¹⁸. Notably, some theorists have proposed that wise deliberation helps to integrate self-protective and interdependent goals¹⁷ and promotes prosocial outcomes⁸. Empirically, however, the role of wise deliberation for prosociality has not yet been explored.

What psychological processes distinguish wise from non-wise deliberation? At least since William James, scholars have pointed out distinct paths of deliberating about personal matters¹⁹: either adopting the experiential “I”-perspective or an observer “me”-perspective. Whereas the experiential focus can draw one’s attention to concrete, focal features of the environment, adopting the observer perspective one can gain access to a wide range of meaning structures, such as schemas²⁰. Similarly, game theory suggests that deliberation from experiential “I” perspective can promote a goal construal of a dilemma as a zero-sum game (e.g., “I want to secure a reward”) that arouses a decision conflict between self-protective and cooperative goals²¹⁻²³. For instance, in Public Goods Games experiential deliberators appear to focus more on protecting self-interest rather than contributing money to produce benefits that are shared by all members of their group, including themselves⁶.

In contrast, deliberation from an observer perspective²⁴ may orient a person away from concrete temptations toward the construal of a dilemma in terms of interdependent ideals and goals^{25,26} (e.g., “I am a fair and just person committed to ethic of reciprocity”). Thus, from an observer perspective one may deliberate on the issue *in relation* to others, sustaining cooperation²⁷. From the observer vantage point, one may also acknowledge the likelihood of taking part in a similar dilemma again, such that the present dilemma is no longer construed as a singular event, incentivizing cooperative responding⁶.

Bringing these bodies of scholarship together, it appears that when perceiving an event from the observer viewpoint, people are more apt to deliberate on the issue in relation to its broader context^{24,28} and transcend their habitual vantage point in a way that promotes wise deliberation^{13,14}. It is therefore possible that engaging in wise aspects of reasoning can guide deliberation towards sustained cooperation. This hypothesis is consistent with recent theorizing, which suggests that consequentialist deliberation can sustain cooperation when intuition is insufficient²⁹.

We explored this hypothesis by examining the utility of wise reasoning for sustaining (vs. attenuating) cooperation when deliberating on a Public Goods Game (PGG). In Study 1, we explore whether individual differences across several facets of wise reasoning moderate the negative influence of experimentally-induced (time-pressure vs. control vs. time-delay) deliberation on cooperation. In Studies 2-3, we focused on the observer vs. experiential deliberation directly. In Study 2, we test whether considering one's decision from an observer (3rd person) compared to experiential (1st-person) viewpoint moderates the impact of decision time on cooperation. In Study 3, we utilized logos on the top of the survey page to make observer perspective ("bird's eye view") or experiential perspective ("here and now") salient when examining manipulated and habitual differences in decision time on cooperation. Additionally, Study 3 probed underlying reasons and motivations for participants' behavior.

In Study 1, we assessed multiple aspects of wise reasoning (WR) about personal conflicts, using this individual difference measure to test how it moderates the influence of deliberation time on cooperation in a PGG. To this end, we manipulated deliberation (time delay/control/time pressure) and assessed cooperative behavior in a PGG, following previously established procedures⁶.

Decision times were comparable in ‘time pressure’ and ‘control’ conditions, $M_{\text{difference of } \log(t)} = .09$, $SE = .05$, $P = .150$, Sidak-test *Wald Confidence Interval (CI)* [-.02, .20], and significantly different from ‘time delay’ condition, $1.13 < M_{\text{difference of } \log(t)} < 1.20$, $Ps < .00001$. Because the chief research question in Study 1 concerned the role of wise reasoning for reducing the negative effect of taking additional time to deliberate on a task on cooperation, we pooled the slopes for both conditions, examining how wise reasoning moderates effects of deliberation on contributions, group*WR interaction, $t = 2.34$, $P = .019$. Instructions to deliberate led to less cooperation among participants who reported low WR about their personal conflict experience (simple effect at -1 *SD* on WR), $B = -8.56$, $SE = 4.37$, $t = 1.96$, $P = .051$. However, as Figure 1 indicates, this effect was attenuated and reversed in direction among participants who reported higher WR (at +1 *SD*), $B = 6.02$, $SE = 4.46$, $t = 1.35$, $p = .177$. Supplementary analyses indicated a consistent interaction pattern across individual facets of wise reasoning (see Supplementary Information – SI). For each WR facet, instructions to deliberate led to less cooperation among participants who scored low and this effect was attenuated and reversed in direction among participants who scored high.

Whereas Study 1 established that individual differences in wise reasoning moderate effects of the amount of deliberation (induced via time delay) on cooperation, Studies 2-3 manipulated the type of reasoning underlying wise deliberation^{13,14}. In Study 2 we induced an observer vs. experiential deliberation by instructing participants to use 3rd – vs. 1st –person language when making a decision in a PGG. Notably, Study 2 did not manipulate amount of deliberation, as it would interfere with the aim of testing effects of different types of deliberation on cooperation with the help of adopting 3rd- vs.1st-person language during deliberation. We addressed this limitation in Study 3, utilizing a different manipulation of observer vs.

experiential deliberation and simultaneously manipulating time delay (vs. no delay)⁶.

Specifically, Study 3 manipulated observer (vs. experiential) deliberation by using specific logos on the survey banner, independent of the PGG instructions. The logos reflected an observer-oriented (“bird’s-eye view”) or an experientially-oriented phrase (“here and now”).

Replicating past research⁶ and supplementary Study 1 results (see Supplementary Table 3), people who spent more time deliberating about their decision contributed significantly less, Study 2: $B = -.45$, $SE = .11$, $t = 3.95$, $P < .001$; Study 3: $t = 3.35$, $P = .001$, and this effect was qualified by a significant observer (vs. experiential) condition *deliberation time interaction, Study 2: $t = 2.93$, $P = .004$; Study 3: $t = 2.55$, $P = .011$. As Figure 2 indicates, more time spent deliberating was associated with significantly less cooperation in the experiential conditions, but not in the observer conditions. Notably, these results hold when controlling for the extremity of contribution²² (see SI).

In Study 3, direct effects of time delay vs. control manipulation and observer framing* time delay interaction did not significantly impact cooperation, $|ts| < 1.05$, *ns* (but see direct effects for quality of thought in Figure 3 below). Notably, because decision time was greater in the time delay (vs. control) condition, $Wald \chi^2 (df = 1) = 53.32$, $P < .001$, we tested whether the indirect effect of time delay (vs. control) → greater decision time → (lower) contributions was moderated by observer vs. experiential framing of the survey. Results of a bootstrapped model (model 14 with 5000 resamples)³⁰ indicated a significant moderated mediation, $B = .079$, $SE = .037$, 95% *Confidence Interval (CI)* [.006, .150]. In the experiential condition, time delay (vs. control) led to significantly lower contributions via greater decision time, $B = -.118$, $SE = .030$, 95% *CI* [-.176, -.056]. However, in the observer condition, this effect was not significant, $B = -.039$, $SE = .031$, 95% *CI* [-.111, .008].

Studies 2-3 further provided evidence about thought processes guiding different types of deliberation. At the end of the Study 2, we examined participants' construal of the game. Participants ($N = 529$; 96.7%) responded to an open-ended question "What do you think was the central research question of this study?" Two condition-blind coders categorized responses regarding the individual-focused statements. As Figure 3 indicates, participants who reflected on the PGG from an observer viewpoint construed the game in terms of interdependence, whereas those who reflected on the PGG from an experiential viewpoint construed the game in terms of self-serving concerns.

Furthermore, in Study 3 we directly asked participants about their thought process guiding different kinds of deliberation. As Figure 3-C indicates, deliberators in the observer-framed PGG mentioned interdependent and moral concerns, whereas deliberators in the experience-framed PGG mentioned anxiety. It is noteworthy that greater deliberation led to more moral concerns in the observer (vs. experiential) condition. Participants who mentioned interdependent and moral terms contributed significantly more in the PGG, $\tau = .174$, $P < .001$, $\tau = .163$, $P < .001$, respectively, whereas anxiety terms were unrelated to contributions, $\tau = -.053$. Finally, interdependent and moral thoughts accounted for the moderating role of observer- (vs. experiential) framing on PGG contributions. Specifically, results of a bootstrapped analysis (5000 resamples) indicated that observer (vs. experiential) framing * decision time interaction effect became non-significant after entering interdependent and moral terms into the model, $t = 1.50$, $P = .138$. Moreover, indirect effects were significant for both variables, $B_{\text{interdependence}} = .0006$, $SE = .0004$, 95% $CI [.0002, .002]$; $B_{\text{morality}} = .001$, $SE = .0005$, 95% $CI [.0003, .002]$.

Philosophers³¹ and psychological scholars^{9,12,15,32} have long speculated that certain forms of deliberation are essential for maintaining interpersonal relations and central to the

psychological notion of wisdom¹¹. However, little empirical research has examined *how* cooperation can be sustained (vs. inhibited) over the course of making a decision. Building on this work, in the present paper we introduced the concept of wise reasoning to the topic of behavioral economics, proposing that wise deliberation orients individuals towards the bigger picture view of the dilemma (e.g., ideals and common goals) and away from uncertainty-arousing self-focused concerns (e.g., maximization of personal rewards). As a result, wisdom-related processes qualify the effects of deliberation time for cooperation. Specifically, the key psychological process underlying wisdom¹⁰ – the observer viewpoint – sustains cooperation by promoting the view of the dilemma in bigger picture, interdependent terms. Consistent with our proposition, results from three experiments indicated that deliberation does not uniformly result in less cooperation. In Study 1, people responded very differently to deliberation depending on their wise reasoning ability. For those who were indifferent to various facets of wise—such as observer viewpoint, recognition of change, or search for a compromise— experimentally-induced deliberation (time delay vs. spontaneous acting) inhibited cooperation. However, for people who tended to engage in wise reasoning, cooperation was sustained over time spend deliberating on one’s decision.

This latter finding is noteworthy for its contribution to the emerging body of empirical research on wisdom. A number of theorists have proposed that wise reasoning has a prosocial component^{17,33}, yet no published work has yet examined conditions under which wise reasoning would be aligned with cooperation. The present research supports the view that wise reasoning is aligned with prosocial giving in economic transactions. As Figure 3 demonstrates, however, this relationship emerged only if the person takes time deliberating on their decision. Spontaneously, wise reasoners appear to be no more prosocial than their non-wise counterparts.

In Studies 2-3 we manipulated the central feature of wise reasoning – the observer viewpoint. When inducing the observer viewpoint via 3rd-person (vs. 1st-person) linguistic viewpoint¹³ in Study 2, individual differences in decision time had no effect on cooperation. Rather, the negative relation between decision time and cooperation was significant only within the 1st-person language condition. Similar results were obtained in Study 3, when inducing the observer- (vs. experience-) oriented framing of the survey logos. Across the three studies, individual differences in decision time appeared a more robust predictor of cooperation as compared to effects of manipulated time delay. This observation could be a result of a restricted range of variance when manipulating time delay as compared to individual differences in decision time or a specific cut-off used in the time delay condition. Notwithstanding this caveat, the present findings paint a consistent picture that taking more time to deliberate attenuates cooperation when adopting an experience-based perspective. In contrast, adopting a wiser, observer-based perspective sustains cooperation over the course of deliberation. Study 3 results also shed light on the underlying processes, indicating that the effects on prosocial giving can be accounted by greater focus on interdependent and moral considerations when taking time to deliberate from an observer-based (vs. experiential) perspective.

