



## Training for Wisdom: The Distanced Self-Reflection Diary Method

*in press*

*Psychological Science*

### Author Line:

Igor Grossmann\*, Anna Dorfman, Harrison Oakes, Henri C. Santos, Kathleen D. Vohs, Abigail A. Scholer

### Author Affiliations:

I. Grossmann <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [igrossma@uwaterloo.ca](mailto:igrossma@uwaterloo.ca) [ORCID ID: 0000-0003-2681-3600](https://orcid.org/0000-0003-2681-3600)

Anna Dorfman <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [anna.dorfman@uwaterloo.ca](mailto:anna.dorfman@uwaterloo.ca)

Harrison Oakes <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [hoakes@uwaterloo.ca](mailto:hoakes@uwaterloo.ca)

Henri C. Santos <sup>2</sup>, Steele Institute for Health Innovation, Danville, PA, USA 17822, e-mail: [hsantos@geisinger.edu](mailto:hsantos@geisinger.edu)

Kathleen D. Vohs <sup>3</sup>, 321 19th Avenue South, Minneapolis, MN, USA 55455, e-mail: [kvohs@umn.edu](mailto:kvohs@umn.edu)

Abigail A. Scholer <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [ascholer@uwaterloo.ca](mailto:ascholer@uwaterloo.ca)

<sup>1</sup> University of Waterloo, Canada.

<sup>2</sup> Behavioral Insights Team, Steele Institute for Health Innovation, Geisinger Health System, PA, U.S.A.

<sup>3</sup> Carlson School of Management, University of Minnesota, U.S.A.

Corresponding Author: Igor Grossmann, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [igrossma@uwaterloo.ca](mailto:igrossma@uwaterloo.ca).

Keywords: wisdom, intervention, perspective-taking, intellectual humility, affective forecasting

## **Abstract**

How can people use wisdom when navigating social conflict? Two pre-registered longitudinal experiments (Study 1: Canadian adults /Study 2: American and Canadian adults; Total  $N=555$ ) tested whether encouraging distanced—i.e., third-person—self-reflection would help promote wisdom. Both experiments measured wise reasoning (i.e., intellectual humility, open-mindedness about how situations could unfold, consideration of and attempts to integrate diverse viewpoints) about challenging interpersonal events. In a month-long experiment (Study 1) participants used third- (vs. first-)person perspective in diary-reflections on each day's most significant experience. Compared to pre-intervention assessments, participants reflecting in the third-person showed a significant increase in wise reasoning about interpersonal challenges after the intervention. These effects were statistically accounted for by shifts in diary-based reflections toward a broader self-focus. A week-long experiment (Study 2) replicated the third-person self-reflection effect on wise reasoning (vs. first-person- and no-pronoun-controls). These findings suggest an efficient and evidence-based method for fostering wise reasoning.

### **Statement of Relevance**

Most people experience social conflicts in their lives. Working through social conflicts benefits from wisdom, which entails recognizing limits to one's knowledge, acknowledging different ways the conflict may play out, considering and balancing multiple viewpoints. Because people typically fail to reason wisely when facing social conflicts, we designed an intervention to help them. In the intervention, people reflected on major issues of a day from a distanced, third-person perspective. Two experiments tested the effectiveness of this intervention in promoting wisdom over a month (Study 1)/ a week (Study 2). Compared to controls (reflecting on social conflicts from a first-person perspective/without instructions), distanced self-reflection promoted wiser reasoning about personally challenging interactions after the intervention compared to before. This increase in wise reasoning occurred because distanced self-reflection broadened people's typically narrow self-focus. This research provides the first empirical evidence for the trainability of wisdom in daily life when working through challenging interactions.

## **Training for Wisdom: The Distanced Self-Reflection Diary Method**

Wisdom is universally valued (Dahlsgaard, Peterson, & Seligman, 2005), especially in difficult situations such as interpersonal challenges (Grossmann et al., 2020). It leads to thoughts, feelings, and behaviors that are both personally and socially beneficial (Grossmann et al., 2020; Sternberg, 2014). Being wise includes epistemic forms of reasoning—intellectual humility, sensitivity to possible change in social relations, openness to diverse perspectives, and the search for ways to integrate different viewpoints (Grossmann et al., 2020). In contrast to general cognitive abilities, these forms of reasoning predict subjective well-being (Grossmann et al., 2020) and prosocial behavior (Brienza, Kung, Santos, Bobocel, & Grossmann, 2018; Grossmann, Brienza, & Bobocel, 2017).