The latter results help to clarify mixed evidence in some of the prior literature on deliberation and cooperation^{5,6,34}. Experiential vantage point is common among North Americans when reflecting on personal decisions in daily life³⁵, orienting them towards personal gains. However, experiential (vs. observer) vantage point is less prominent in other parts of the world, including Western Europe and large parts of Asia³⁶. Though speculative, this observation may account for some of the inconsistency in prior deliberation-cooperation research conducted on such crowdsourcing platforms as MTurk³⁷. Forty percent of MTurk participants come from

India³⁸. It is plausible that some of the prior failures are due to cultural differences in habitual forms of deliberation^{39,40}.

It is noteworthy that the wisdom-related effects were in the small-moderate range ($.17 < \text{Cohen's } d \leq .44$). These effects are comparable in size to many observations in behavioral economics and cooperation literature^{41,42}, including the prior effects of deliberation⁶.

Nevertheless, future work could explore whether WR-related effects can be enhanced as a function of greater motivational incentives, non-anonymous interaction partner, or when examining multi-trial (vs. single-shot) games.

Before concluding, let us consider several limitations of the present work. Following prior research, present Studies 1 and 3 manipulated deliberation through instructions to spend a modest amount of time deliberating on a decision (at least 10s). Future work should consider employing other operationalizations of deliberation, including longer decision time periods, incentivizing of a thoughtful response, or triggering an analytical thinking mindset⁴³. Like most of the prior research on decision time and cooperation⁴⁴, participants in the present work were recruited via MTurk. MTurk samples have many advantages over typical student samples employed in behavioral sciences⁴⁵. However, such samples also have limitations, including increased knowledge of behavioral economics studies, which may diminish effects of manipulations⁴⁶ like those employed in Studies 1 and 3. To partially address this concern, we employed screening criteria relying on sincere reporting (see supplementary methods). Future work should test the generalizability of results beyond MTurk samples by utilizing representative community samples. Future work should also explore the generalizability of the present results to other forms of prosocial behavior and explore the exact role of interdependent and idealistic concerns we observed (e.g., generosity, common goals, moral concerns) for sustaining

cooperation when adopting the observer mode of reasoning. For instance, it is possible that such ideals and goals provide a framework for interpreting the task at hand in interdependent terms (i.e., not a dichotomous win-or-lose zero-sum).

Together, the present findings suggest that for the science of human cooperation, questioning *how* people use their reasoning appears to matter just as much as asking whether they engage in deliberation. Finally, these findings suggest novel interventions for prosocial giving when personal goods are at stake: engaging in deliberation from a third-person perspective and reducing the focus on the “here and now.”

Method

Following established procedures⁶, in Study 1 we recruited on-line participants from Amazon.com’s Mechanical Turk (MTurk)³⁷. We targeted at minimum 200 participants per condition⁴⁷, oversampling by 30% to account for attrition due to incomplete responses and answers of participants who failed to adhere to task instructions. Upon screening for reading comprehension and instruction checks, the final sample included 634 people (‘no time’=169, deliberative condition=200, control=265; see Table 1 for complete demographics). Like Rand and colleagues⁶, we filtered participants who failed to decide within 10s in the ‘no time’ condition and participants who failed to spend at least 10s in the ‘time delay’ condition. Including these participants into analyses did not substantially alter the pattern of results (see supplement), indicating that selection effects⁴⁸ are not a concern.

Following prior research by Rand and colleagues^{6 (Study 6)}, Study 1 participants were told that they would receive a \$0.40 bonus to use in a 4-player group task. They then read the PGG instructions, indicating that they were randomly paired with three other anonymous participants for a group project and that each member of the group could contribute as much of their bonus as

they wish to the project. Each member could keep the amount of money that they did not contribute; the collective contribution would be doubled and split evenly between all four members of the group. After reading the PGG instructions, participants proceeded to a contribution page where they were asked to decide how much of their bonus to contribute. Participants were randomly assigned to one of the three conditions. As in the original study⁶ (Study⁶), participants in the ‘no time’ condition were instructed to take *less than* 10 seconds to make their decision. Participants in the ‘time delay’ condition were instructed to consider their decision for at least 10 seconds. Participants in the ‘control’ condition did not receive time instructions (see SI for exact instructions). We tracked the amount of time participants took deliberating their decision.

To assess wise reasoning, Study 1 participants recalled a recent difficult interpersonal experience. To increase the objectivity of recall, we adopted the event-reconstruction method^{49,50}. Participants visualized a specific episode that they had personally experienced with a friend and answered some questions about it, cueing them to reconstruct the context of the experience. Subsequently, participants responded to 22 items asking them the extent to which they engaged one of the five aspects of big picture reasoning previously linked to wisdom^{14,51} (1 = not at all to 5 = very much): 1) appreciation of contexts and others’ perspectives (4 items; $\alpha=.83$), 2) consideration of change and multiple ways a situation could unfold (5 items; $\alpha=.80$), 3) intellectual humility (4 items; $\alpha=.74$), 4) application of an outsider’s vantage point (4 items; $\alpha=.90$), and 5) search for compromise and conflict resolution (5 items; $\alpha=.84$). Averages of five facets feed into a single factor of wise reasoning (PCA eigenvalue=2.85; 56.79% variance explained) and were averaged into a single index of wise reasoning (WR; $\alpha=.79$). SI includes further rationale and verbatim items of the conflict reconstruction method.

In Study 1, we counterbalanced the presentation order of the Public Goods Game (PGG) and the wise reasoning instrument, with a filler task in-between. This filler task was used to avoid order effects of either task on subsequent performance. Specifically, the filler task diverted attention by instructing participants to solve a series of four anagrams that were unrelated to the topic of cooperation and prosociality. By diverting attention we aimed to attenuate priming effects⁵². Preliminary analyses indicated that the filler task was successful: order effects were not significant, $F_{\text{main effect}}(1,626) = 1.83, P = .176, F_{\text{order*group*WR}}(1,626) = .01, ns$. Then participants completed measures of generalized trust and experience with economic games, and a demographics questionnaire. See SI for further presentation of order effects and details and analyses with generalized trust and experience measures as control variables.

In Study 2, we followed Study 1 recruitment procedure. Participants completed the study in exchange for \$0.75 and \$0.40 as a bonus. Our final sample included 547 participants (observer-perspective=275/experiential perspective=272; see Table 1 for demographics). As in Study 1, participants took part in a PGG^{6, Study 1}. See SI for further information. Participants were randomly assigned to one of two conditions. In the experiential viewpoint condition, participants were told to think about the principles of the PGG from a 1st-person perspective by explicitly using first-person pronouns during deliberation on the decision. In the observer viewpoint condition, participants were told to think about the principles of the PGG from a 3rd-person perspective¹³ by using third-person pronouns and their name during deliberation. Participants then made their decision in the PGG and completed a demographics questionnaire. Condition-wise attrition rates after seeing the experimental instructions were very similar across conditions (observer condition = 7%; self-experiential condition = 5.3%), indicating that random assignment was not compromised by selective dropout rates. Participants in both conditions also

spent comparable amount of time on the instruction page, $F(1,544) = 1.09, P = .297$, and on the decision page, $F(1,544) = 0.94, P = .334$, suggesting comparable meta-cognitive processing of instructions. We tracked how much time participants took deliberating over their decision in the PGG. Participants' bonus remuneration was based on the doubled average contribution of the 4-person group to which they were assigned. For the construal coding, two condition-blind coders categorized responses regarding the individual-focused statements (see Figure 2 for all categories) and the first author independently reviewed (90% agreement) and validated the codes (without access to condition-information).

In Study 3, we followed the Study 2 recruitment procedure. Our final sample included 464 participants (observer-condition=226/experiential condition=238; see Table 1 for demographics). As in Study 1, participants took part in a standard version of the PGG⁶. See Supplementary Information (SI) for further information. Participants were randomly assigned to one of two conditions. Each survey included a banner on the top of each page. In the observer condition, the banner consisted of a phrase “bird’s-eye view,” whereas in the experiential condition the banner consisted of a phrase “here and now” (see SI for details). These phrases were selected based on their comparable prevalence in English language (363 vs.318 hits on Google U.S. in 2016) and because of their close conceptual fit with the notion of big picture observer vs. an experiential perspective^{24,28,53}. To ensure sufficient degree on deliberation, participants were further randomly assigned into a time delay ($n = 204$) or control ($n = 260$) conditions. In the time delay, participants were instructed to spend at least 10s before making their PGG decision⁶. No such instruction was provided in the control condition. To be consistent with Studies 1-2, Study 3 predictors included both time delay instructions (as in Study 1) and

individual differences in amount of time participants took deliberating over their decision in the PGG (as in Study 2).

Immediately after deciding on PGG contribution, Study 3 participants were asked to “take a moment to recall the most important factors when making” their decision. They were instructed to list the 3-5 most important factors guiding their thinking. To avoid potential coder bias, we utilized a computer program⁵⁴ to quantify % of words reflecting anxiety, interdependence (first person plural pronouns)^{55,56} and moral concerns (including fairness and cooperation)⁵⁷.

Across three studies, we performed two-sided statistical tests. We estimated indirect effects via the PROCESS procedure³⁰ in SPSS. Dependent variables that customarily violate the normality assumption (*t*) were log-transformed prior to further analyses. To account for possible violation of equal variance between conditions, we used Wald-tests and linear mixed model procedure in SPSS.

Data availability

All data and statistical analyses that support the findings of this study are publicly available in Open Science Framework with identifier <https://osf.io/bj6re>

References

1. Zaki, J. & Mitchell, J. P. Intuitive prosociality. *Curr. Dir. Psychol. Sci.* **22**, 466–470 (2013).
2. Festinger, L. A theory of social comparison processes. *Hum. Relations* **7**, 117–140 (1954).
3. Mitchell, J. P., Banaji, M. R. & Neil, C. The link between social cognition and self-referential thought in the medial prefrontal cortex. *J. Cogn. Neurosci.* **17**, 1306–1315 (2005).
4. Gilbert, D. T. & Wilson, T. D. Propection: experiencing the future. *Science (80-.)*. **317**, 1351–1354 (2007).
5. Fiedler, S., Glöckner, A., Nicklisch, A. & Dickert, S. Social Value Orientation and information search in social dilemmas: An eye-tracking analysis. *Organ. Behav. Hum. Decis. Process.* **120**, 272–284 (2013).
6. Rand, D. G., Greene, J. D. & Nowak, M. A. Spontaneous giving and calculated greed. *Nature* **489**, 427–430 (2012).
7. Yamagishi, T. *et al.* Cortical thickness of the dorsolateral prefrontal cortex predicts strategic choices in economic games. *Proc. Natl. Acad. Sci. U. S. A.* **113**, 5582–5587 (2016).
8. Bangen, K. J., Meeks, T. W. & Jeste, D. V. Defining and assessing Wisdom: A review of the literature. *Am. J. Geriatr. Psychiatry* **21**, 1254–1266 (2013).
9. Staudinger, U. M. & Glück, J. Psychological wisdom research: Commonalities and differences in a growing field. *Annu. Rev. Psychol.* **62**, 215–241 (2011).
10. Grossmann, I. Wisdom in context. *Perspect. Psychol. Sci.* (2016).
11. Baltes, P. B. & Smith, J. The fascination of wisdom: Its nature, ontogeny, and function.

- Perspect. Psychol. Sci.* **3**, 56–64 (2008).
12. Grossmann, I., Na, J., Varnum, M. E. W., Kitayama, S. & Nisbett, R. E. A route to well-being: Intelligence versus wise reasoning. *J. Exp. Psychol. Gen.* **142**, 944–953 (2013).
 13. Grossmann, I. & Kross, E. Exploring ‘Solomon’s paradox’: Self-distancing eliminates the self-other asymmetry in wise reasoning about close relations in younger and older adults. *Psychol. Sci.* **25**, 1571–1580 (2014).
 14. Kross, E. & Grossmann, I. Boosting wisdom: Distance from the self enhances wise reasoning, attitudes, and behavior. *J. Exp. Psychol. Gen.* **141**, 43–48 (2012).
 15. Grossmann, I. *et al.* Reasoning about social conflicts improves into old age. *Proc. Natl. Acad. Sci. U. S. A.* **107**, 7246–7250 (2010).
 16. Staudinger, U. M., Lopez, D. & Baltes, P. B. The psychometric location of wisdom-related performance: Intelligence, personality, and more? *Personal. Soc. Psychol. Bull.* **23**, 1200–1214 (1997).
 17. Sternberg, R. J. A balance theory of wisdom. *Rev. Gen. Psychol.* **2**, 347–365 (1998).
 18. Brienza, J., Kung, F., Santos, H. C., Bobocel, R. & Grossmann, I. *Wisdom and bias: Towards a state-level measure of wisdom-related cognition.* (University of Waterloo, 2016).
 19. James, W. *Principles of psychology.* (Holt, 1890).
 20. Markus, H. R. Self-schemata and processing information about the self. *J. Pers. Soc. Psychol.* **35**, 63–78 (1977).
 21. Ariely, D. & Norton, M. I. From thinking too little to thinking too much: a continuum of decision making. *WIREs Cogn. Sci.* **2**, 39–46 (2011).
 22. Evans, A. M., Dillon, K. D. & Rand, D. G. Fast but not intuitive, slow but not reflective:

- Decision conflict drives reaction times in social dilemmas. *J. Exp. Psychol. Gen.* **144**, 951–966 (2015).
23. Epley, N., Keysar, B., Van Boven, L. & Gilovich, T. Perspective taking as egocentric anchoring and adjustment. *J. Pers. Soc. Psychol.* **87**, 327 (2004).
 24. Kross, E. & Ayduk, O. Making meaning out of negative experiences by self-distancing. *Curr. Dir. Psychol. Sci.* **20**, 187–191 (2011).
 25. Kahneman, D. & Frederick, S. in *Heuristics and biases: The psychology of intuitive judgment* (eds. Gilovich, T., Griffin, D. & Kahneman, D.) 49–81 (Cambridge University Press, 2002).
 26. Metcalfe, J. & Mischel, W. A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychol. Rev.* **106**, 3–19 (1999).
 27. Kelley, H. H. & Stahelski, A. J. The social interaction basis of cooperators' and competitors beliefs about others. *J. Pers. Soc. Psychol.* **16**, 66–91 (1970).
 28. Libby, L. K. & Eibach, R. P. in *Advances in Experimental Social Psychology* (eds. Olson, J. M. & Zanna, M. P.) **44**, 185–245 (Academic Press, 2011).
 29. Greene, J. D. *Moral Tribes: Emotion, Reason and the Gap Between Us and Them*. (Penguin, 2013).
 30. Hayes, A. F. *Model Templates for PROCESS for SPSS and SAS*. (2013). at <http://afhayes.com/public/templates.pdf>
 31. Sibley, W. M. The rational versus the reasonable. *Philos. Rev.* 554–560 (1953).
 32. Grossmann, I. *et al.* Aging and wisdom: Culture matters. *Psychol. Sci.* **23**, 1059–1066 (2012).
 33. Kekes, J. *Moral wisdom and good lives*. (Cornell University Press, 1995).

34. Krajbich, I., Bartling, B., Hare, T. & Fehr, E. Rethinking fast and slow based on a critique of reaction-time reverse inference. *Nat. Commun.* **6**, 7455 (2015).
35. Ayduk, Ö. & Kross, E. From a distance: Implications of spontaneous self-distancing for adaptive self-reflection. *J. Pers. Soc. Psychol.* **98**, 809–829 (2010).
36. Kitayama, S., Park, H., Sevincer, A. T., Karasawa, M. & Uskul, A. K. A cultural task analysis of implicit independence: Comparing North America, Western Europe, and East Asia. *J. Pers. Soc. Psychol.* **97**, 236–255 (2009).
37. Paolacci, G. & Chandler, J. Inside the Turk: Understanding Mechanical Turk as a Participant Pool. *Curr. Dir. Psychol. Sci.* **23**, 184–188 (2014).
38. Ipeirotis, P. Demographics of mechanical turk. (2010).
39. Nisbett, R. E., Peng, K., Choi, I. & Norenzayan, A. Culture and systems of thought: Holistic vs. analytic cognition. *Psychol. Rev.* **108**, 291–310 (2001).
40. Grossmann, I. & Na, J. Research in culture and psychology: Past lessons and future challenges. *Wiley Interdiscip. Rev. Cogn. Sci.* **5**, 1–14 (2014).
41. Frank, R. H., Gilovich, T. & Regan, D. T. Does studying economics inhibit cooperation? *J. Econ. Perspect.* **7**, 159–171 (1993).
42. Balliet, D., Mulder, L. B. & Van Lange, P. A. M. Reward, punishment, and cooperation: A meta-analysis. *Psychol. Bull.* **137**, 594–615 (2011).
43. Gervais, W. M. & Norenzayan, A. Analytic Thinking Promotes Religious Disbelief. *Science (80-.).* **336**, (2012).
44. Rand, D. G. Cooperation, Fast and Slow: Meta-Analytic Evidence for a Theory of Social Heuristics and Self-Interested Deliberation. *Psychol. Sci.* (2016).
doi:10.1177/0956797616654455

45. Henrich, J., Heine, S. J. & Norenzayan, A. Most people are not WEIRD. *Nature* **466**, 29 (2010).
46. Chandler, J., Paolacci, G., Peer, E., Mueller, P. & Ratliff, K. A. Using nonnaive participants can reduce effect sizes. *Psychol. Sci.* **26**, 1131–1139 (2015).
47. Gervais, W. M., Jewell, J. A., Najle, M. B. & Ng, B. K. L. A powerful nudge? Presenting calculable consequences of underpowered research shifts incentives toward adequately powered designs. *Soc. Psychol. Personal. Sci.* **6**, 847–854 (2015).
48. Tinghög, G. *et al.* Intuition and cooperation reconsidered. *Nature* **498**, E1-2-3 (2013).
49. Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N. & Stone, A. A. A survey method for characterizing daily life experience: The day reconstruction method. *Science* (80-.). **306**, 1776–1780 (2004).
50. Schwarz, N., Kahneman, D. & Xu, J. in *Calendar and time diary: Methods in life events research* (eds. Belli, R., Alwin, D. & Stafford, F.) 157–174 (Sage Publications, 2009).
51. Grossmann, I. & Kross, E. Exploring Solomon’s Paradox: Self-distancing eliminates the self-other asymmetry in wise reasoning about close relationships in younger and older adults. *Psychol. Sci.* **25**, 1571–1580 (2014).
52. Mulligan, N. W. Attention and implicit memory tests: The effects of varying attentional load on conceptual priming. *Mem. Cognit.* **25**, 11–17 (1997).
53. Liberman, N. & Trope, Y. The psychology of transcending the here and now. *Science* (80-.). **322**, 1201–1205 (2008).
54. Pennebaker, J. W., Francis, M. E. & Booth, R. J. *Linguistic Inquiry and Word Count (LIWC): LIWC2001*. (Lawrence Erlbaum Associates, 2001).
55. Grossmann, I. & Kross, E. The impact of culture on adaptive versus maladaptive self-

- reflection. *Psychol. Sci.* **21**, 1150–1157 (2010).
56. Gardner, W. L., Gabriel, S. & Lee, A. Y. ‘I’ value freedom, but ‘we’ value relationships: Self-construal priming mirrors cultural differences in judgment. *Psychol. Sci.* **10**, 321–326 (1999).
57. Graham, J., Haidt, J. & Nosek, B. A. Liberals and conservatives rely on different sets of moral foundations. *J. Pers. Soc. Psychol.* **96**, 1029–1046 (2009).

Acknowledgements: The present research was funded by Social Sciences and Humanities Research Council of Canada Insight Grants 435-2014-0685 (to I.G.) and 435-2012-0306 (to D.R.B.), and by the John Templeton Foundation Science of Prospection grant (to I.G.). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Author Contributions: I.G. and J.P.B. contributed to the design. J.P.B. collected the data. I.G. and J.P.B. carried out data analysis. All authors contributed to the conceptual analysis of the results. I.G. drafted the manuscript. All authors approved the final manuscript for submission.

Competing Interests statement: The authors declare no competing interests.

Author Information: Correspondence and requests for materials should be addressed to I.G. (igrossma@uwaterloo.ca) or J.P.B. (jbrienza@uwaterloo.ca).

Figure Legends

Figure 1. Effect of wise reasoning (WR) on the relationship between experimentally manipulated deliberation (time delay vs. no time delay) and cooperation in the public goods game. Estimated means and standard errors at ± 1 *SD* around the mean of the WR scores. Analysis with condition, WR, and their interaction as predictors of contribution showed a main effect of WR, $F(1,628) = 4.42, P = .036$, and a marginal condition*WR interaction, $F(2,628) = 2.92, p = .055$. In the ‘time delay’ condition WR was significantly associated with more cooperation, $B = 10.99, SE = 3.59, t = 3.06, P = .002$. There was no significant WR-cooperation association among participants in the other groups, $ts < 1, ns$. Decomposing the condition factor into two dummy-coded variables, WR significantly qualified the difference between ‘time delay’ and control conditions, ‘time delay’-code*WR interaction: $t = 2.38, P = .018$. However, WR did not qualify the difference between ‘time pressure’ and control conditions, $|t| = .59, P = .557$.

Figure 2. Effect of observer (vs. experiential) deliberation on the relationship between decision time and cooperation in the public goods game in Studies 2-3. Results represent estimated means and standard errors at 10%, 25%, median, 75%, and 90% of decision time. Panel A. Deliberation from 3rd- vs. 1st-person linguistic viewpoint in Study 2. Decision time effect was three times larger and statistically significant among participants in the experiential viewpoint group, $B = -.80, SE = .22, t = 3.72, P = .0002$, compared to participants in the observer viewpoint group, $B = -.11, SE = .08, t = 1.52, P = .13$, for whom there was no significant effect of decision time. Panel B. Deliberation in Study 3 with “bird’s eye view” vs. “here and now” logo in a survey banner. Negative effect of decision time on cooperation was significant among participants in the experiential condition, $B = -.010, SE = .003, |t| = 4.04, P = .00006$, but not among the participants in the observer condition, $B = -.002, SE = .002, |t| = -1.07, P = .29$.