The importance of using wise reasoning seems straightforward, yet people often fail to exercise it in thinking about issues important to them (Grossmann & Kross, 2014). In particular, personal conflicts tend to elicit bias and low levels of wisdom (Grossmann & Kross, 2014; Staudinger & Baltes, 1996). Though emerging scholarship has started to identify ways to promote wise reasoning in the face of personal challenges, this work has been either cross-sectional or confined to testing short, artificial scenarios in the laboratory. A critical question has remained unaddressed: How can one train wise reasoning in daily life?

Though empirical scholarship has not yet evaluated the effectiveness of wisdom training in daily life, propositions of wisdom-enhancing training exist (Ferrari & Potworowski, 2008; Sternberg, Jarvin, & Reznitskaya, 2008). One dominant proposition has centered on the use of *distanced self-reflection*—i.e., referring to oneself in the third person. Also known as *illeism*, this an ancient form of writing and speaking dates as far back as 58 BC in writings by Julius Caesar (Raaflaub & Strassler, 2017). Though intentions behind referring to oneself in the third person

may vary, when applied to self-reflections it promotes psychological self-distancing (Kross et al., 2014; Trope & Liberman, 2010)—a process in which a narrow egocentric focus on the experience in the here-and-now is diminished and instead, a broader focus on the bigger picture is promoted (Kross & Ayduk, 2017; Orvell, Ayduk, Moser, Gelman, & Kross, 2019). In turn, this bigger-picture representation of the situation can bolster wise reasoning (Grossmann, Oakes, & Santos, 2019; Kross & Grossmann, 2012). Indeed, distanced self-reflection is common in diaries of spiritual leaders and has been linked to better emotion regulation (Kross et al., 2014) and relational well-being (Finkel, Slotter, Luchies, Walton, & Gross, 2013).

Past scholarship has also shown that distanced self-reflections can temporarily promote wise reasoning about hypothetical scenarios (Grossmann & Kross, 2014). Whether such short-term effects extend to situations without instructional prompts is unknown. Consequently, we instructed people in two longitudinal experiments to repeatedly practice distanced self-reflections across a range of situations they encountered daily. In this way, we aimed to promote a shift toward more *spontaneous self-distancing* (Ayduk & Kross, 2010)—i.e., a habitually implemented process that can be applied to novel situations. If the intervention successfully promotes an uptake in spontaneous self-distancing, then it should increase people's propensity to use wise reasoning when facing novel challenges.

We were particularly interested in testing the intervention in the context of adverse events, which is precisely where wisdom is needed the most. Adverse events are more likely to narrow one's cognitive focus (Garland et al., 2010), which inhibits one's ability to reason wisely (Grossmann & Kross, 2014).

## Study 1

A community sample participated in a month-long training intervention. At the end of each day, people reflected on the central event of the day. Participants randomly assigned to the *training condition* were instructed to use third-person language (e.g., “she”/ “her”) to promote distanced self-reflections on key daily events. Participants in the *control condition* were told to use first-person language (e.g., “I”/ “mine”), which characterizes people’s usual reflections on social issues (Kross & Ayduk, 2017). People used their assigned perspective to reconstruct and reflect on one daily social experience.

By repeatedly practicing distanced self-reflection on a wide range of meaningful daily experiences, we tested whether the intervention could effectively shift participants’ focus toward a broader view of the situation. We also tested whether a broader view would promote wiser reasoning about a novel interpersonal challenge that occurred after the intervention.

### Method

Unless noted, we pre-registered our predictions and analytical methods ([osf.io/crw2y](https://osf.io/crw2y)) and procedures ([osf.io/gb7js](https://osf.io/gb7js)). We pre-registered our predictions after starting data collection, but before quantifying open-ended reflections and performing statistical analyses.