Figure 3. Effects of observer vs. experiential viewpoint deliberation on construal and thought processes during the decision in a Public Goods Game. Panels A-B. Percentage of participants in observer vs. experiential viewpoint conditions in Study 2 describing the aim of the study in individual, interdependent terms, and unrelated terms (e.g., nonsense statements, general reference to economic games). Observer (vs. experiential) viewpoint participants were more likely to construe the event using interdependent terms (e.g., generosity, common goals, moral concerns), $\chi^2(df = 1) = 6.36, P = .012$. In contrast, experiential (vs. observer) viewpoint participants were more likely to construe the PGG using individual-focused terms (e.g., risk, individual differences, selfishness), $\chi^2(df = 1) = 7.07, P = .008$. Panel C. PGG decision-related thoughts in the observer vs. experiential conditions in Study 3. Participants in the experiential condition were more anxious compared to participants in the observer condition, $F(1,461) = 5.53, P = .019$. Moreover, for interdependence- and morality-related terms, we observed an observer condition * time delay interactions, $F_{interdependence}(1,459) = 6.24, P = .013$; $F_{morality}(1,459) = 4.13, P = .043$. As Fig. 3 indicates, greater deliberation led to more moral concerns in the observer (vs. experiential) condition. Similar pattern emerged when examining observer condition * decision time interaction, $F_{morality}(1,459) = 1.96, P = .162$; $F_{morality}(1,459) = 4.31, P = .038$.

Table 1
Demographics

	Study 1	Study 2	Study 3
<i>N</i>	634	547	464
Age _{mean} (<i>SD</i>)	34.44 (11.06)	36.54 (12.99)	37.29 (11.67)
Gender (%f/m/other)	62.5/37.5	56.1/43.5/.4	56.2/43.8
Ethnicity (%)			
Asian-Am.	3.9	3.1	6.9
African-Am.	9.9	8.8	8.8
White	79.7	81.3	75
Hispanic	3.6	3.7	5.8
“Other”	2.8	3.1	3.5
Income _{median}	35,001-50,000	35,001-50,000	35,001-50,000
Education (%)			
High school	10.6	14	8.4
Some college	30.7	34.2	29.2
College	42.4	36.6	47
Post-grad	16.4	15.3	15.6

Note: Valid *N* = sample size after screening procedures (see SI).

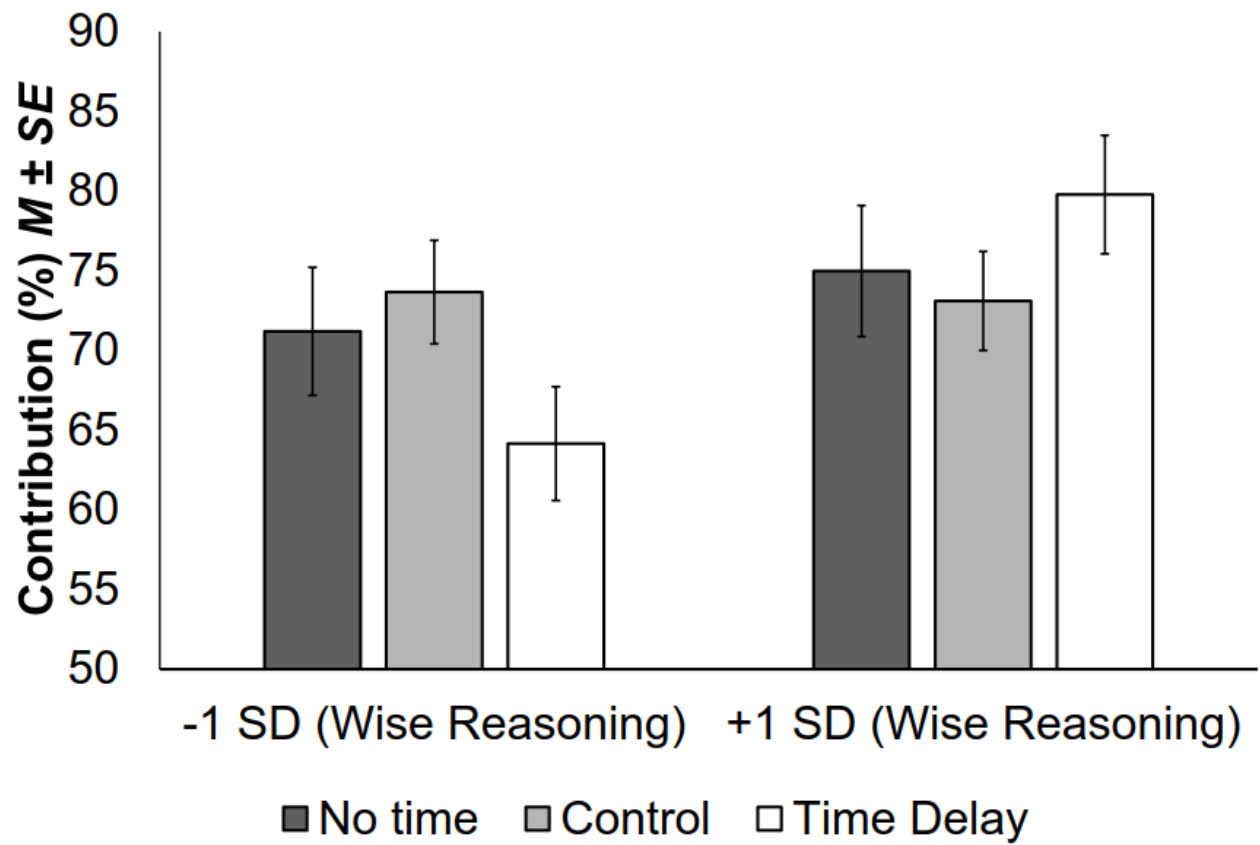


Figure 1

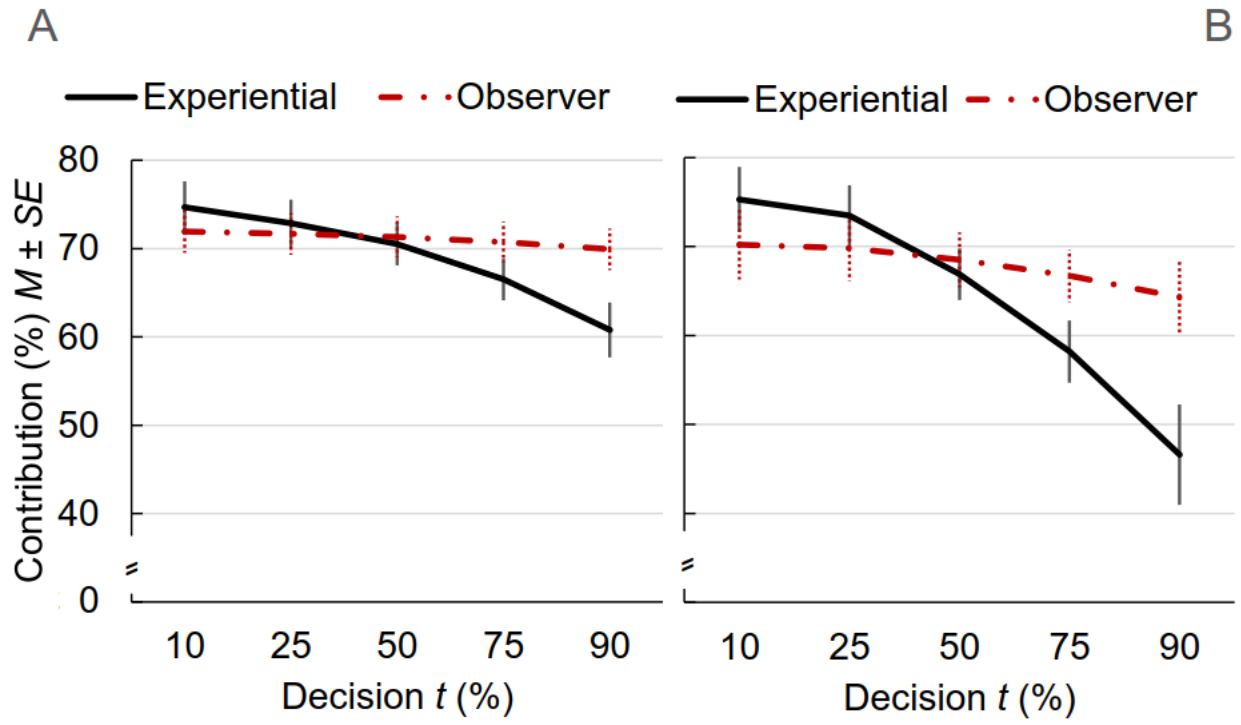


Figure 2

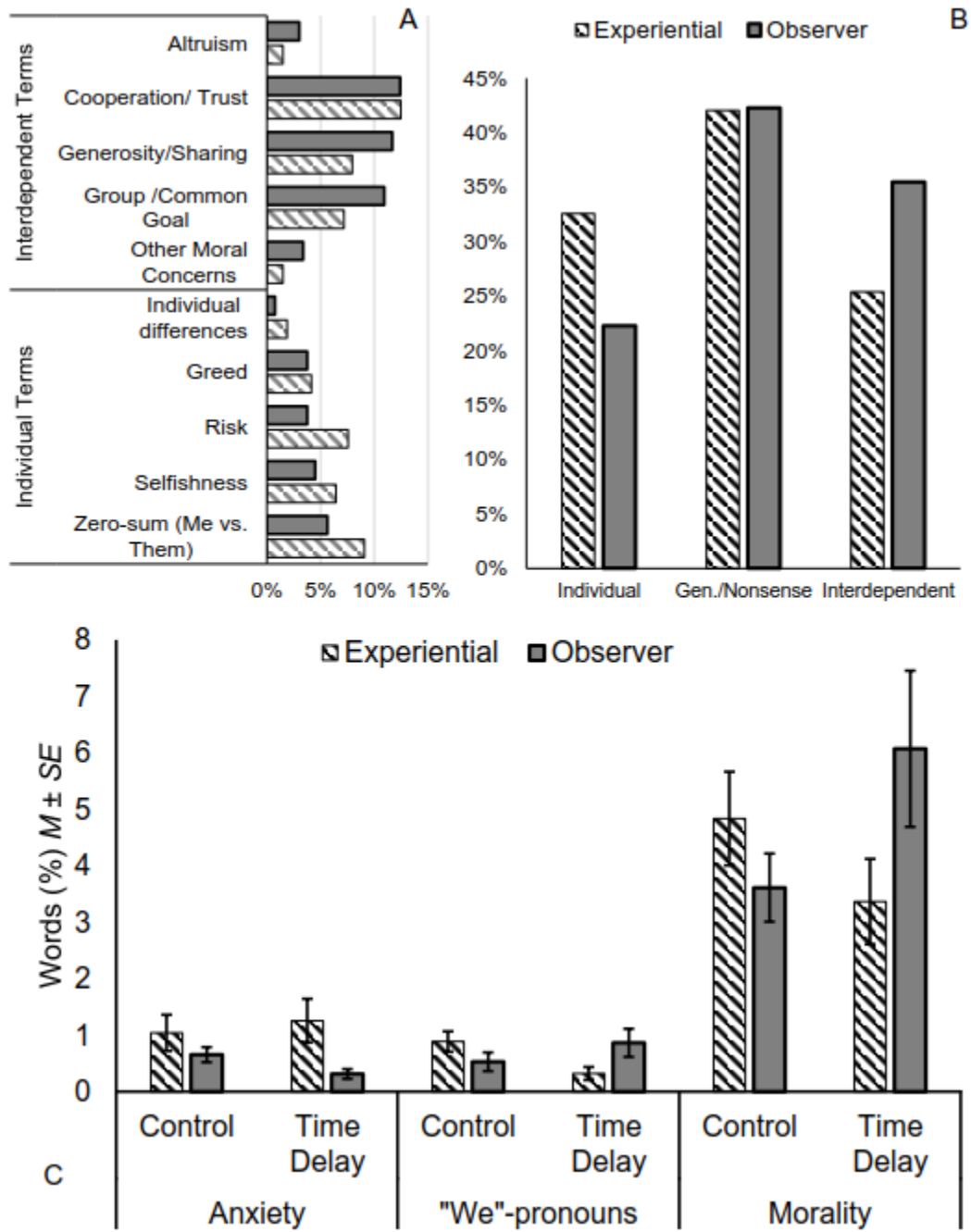


Figure 3

Wise Deliberation Sustains Cooperation

Supplementary Information

Authors: Igor Grossmann, Justin P. Brienza, & D. Ramona Bobocel

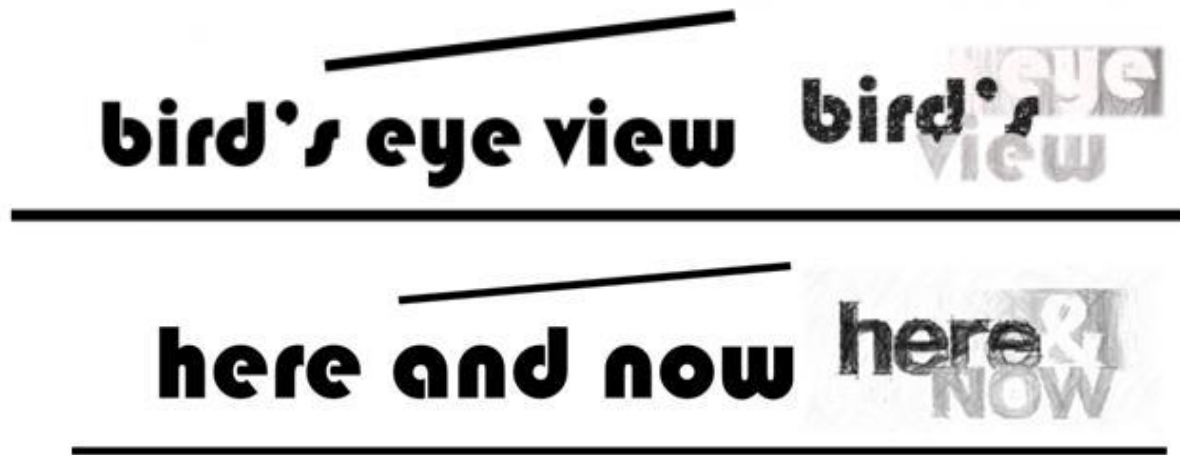
Authors note: Correspondence and requests for materials should be addressed to I.G. (igrossma@uwaterloo.ca) or J.P.B. (jbrienza@uwaterloo.ca).

CONTENTS

<u>Supplementary Figures</u>	30
<u>Supplementary Figure 1: Banner logos used in Study 3</u>	30
<u>Supplementary Tables</u>	31
<u>Supplementary Table 1: Descriptives for time spent on each screen in Study 2</u>	31
<u>Supplementary Table 2: Zero-order correlations among Study 2 measures</u>	31
<u>Supplementary Table 3: Interaction effects and simple effect estimates in Study 1</u>	32
<u>Supplementary Table 4: Correlations between WR facets and Study 1 contribution</u>	32
<u>Supplementary Notes</u>	33
<u>Study 1: WR moderates individual differences in decision time (control condition) on contribution</u>	33
<u>Study 1 analysis of manipulated decision time on contribution as a function of WR</u>	33
<u>Presentation order effects in Study 1</u>	33
<u>Replication without filtering participants violating condition instructions</u>	33
<u>Including participants who violated <10s rule in the “time pressure” (no time) condition</u>	33
<u>Including participants who violated >10s rule in the “time delay” condition</u>	34
<u>Extreme responding on the Public Goods Game (PGG)</u>	34
<u>The role of WR for extreme responding on the PGG</u>	34
<u>WR attenuated the relationship between deliberation time and decision conflict</u>	34
<u>Extremity does not account for decision time * WR interaction for PGG contributions</u>	34
<u>The role of past experience with public goods games</u>	35
<u>The role of trust</u>	35
<u>The role of education</u>	36
<u>The role of attention to the task in Study 1</u>	36
<u>The role of comprehension of PGG in Study 1</u>	36
<u>Distractibility differences by condition in Study 2</u>	36
<u>Supplementary Methods</u>	38
<u>Attrition rates</u>	38
<u>Study 1 methods</u>	38
<u>Details on the wise reasoning instrument</u>	38
<u>Conflict reconstruction method of wise reasoning in Study 1</u>	40
<u>Experimental instructions for public goods task in Study 1</u>	41
<u>Experience with the Public Goods Game</u>	43
<u>Study 2 methods</u>	43
<u>Instructions for PGG task (Study 2)</u>	44
<u>Supplementary References</u>	46

Supplementary Figures

Supplementary Figure 1: Banner logos used in Study 3



Supplementary Tables

Supplementary Table 1: Descriptives for time spent on each screen in Study 2

	Minimum	Maximum	<i>M</i>	<i>Md</i>	<i>SD</i>
time.screen1 (s)	2.00	95.32	4.33	2.98	5.68
time.screen2 (s)	15.80	554.37	53.52	44.88	39.50
time.screen3 (s)	2.02	114.17	11.01	9.45	9.05
time.screen4 (s)	26.23	247.07	49.01	40.09	28.11
time.screen5 (s)	.27	451.53	15.14	11.28	23.48

Supplementary Table 2: Zero-order correlations among Study 2 measures

	1.	2.	3.	4.	5.
1. Big Picture (1) vs. General (0) vs. Individual Terms (-1)	--	-.83 ^{***(s)}	.85 ^{***(s)}	-.007 ^(κ)	.07 ^{†(κ)}
2. Individual Terms		--	-.41 ^{***(s)}	.02 ^(s)	-.04 ^(s)
3. Big Picture Terms			--	.008 ^(s)	.10 ^{*(s)}
4. Deliberation Length				--	-.11 ^{**}
5. Contribution Amount					--

Note. (s) – Spearman’s rho, (κ) = Kendall’s tau. † ≤ .10 * ≤ .05 ** ≤ .01 *** ≤ .001

Supplementary Table 3: Interaction effects and simple effect estimates in Study 1

IV	Facet of Wise Reasoning	Delib. x WR		Simple Effect at -1 <i>SD</i> on WR		Simple Effect at +1 <i>SD</i> on WR	
		<i>F</i> / <i>p</i> -value	<i>B</i> (<i>SE</i>)	<i>t</i> / <i>p</i> -value	<i>B</i> (<i>SE</i>)	<i>t</i> / <i>p</i> -value	
Decision Time (control)	Total Score	6.75 / .010	-2.06 (.50)	4.16 / < .00001	-.86 (.25)	3.39 / .001	
	Intellectual Humility	5.74 / .017	-2.09 (.54)	3.89 / .0001	-.88 (.25)	3.50 / .001	
	Others' Perspectives	8.86 / .003	-2.57 (.60)	4.28 / < .0001	-.67 (.27)	2.54 / .012	
	Compromise/Resolution	6.36 / .012	-2.06 (.51)	4.05 / .0001	-.79 (.26)	3.07 / .002	
	Change	2.59 / .109	-1.66 (.52)	3.17 / .002	-.85 (.26)	3.31 / .001	
	Outsider's Vantage Point	1.91 / .168	-1.27 (.35)	3.69 / .0003	-.71 (.30)	2.33 / .021	
Delay / No Delay (full sample)	Intellectual Humility	.70 / .401	-4.00 (4.35)	.92 / .359	1.17 (4.45)	.26 / .793	
	Others' Perspectives	2.61 / .106	-6.45 (4.39)	1.47 / .142	3.69 (4.50)	.82 / .407	
	Compromise/Resolution	2.84 / .093	-6.81 (4.39)	1.55 / .122	3.59 (4.44)	.81 / .420	
	Change	5.27 / .024	-9.10 (4.49)	2.03 / .043	5.26 (4.37)	1.20 / .230	
	Outsider's Vantage Point	4.14 / .042	-7.69 (4.39)	1.75 / .080	5.25 (4.59)	1.14 / .250	

Supplementary Table 4: Correlations between WR facets and Study 1 contribution

Condition		Humility	Change	Perspective	Compr./Resol.	Outsider	
Pearson's <i>r</i>	Control	<i>r</i>	.001	-.058	-.011	-.009	.032
		<i>p</i> -value	.984	.347	.860	.887	.608
		<i>N</i>	265	265	265	265	265
	'No Time'	<i>r</i>	.062	.039	-.015	.134	-.016
		<i>p</i> -value	.425	.613	.848	.084	.836
		<i>N</i>	169	169	169	169	169
	'Time Delay'	<i>r</i>	.100	.177	.125	.193	.185
		<i>p</i> -value	.158	.012	.077	.007	.010
		<i>N</i>	200	200	200	196	196
Kendall's τ	Control	<i>T</i>	-.001	-.058	-.018	-.022	.005
		<i>p</i> -value	.977	.232	.709	.651	.917
		<i>N</i>	265	265	265	265	265
	'No Time'	<i>T</i>	.034	.006	-.028	.090	-.011
		<i>p</i> -value	.577	.917	.650	.140	.862
		<i>N</i>	169	169	169	169	169
	'Time Delay'	<i>T</i>	.075	.124	.070	.151	.126
		<i>p</i> -value	.168	.024	.205	.006	.022
		<i>N</i>	200	200	200	196	196

Supplementary Notes

Study 1: WR moderates individual differences in decision time (control condition) on contribution

Focusing on the control condition, we tested the relationship between decision time and cooperation for people who report high and low levels of wise reasoning on an independent task. Consistent with prior work²; Study 1, we observed that the time participants spent on the PGG decision was negatively related to their public contributions in the control condition ($n = 265$), $B = -1.46$, $SE = .32$, $df = 261$, $|t| = 4.59$, $p < .001$, 95% CI: $-2.09, -.83$. Examining control participants further, we found that WR moderated the relationship between deliberation time and cooperation (see Supplementary Table 3). Further, time spent deliberating had a stronger negative effect on cooperation for participants who reported less WR in their lives than for those who reported more WR. The WR effect held when controlling for presentation order, $B = .86$, $SE = .32$, $|t| = 2.66$, $p = .008$, 95% CI: $.22, 1.50$.

Performing a parallel set of analyses across each of the five facets of wise reasoning, we observed a systematic deliberation time X reasoning interaction for intellectual humility, perspectives, and compromise, and trends for change, resolution, and outsider's vantage point (see Supplementary Table 3). Unpacking these interactions, we found that time spent deliberating had a stronger negative effect on cooperation for participants who reported lower intellectual humility, perspectives, compromise, resolution, and outsider's vantage point, compared to those who reported higher score on these dimensions. Recognition of change was the only exception to this pattern: the effect of deliberation time was comparable for both low and high WR participants.

Study 1 analysis of manipulated decision time on contribution as a function of WR

We subsequently examined how each WR-facet attenuates negative effects of manipulated deliberation time (time delay vs. no time delay) on contributions. Supplementary Table 3 indicates effects for change, compromise/resolution, and outsider's viewpoint, and a trend for perspectives, indicating that the overall effect is spread across multiple facets of wise reasoning concerning the big-picture thinking. Similar to the analyses in the main text, we also explored the relationship between each facet of wise reasoning and contribution amounts within each experimental condition. As Supplementary Table 4 indicates, in the 'time delay' condition we observed a consistent pattern of positive association between contribution amount and the likelihood of recognizing change, considering different bigger picture/others' perspectives on the issue, search for a compromise/resolution, and reflect on one's personal from an outsider's vantage point. In contrast, none of the associations was significant in the 'no time' and 'control' conditions.

Presentation order effects in Study 1

We performed post-hoc analyses examining whether effects of deliberation [time delay condition] vs. spontaneous deciding [no time and control conditions], WR, and WR *deliberation group interaction on cooperation varied as a function on presentation order of WR and PGG tasks.

When WR task came first, we observed a trend of deliberation towards less cooperative giving, $F(1,276) = 2.56$, $p = .111$, a trend of WR towards more cooperative giving, $F(1,276) = 1.51$, $p = .220$, and a marginal WR *deliberation interaction, $F(1,276) = 3.27$, $p = .072$. When WR task came second, we observed no trend of deliberation towards less cooperative giving, $F(1,350) < 1$, *ns.*, a trend of WR towards more cooperative giving, $F(1,350) = 1.68$, $p = .195$, and a trend of WR *deliberation interaction, $F(1,350) = 2.47$, $p = .12$. Effects of simple effects were also consistent with the pattern in the main text. Overall, it appears that the direction of WR*deliberation effects were symmetric regardless whether the WR task came first or second.

Replication without filtering participants violating condition instructions

Including participants who violated <10s rule in the "time pressure" (no time) condition

Results of a linear mixed model with condition contrast ('time delay' vs. 'no time'/control), wise reasoning, and their interaction predicting contributions showed a significant positive effect of wise reasoning, $F(1,702) = 4.08$, $p = .044$, and a condition contrast X wise reasoning interaction, $F(1,702) = 5.94$, $p = .015$. As with the main

text, simple slope results indicated a marginal negative effect of condition contrast when wisdom was low (at -1 *SD* on WR), $B = -7.59$, $SE = 4.30$, $|t| = 1.77$, $p = .078$, and reversal when wisdom was high (simple slope at +1 *SD* on WR), $B = 7.36$, $SE = 4.38$, $|t| = 1.68$, $p = .094$.

Including participants who violated >10s rule in the “time delay” condition

Results of a linear mixed model with condition contrast (‘time delay’ vs. ‘no time’/control), wise reasoning, and their interaction predicting contributions showed a marginal positive effect of wise reasoning, $F(1,672) = 2.89$, $p = .089$, and a significant condition contrast X wise reasoning interaction, $F(1,672) = 4.13$, $p = .042$. As with the main text, simple slope results indicated a negative trend of condition contrast when wisdom was low (at -1 *SD* on WR), $B = -4.72$, $SE = 4.09$, $|t| = 1.15$, $p = .249$, and reversal when wisdom was high (simple slope at +1 *SD* on WR), $B = 7.14$, $SE = 4.16$, $|t| = 1.72$, $p = .087$.

Extreme responding on the Public Goods Game (PGG)

The role of WR for extreme responding on the PGG

Some scholars recently suggested that individual differences in response times on the public goods task may reflect the magnitude of decision conflict between selfish and cooperative goals¹⁰. Specifically, Evans and colleagues suggested that some people do not work through the task contingencies, rather spontaneously deciding to give money to others or keep for themselves, whereas other people spend time reflecting on the self- and other-benefitting contingencies and subsequently choose intermediate responses. Evans et al.¹⁰ demonstrated that these effects were specific to individual differences in time spent on the task, but did not hold when manipulating deliberation time.

If WR helps to manage the risk and uncertainty by orienting individuals towards big picture ideals when working through self-protective and other-benefitting contingencies (see Figure 2 in the main text), it is possible that wise reasoning moderates the relationship between individual differences in decision-time and response extremity. Following Evans et al., we first calculated extremity scores – i.e., the absolute distance between the contribution amount and the intermediate, midpoint response. In both studies, these extremity scores were highly correlated with contribution scores, Experiment 1 (control condition): $r = .409$, $p < .001$, Experiment 2: $r = .298$, $p < .001$. Next, we examined whether wise reasoning moderates the effect of time on extreme responding.

WR attenuated the relationship between deliberation time and decision conflict

In Experiment 1 (control condition), greater time was associated with less extreme responses, $B = -.007$, $SE = .002$, $|t| = 3.84$, $p < .0001$. This relationship was qualified by a significant time * WR interaction, $|t| = 2.55$, $p = .011$. Unpacking this interaction with help of simple slopes, we found that time spent deliberating had a stronger negative relationship to extremity of contributions for participants who reported less WR in their own lives (at -1 *SD* on WR), $B = -.010$, $SE = .003$, $|t| = 3.66$, $p = .0003$, than for those who reported more WR (simple slope at +1 *SD* on WR), $B = -.003$, $SE = .001$, $|t| = 2.50$, $p = .013$. Overall, these extremity analyses suggest that wise reasoning indeed attenuates the relationship between deliberation time and decision-conflict-related extremity.

In Experiment 2, greater time was associated with less extreme responses, $B = -.003$, $SE = .001$, $|t| = 2.70$, $p = .007$. Similar to Experiment 1, this effect which was qualified by a significant decision time * condition interaction, $|t| = 2.18$, $p = .030$. Simple slope analyses indicated that time spent deliberating was related to extremity of contributions only for participants in the experiential condition, $B = -.005$, $SE = .002$, $|t| = 2.60$, $p = .010$, but not for participants in the observer condition, $B = -.0006$, $SE = .0007$, $|t| = .83$, $p = .410$.

Similarly, in Experiment 3, greater time was associated with less extreme responses, $B = -.152$, $SE = .069$, $|t| = 2.19$, $p = .029$. However, this effect which was qualified by a decision time * condition interaction, $|t| < 1$, *ns*.

Extremity does not account for decision time * WR interaction for PGG contributions

We also explored whether the extremity fully accounts for the relationship between time*WR for public goods contributions. To this end, we re-ran main text analyses with extremity as a covariate. In Experiment 1 (control

condition), differences in WR marginally moderated the effect of time on contribution, above and beyond extremity, $|t|= 1.76$, $p = .081$, with Johnson-Neyman technique indicating that the negative relationship between time and contributions was not significant for the top 10% of participants on WR.

Similarly, in Experiment 2 we observed a significant time * condition interaction, $|t|= 2.43$, $p = .015$, with a significant negative relationship between time and contribution for participants in the experiential viewpoint condition, $B = -.006$, $SE = .002$, $|t|= 3.02$, $p = .003$, but not for participants in the observer viewpoint condition, $B = -.001$, $SE = .0007$, $|t|= 1.37$, $p = .171$.

Further, in Experiment 3, we observed a significant time * condition interaction, $|t|= 2.70$, $p = .007$, with a significant negative relationship between time and contribution for participants in the experiential viewpoint condition, $B = -.009$, $SE = .002$, $|t|= 3.91$, $p = .0001$, but not for participants in the observer viewpoint condition, $B = -.001$, $SE = .002$, $|t|= .66$, $p = .509$.

Together, these results suggest that the association between WR and extreme responding on the PGG plays a role for the relationship between deliberation time and performance on the PGG, yet extremity alone is not sufficient to explain the relationship between time, WR, and cooperation.

The role of past experience with public goods games

Past research found that people behave differently in PGGs when they have experience with the task. Specifically, researchers observed that the negative effect of deliberation (time spent on the task) on cooperation did not hold among those with experience (henceforth “experienced”), but only among novices². Thus, in Experiment 1 we explored whether we replicate the moderating effect of experience vs. novice on the effect of deliberation on cooperation, and whether wise reasoning has an impact on this relationship. To this end, we categorized participants’ responses to the questions concerning prior experience with public goods games, with those who reported no such experience as *Novices* (0) and those who reported encountering public good games before as *Experienced Participants* (1).

We examined the effect of prior experience with the PGG on the relationship between the experimental condition and level of cooperation. We conducted moderation analysis, with experimental condition (contrast of deliberation condition = 1 vs. spontaneous ‘no time’ and ‘control’ conditions = 0) as the predictor, cooperation as the criterion, and level of expertise (novice vs. experienced subject) as the moderator; if expertise made a difference in how people respond to the PGG task when instructed to deliberate about their decision, we would expect to find an interaction between condition and expertise variables. We did not find such an interaction, $F = .265$, $p = .607$. Splitting the data by experience, we found no significant effect of deliberation for novices, $F(1,236) = .675$, $p = .412$, experienced participants, $F(1,379) = .064$, $p = .800$, or those who did not complete the experience question, $F(1,13) = 2.11$, $p = .170$.

Moreover, adding experience variable into the model with experimental condition, WR, and their interaction predicting contributions did not yield a significant 3 way interaction, $F(1, 611) = 1.12$, $p = .291$, and no significant 2-way interactions with condition, $F < 1$, or wise reasoning, $F = 1.17$.

The role of trust

In Experiment 1, we examined the role of trust in determining the effect of deliberation on cooperation. We found a small-medium positive correlation between wise reasoning and trust, $r = .14$, $p < .001$ ($N = 620$). Given that higher WR scores were positively related to greater trust, trust might have confounded the role of WR for the effects of deliberation on cooperation. We ran multiple regressions with the condition, WR, and group (deliberative vs. spontaneous) * WR interaction as predictors, cooperation as the dependent variable, and trust as a covariate. Trust was a marginally significant predictor of cooperation, $F(1, 615) = 3.75$, $p = .053$. Moreover, deliberation * wise reasoning interaction remained significant, $F(1, 615) = 5.45$, $p = .020$, indicating that trust does not confound the relationship of wise reasoning and deliberation in facilitating cooperation.

The role of education

In Experiment 1, we also examined whether wise reasoning scores are confounded with the level of education. The level of education was not significantly related to the WR index, $r = -.01$, *ns.*, nor its individual facets, $-.04 < r_s < .01$, *ns.* Moreover, deliberation * wise reasoning interaction remained significant, when including the level of education as a covariate, $B=10.68$, $SE=4.45$, $t=2.40$, $p=.017$, suggesting that education does not confound the relationship of WR and deliberation in facilitating cooperation.

The role of attention to the task in Study 1

Does attention to PGG instructions play a role in determining the effect of WR on cooperation? Perhaps high wise reasoners spend more time attending to task instructions, which may induce greater cooperation; in this case, wise reasoning would be positively correlated with time spent on instruction pages. Alternatively, it may be the case that high WR people process information more effectively, which may improve their construal (i.e., realizing that outcomes may be optimized by mutual cooperation) of the task and lead to more cooperation and increased collective gains; in this case, we would find a positive correlation between WR and cooperation.

We examined how amount of time spent attending to instructions prior to the critical decision time page influences participants' responses. We found negligible relationships between time spent on instruction pages and cooperation, $r = -.08$, *ns.*, and between time and group, $r < .01$, *ns.*, suggesting that time spent on instructions played little to no role in cooperation or in explaining the effect of condition on cooperation. We found no relation between time and wise reasoning, nor condition and wise reasoning, $r_s < .03$, *ns.*; thus, the moderating effect of wise reasoning and deliberation on cooperation could not be confounded by time spent on instruction pages.

The role of comprehension of PGG in Study 1

Some recent work suggests that understanding of the pay-off matrix in the PGG qualifies the effects of time delay (vs. time pressure) on cooperation⁵. As in this work, we assessed comprehension (yes/no) with correct responses to two questions: (1) What level of contribution earns the highest payoff for the group as a whole? (2) What level of contribution earns the highest immediate payoff for the individual player?

Adding comprehension variable into the model with deliberation condition, WR, and their interaction predicting contributions did not yield a significant 3 way interaction, $F(1, 626) = .14$, $p = .709$, and no significant 2-way interactions with condition, $F < 1$, or wise reasoning, $F = 1.40$, $p = .237$. Rather, it revealed a main effect of comprehension, with higher contributions among participants who showed understanding of the PGG task, $F(1,626) = 9.83$, $p = .002$, a significant positive effect of wise reasoning, $F(1,626) = 4.84$, $p = .028$, and an expected significant deliberation condition * wise reasoning interaction, $F(1,626) = 4.46$, $p = .035$. Moreover, parallel analyses separately for participants who did vs. did not pass the comprehension test indicated that the deliberation condition * wise reasoning interaction was significant for participants who passed the comprehension test, $F(1,457) = 5.21$, $p = .023$, and not significant among participants who did not pass the comprehension test, $F(1,169) < 1$. For the latter group, the only effect concerned greater contributions among participants scoring higher on wise reasoning task, $F(1,169) = 3.49$, $p = .064$.

Based on these results, in Experiment 3, where we manipulated time delay, we included only participants who passed the comprehension test.

Distractibility differences by condition in Study 2

Does the experiential vs. observer viewpoint manipulation lead to different levels of distractibility? We examined open-ended responses regarding difficulties following instructions, including instructions to adopt the respective perspective. Three participants in the first-person language condition (out of 209 participants in this condition who provided responses to the question) mentioned difficulty using first-person language when deliberating on the instructions and contribution amount. Only one participant in the third-person condition (out of 211 who provided responses to this question) mentioned difficulty with using third-person pronouns and their name. Further, 18 participants in the first-person language condition and 17 participants in the third-person

language condition spontaneously indicated that they enjoyed the survey and found it interesting. Moreover, six participants in the first-person language condition and five participants in the third-person language condition explicitly commented on the high level of clarity of the instructions and the survey flow. Overall, it appears that most participants had no difficulties understanding instructions, with a larger number of participants in each condition complementing rather than complaining about the instructions to adopt first- or third-person perspective.

Further, we conducted a supplementary study on MTurk ($N = 224$) examining degree of distractibility as a function of reflecting on the PGG instructions from the observer (3rd-person) vs. experiential (1st person) viewpoint. PGG and viewpoint instructions were identical to Experiment 2. Instead of providing the contribution amount, participants were asked to reflect on the game, maintaining their viewpoint. Afterwards, we asked participants to rate “the extent to which you felt distracted when reflecting on the game following third-[first]-person perspective” on a scale from 1 – extremely distracted to 5 – not distracted at all. Results indicated that participants in the observer condition ($M = 4.44$, $SD = .87$, $n = 110$) indicated not being any more distracted reflecting on the PGG than participants in the experiential condition ($M = 4.56$, $SD = .70$, $n = 114$), $F(1,222) = 1.40$, $p = .24$.

Supplementary Methods

Participants from all studies were screened for United States residence, the adult age (18 years), and English as a first language to ensure comprehension of the materials. Recruits who failed any of these criteria were not allowed to participate in the studies.

Attrition rates

MTurk attrition rates can be high and they have multiple causes. As Mason and Suri ¹ pointed out “A worker could simply open up a new browser window and stop paying attention to the experiment at hand, he or she could walk away from their computers in the middle of an experiment, a user’s Web browser or entire machine could crash, or his or her Internet connectivity could cut out.”

In both studies, we aimed to recruit naïve, and not only experienced MTurk participants. For this purpose, we had to include individuals with zero approval rating on the MTurk platform (as novices don’t have approval ratings). Therefore, we expected higher attrition rate (30-40%, including people who decided to click on the MTurk hit, but dropped it very initial inquiry; people who do not qualify as per predefined criteria and who did not follow instructions; see Table 1 in main text) as compared to typical online studies.

Consistent with past studies ² and research on reading speed and comprehension ^{3,4}, we filtered cases for failure to read or adhere to task instructions. In Experiment 1, we filtered <2s, <14.24s, and <2s on screens 1, 2 and 3, respectively in the control condition, and < 2s, <15.77s, and <2s, on screens 1, 2, and 3, respectively in the ‘no time’ and deliberation conditions), screening out 8.5%_{time pressure}/8.4%_{time delay}/6.3%_{control} recruits for failing to read task instructions, and 7.4%_{time pressure}/4.3%_{time delay} recruits for failing to adhere to experimental instructions. In Experiment 2, we filtered < 2s, <15.55s, and <2s on screens 1, 2 and 3, screening out 22.7%_{self-distanced}/23.9%_{self-immersed} recruits for failing to read task instructions. Similarly, in Experiment 3, we filtered < 2s on screens 1, 2 and < <15.83s on screen 3 (which included 11% more words compared to screen 2 of Experiment 1-control condition), screening out 16.97%_{bird’s eye view}/12.27%_{here and now} recruits for failing to read task instructions, and 11.9% recruits for failing to adhere to instructions. Based on comprehension results in Experiment 1 (see below) and prior research⁵, we also filtered 28.9% of participants who failed PGG comprehension check.

Study 1 methods

Participants completed the wise reasoning instrument (see subsequent sections) and a public goods game (PGG; presentation order was counterbalanced; see subsequent sections). Following past work ², we examined individual differences in generalized trust, as a marker of subjective perception of one’s environment as cooperative vs. uncooperative, by asking participants, “To what extent do you feel you can trust other people that you interact with in your daily life?” using a ten-point Likert scale (1 = “*Very Little*” to 10 = “*Very Much*”). Fifteen participants did not complete the trust item, which was presented at the end of the study). Then participants completed a few filler tasks, as well as a measure of experience with economic games (on a scale 1-5 scale: 1 = *never*, 2 = *don’t recall*, 3 = *once or twice*, 4 = *a few times*, 5 = *many times*; see a subsequent method section for exact details) and a demographics questionnaire.

Details on the wise reasoning instrument

Within the body of psychological wisdom research, scholars have proposed a number of interrelated ego-decentered aspects of reasoning conducive for gauging a bigger picture context of the issue at hand, including intellectual humility (i.e., recognition of limits of one’s own knowledge), appreciation of contexts broader than the issue at hand, sensitivity to the possibility of change in social relations, acknowledgment of the likelihood of multiple outcomes of a social conflict, and adopting a view of events through the vantage point of an outsider.

Empirical and theoretical work suggests that wise reasoning (WR) plays a crucial role for navigating through difficult life events⁶⁻⁸.

We designed our measure to assess the extent to which people engage in WR when recalling difficult interpersonal experiences they have recently been involved in. Specifically, we assessed WR during difficult interpersonal situations (e.g., conflicts), asking people to recall recent personal experiences. Participants were initially prompted to take a moment to recall a specific conflict episode that they had personally experienced with a friend. Next, participants answered a set of questions about the conflict, using them to help participants reconstruct the context of the experience. Subsequently, participants responded to a set of 22 wise reasoning items, which referred to one of six aspects of wise reasoning. Twenty-one items were selected based on an independent set of 3,000 participants⁹, indicating that (a) responses to this instrument show a coherent confirmatory factor structure, with five facets feeding into a second-order factor, and (b) composite (second-order or cross-item average) WR score is only modestly correlated to other existing instruments (e.g., empathic concern; mindfulness; intellect; attributional complexity). One additional item measuring the change-facet of WE was accidentally kept from the initial item reduction phase “Considered how the situation might change through time.” Results were consistent with and without excluding this item. Therefore, we kept this item as part of the change-facet of WE in the present set of analyses.

Notably, though the general aspects of WR (e.g., recognition of others' perspectives vs. recognition of world in flux/change) may vary in the extent to which they require more or less deliberation, the method of reconstructing a conflict experience by design requires deliberation in the reconstruction phase. Moreover, each item was phrased in a way that captured a deliberative (rather than intuitive) processes. See the next section for exact method procedure.

In the present study, the 22 items were presented on 2 computer screens (11 items each). Four participants finished their study without completing the second page of the WR instrument. Therefore, data on facets of compromise, resolution, and outsider's viewpoint is missing for these four participants.

Conflict reconstruction method of wise reasoning in Study 1

Page 1

In this section we would like you to think about a difficult situation that has happened to you with another person, **specifically with a close friend** (e.g., a disagreement, conflict). This should be a situation that you yourself were involved in, whether or not you were the person who initiated the situation. We would like you to take a moment to recall the situation and visualize the events in your mind's eye; consider who was involved and what happened, what you thought and how you felt. After doing so, please respond to the following questions:

1. When did this situation first begin? a. This week b. Within the last month c. Within the last 6 months d. Within the last year e. Over a year ago
2. What day of the week was it? M T W T F Sat Sun Don't remember
3. What time of day was it? Morning Afternoon Evening Don't remember
4. What were you doing when it happened? [text box]
5. Where were you? [text box]
6. As you were thinking about this situation, what thoughts came to your mind? Please write your thoughts in the space provided. [text box]

Page 2

Please continue to think about the situation you called to mind in the previous section and recall the extent to which you engaged in the following thoughts and behaviors – what you actually did as the situation unfolded. None of the statements listed below are supposed to be "good" or "bad". We are simply interested in how people approach difficult situations. Therefore, it is very important to us that you answer as accurately as possible - your honesty is appreciated, and your replies are anonymous.

"While this situation was unfolding, I did the following..." (from 1 – not at all, to 5 – very much)

1. Put myself in the other person's shoes
2. Tried to communicate with the other person what we might have in common
3. Made an effort to take the other person's perspective
4. Took time to get the other person's opinions on the matter before coming to a conclusion
5. Looked for different solutions as the situation evolved
6. Considered alternative solutions as the situation evolved
7. Believed the situation could lead to a number of different outcomes
8. Considered how the situation might change through time
9. Thought the situation could unfold in many different ways
10. Double-checked whether my opinion on the situation might be incorrect
11. Double-checked whether the other person's opinions might be correct
12. Looked for any extraordinary circumstances before forming my opinion
13. Behaved as if there may be some information to which I did not have access
14. Tried my best to find a way to accommodate both of us
15. Though it may not have been possible, I searched for a solution that could result in both of us being satisfied
16. Considered first whether a compromise was possible in resolving the situation
17. Viewed it as very important that we resolve the situation
18. Tried to anticipate how the conflict might be resolved
19. Wondered what I would think if I was somebody else watching the situation
20. Tried to see the conflict from the point of view of an uninvolved person
21. Asked myself what other people might think or feel if they were watching the conflict
22. Thought about whether an outside person might have a different opinion from mine about the situation

Items 1-4: recognition of the larger issue at hand/others' perspectives; items 5-9: consideration of change and multiple ways situation may unfold; items 10-13: intellectual humility/recognition of limits of knowledge; items 14-18: search for a compromise / conflict resolution; items 19-22: view of the event through the vantage point of an outsider

Experimental instructions for the Public Goods Game in Study 1

Experimental conditions

Screen 1.

You will now complete a short decision making task. Below is a description and instructions:

You have been randomly assigned to interact with 3 other people. All of you receive this same set of instructions. You cannot participate in this study more than once.

Screen 2.

In addition to the 75 cents you already receive for this HIT, each person in your group is given 40 cents for this interaction.

You each decide how much of your 40 cents to keep for yourself, and how much (if any) to contribute to the group's common project (in increments of 2 units: 0, 2, 4, 6, etc.). Money contributed to the common project will be doubled, and then split evenly among the 4 group members.

For every 2 cents contributed to the common project, the group receives 4 cents to split. If everyone contributes all of their 40 cents, everyone's money will double: each of you will earn 80 cents. But if everyone else contributes their 40 cents, while you keep your 40 cents, you will earn 100 cents, while the others will earn only 60 cents. Thus, if everybody contributes to the project, you all may gain; if nobody else contributes, you may personally lose money on contributing.

Screen 3.

The other people are REAL and will really make a decision – there is no deception in this study. Once you and the other people have chosen how much to contribute, the interaction is over. Neither you nor the other people receive any bonus other than what comes out of this interaction.

Screen 4 (No time condition).

Please make your decision as quickly as possible. You must make your decision in less than 10 seconds!

Please use the slider to choose the amount of money you wish to contribute:

Your contribution: 0 -----slider-----40

Screen 4 (time delay condition).

Please carefully consider your decision. You must wait and think for at least 10 seconds before making your decision.

Please use the slider to choose the amount of money you wish to contribute:

Your contribution: 0 -----slider-----40

Screen 5.

You MUST answer these two questions correctly to receive your bonus!

1. What level of contribution earns the highest payoff for the group as a whole?
 2. What level of contribution earns the highest payoff for you personally?
-

Control condition

Screen 1.

You will now complete a short decision making task. Below is a description and instructions:

You have been randomly assigned to interact with 3 other people. All of you receive this same set of instructions. You cannot participate in this study more than once.

Screen 2.

In addition to the 75 cents you already receive for this HIT, each person in your group is given 40 cents for this interaction.

You each decide how much of your 40 cents to keep for yourself, and how much (if any) to contribute to the group's common project (in increments of 2 units: 0, 2, 4, 6, etc.). Money contributed to the common project will be doubled, and then split evenly among the 4 group members.

For every 2 cents contributed to the common project, the group receives 4 cents to split. If everyone contributes all of their 40 cents, everyone's money will double: each of you will earn 80 cents. But if everyone else contributes their 40 cents, while you keep your 40 cents, you will earn 100 cents, while the others will earn only 60 cents. Thus, if everybody contributes to the project, you all may gain; if nobody else contributes, you may personally lose money on contributing.

Screen 3.

The other people are REAL and will really make a decision – there is no deception in this study.

Once you and the other people have chosen how much to contribute, the interaction is over. Neither you nor the other people receive any bonus other than what comes out of this interaction.

Screen 4.

Please use the slider to choose the amount of money you wish to contribute.

Your contribution: 0 -----slider-----40

Screen 5.

You MUST answer these two questions correctly to receive your bonus!

1. What level of contribution earns the highest payoff for the group as a whole?
 2. What level of contribution earns the highest payoff for you personally?
-

Experience with the Public Goods Game

Screen 1.

Please recall the group decision-making task you completed earlier, for bonus. Can you recall what the task was about? (open text response)

Screen 2.

Did you ever participate in MTurk tasks similar to the one described below? (1 = *never*, 2 = *don't recall*, 3 = *once or twice*, 4 = *a few times*, 5 = *many times*):

Where you choose how many points or dollars to keep for yourself versus contributing to benefit the group (i.e., a "public goods game").

Study 2 methods

Participants were told that they would complete a short task and were presented with PGG instructions, across several screens. We asked participants to read through the instructions of the game, embedding the self-immersed vs. self-distanced experimental manipulation within the instructions. Specifically, in the self-immersed condition, participants were told to think about the principles of the PGG from a first-person perspective (e.g., "What would my decision be?"); in the self-distanced condition, participants were told to think about the principles of the PGG from a third-person perspective (e.g., "What would [Chris]'s decision be?" see the next section). Participants then entered their decision in the PGG. See Supplementary Table 1 for descriptives concerning time spend on each screen.

At the end of the study, participants responded to several open-ended questions, including "Did you find anything strange or uncomfortable during the study?" Responses were coded with regard to mentioning difficulties with the task instructions or lack of instruction comprehension. See Supplementary Table 2 for relationship between dependent variables in Experiment 2.

Instructions for PGG task (Study 2)

Screen 1.

You will now complete a short task. On the next page are task instructions.

Screen 2.

Please read the instructions:

The task involves 4 people. Each receives the same set of instructions and can only participate in this task once. In addition to the 50 cents each person receives for this HIT, each person in the group is given 40 cents for their interaction.

Each person decides how much of the 40 cents to keep for oneself, and how much to contribute to the group's common project (from 0 – 40 cents, in 2-cent increments). Money contributed to the common project is doubled, and then split evenly among the 4 group members. For every 2 cents contributed to the common project, the group receives 4 cents to split.

So, if everyone contributes 40 cents, everyone's money will double: each of you will earn 80 cents. If everyone else contributes their 40 cents, while you keep your 40 cents, you will earn 100 cents, while the others will earn only 60 cents. If everybody contributes to the project, everybody gains; if you contribute but nobody else does, you will lose and others will gain.

Screen 3.

We would like you to play this game with other players on MTurk. The other people are REAL, there is no deception in this study. Once you and the other people have chosen how much to contribute, the interaction is over. Neither you nor the other people receive any bonus other than what comes out of this interaction.

Screen 4.

<i>Experiential viewpoint condition</i>	<i>Observer viewpoint condition</i>
<p>First, we would like to help you understand the principles of the game.</p> <p>Some people report understanding this game better by taking a first person perspective. This is what we would like you to do. Please put yourself in the role of a player in this task, and ask yourself “how would I behave as a player in this task?” To help you to take the first person perspective, use the pronouns I/me as much as possible as you try to understand the game. For example, ask yourself, “What would I do?”, and “What would my decision be?” Please take a moment to think about the game from the first person perspective. For your convenience, the instructions are presented below.</p> <p>This page is timed at 25 seconds, to ensure enough time to consider these instructions. We will notify you when to continue.</p> <p>The task involves 4 people. In addition to the 50 cents each person receives for this HIT, each person in the group is given 40 cents for their interaction. Each person decides how much of the 40 cents to keep for oneself, and how much to contribute to the group’s common project (from 0 – 40 cents, in 2-cent increments). Money contributed to the common project is doubled, and then split evenly among the 4 group members. For every 2 cents contributed to the common project, the group receives 4 cents to split. So, if everyone contributes 40 cents, everyone’s money will double: each of you will earn 80 cents. If everyone else contributes their 40 cents, while you keep your 40 cents, you will earn 100 cents, while the others will earn only 60 cents. If everybody contributes to the project, everybody gains; if you contribute but nobody else does, you will lose and others will gain.</p>	<p>First, we would like to help you understand the principles of the game.</p> <p>Some people report understanding this game better by taking a third person perspective. This is what we would like you to do. Please put yourself in the role of a player in this task, and ask yourself “how would I behave as a player in this task?” To help you to take the third person perspective, use your name as much as possible as you try to understand the game. For example, if your name is Chris, ask yourself, “What would [Chris] do?”, and “What would [Chris]’s decision be?” Please take a moment to think about the game from the third person perspective. For your convenience, the instructions are presented below.</p> <p>This page is timed at 25 seconds, to ensure enough time to consider these instructions. We will notify you when to continue.</p> <p>The task involves 4 people. In addition to the 50 cents each person receives for this HIT, each person in the group is given 40 cents for their interaction. Each person decides how much of the 40 cents to keep for oneself, and how much to contribute to the group’s common project (from 0 – 40 cents, in 2-cent increments). Money contributed to the common project is doubled, and then split evenly among the 4 group members. For every 2 cents contributed to the common project, the group receives 4 cents to split. So, if everyone contributes 40 cents, everyone’s money will double: each of you will earn 80 cents. If everyone else contributes their 40 cents, while you keep your 40 cents, you will earn 100 cents, while the others will earn only 60 cents. If everybody contributes to the project, everybody gains; if you contribute but nobody else does, you will lose and others will gain.</p>

Screen 5.

Visualizing your decision from a first [third] person perspective, how much money do you contribute? (use the slider below - you must click on the slider for a valid response)

Your contribution: 0 -----slider-----40

Supplementary References

1. Mason, W. & Suri, S. Conducting behavioral research on Amazon's mechanical Turk. *Behav. Res. Methods* **44**, 1–23 (2012).
2. Rand, D. G., Greene, J. D. & Nowak, M. A. Spontaneous giving and calculated greed. *Nature* **489**, 427–430 (2012).
3. Burns, M. K. *et al.* Minimum Reading Fluency Rate Necessary for Comprehension: A Potential Criterion for Curriculum-Based Assessments. *Assess. Eff. Interv.* **28**, 1–7 (2002).
4. Mayes, D. K., Sims, V. K. & Koonce, J. M. Comprehension and workload differences for VDT and paper-based reading. *Int. J. Ind. Ergon.* **28**, 367–378 (2001).
5. Stromland, E., Tjotta, S. & Torsvik, G. *Cooperating, Fast and Slow: Testing the Social Heuristics Hypothesis*. (2016). at <<https://ssrn.com/abstract=2780877>>
6. Grossmann, I. *et al.* Reasoning about social conflicts improves into old age. *Proc. Natl. Acad. Sci. U. S. A.* **107**, 7246–7250 (2010).
7. Staudinger, U. M. & Glück, J. Psychological wisdom research: Commonalities and differences in a growing field. *Annu. Rev. Psychol.* **62**, 215–241 (2011).
8. Baltes, P. B. & Smith, J. The fascination of wisdom: Its nature, ontogeny, and function. *Perspect. Psychol. Sci.* **3**, 56–64 (2008).
9. Brienza, J., Kung, F., Santos, H. C., Bobocel, R. & Grossmann, I. *Wisdom and bias: Towards a state-level measure of wisdom-related cognition*. (University of Waterloo, 2016).
10. Evans, A. M., Dillon, K. D. & Rand, D. G. Fast but not intuitive, slow but not reflective: Decision conflict drives reaction times in social dilemmas. *J. Exp. Psychol. Gen.* **144**, 951–966 (2015).