### *Participants*

The study was reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE # 31889). We recruited local community members from a midsized city in southwestern Ontario and students from a local university to “participate in research on social experiences and personal goals in daily life” for the opportunity to earn up to CAD\$110. The present study was part of a large-scale investigation of goals, emotions, and reasoning. We aimed to recruit at least 50 participants per cell, similar to the laboratory studies

employing third-person perspective manipulations (Grossmann & Kross, 2014). Power analyses with G\*Power indicate that with an effect size calculated by averaging meta-analytic estimates for effect size in pre-registered psychological experiments employing between- and within-subject designs ( $r = .25$ ; Schäfer & Schwarz, 2019) and conventional  $\alpha$  and  $\beta$  errors (5% and 20%, respectively), we would need at least 128 participants for a mixed design with two between-subject groups (conditions) and two measurement points (pre-/post-intervention). Students recruited via the university's psychology subject pool signed up for the first in-lab session for course credit and then had to opt in for the month-long intervention and subsequent in-lab sessions for extra pay. Accordingly, we anticipated higher attrition in this portion of our sample. Additionally, we anticipated some participants not complying with the training, so we pro-actively doubled the target sample size for the pre-diary laboratory session to maximize the likelihood of attaining an appropriately powered final sample.

We invited 290 participants for the pre-diary laboratory session, of whom 149 participants ( $77_{\text{training}} / 72_{\text{control}}$ ;  $M_{\text{age}} = 22.28$ ,  $SD_{\text{age}} = 6.93$ ,  $Range_{\text{age}} = 17-62$ ; 77% female; 60% without a college degree;  $Mdn$  household income = \$50,000-\$75,000; 37% European-Canadian, 30% Asian/Asian-Canadian, 11% East Indian, 7% African/African-Canadian, 6% Middle Eastern, 9% other ethnicity) opted-in for the subsequent daily diary intervention. Over half of these participants came from the student subject pool sample (student pool  $n = 92$  / community  $n = 56$ ). Preliminary analyses indicate that sample type did not significantly qualify training effects on wise reasoning (see SOM-R).

### ***Procedure***

Participants first completed an online survey and a laboratory pre-diary session. They then completed a four-week daily diary intervention, after which they returned for a post-diary

laboratory session. Full project documentation, including a timeline summary and power analyses, are available in the SOM-R and on Open Science Framework (Methods:

<https://osf.io/4ksm7/>; Variables: <https://osf.io/v8eyt>).

### ***Daily diary intervention***

***Experimental manipulation.*** Prior to beginning the 4-week daily diary intervention, participants were randomly assigned to one of two self-reflection conditions: distanced (i.e., using third-person singular pronouns [s/he, her/him, they and theirs] and their name when referring to themselves) or first-person control (i.e., using first-person singular pronouns [I, me, my, mine]). Prior research has indicated that first-person singular pronouns use is the habitual baseline in self-reflections on daily social events (Kross & Ayduk, 2017). By instructing participants to use these pronouns in the control condition, we aimed to invoke the habitual self-reflection on daily events.

Participants were instructed to complete a daily diary for the duration of four weeks. A computer program guided them through the diary reporting. First, they saw a list of events that constituted a range of social experiences (i.e., conflict/argument with another person; annoying/irritating social situation; celebration with others; enjoyable social event; sad/bad news in a social setting), presented in a randomized order. The content of the survey was then based on the events participants indicated experiencing that day. If participants indicated they had experienced multiple events in one day, the program selected only one event, prioritizing an adverse over pleasurable event, and randomly selecting one of the same-valence events if multiple were reported. If participants indicated that they had experienced none of the social events listed, they did not participate in the training on that day. Instead, they reported on their



general emotions on the day and whether they had experienced other personal challenges (collected to ensure comparable length across diary days).

Participants reconstructed the social event using the Event Reconstruction Method (Schwarz, Kahneman, & Xu, 2009), providing the first name of the other person(s) involved in the event, contextual information (e.g., time of the day, location), and a detailed description of the event. They rated the intensity of the event (0 = *Not at all intense*; 6 = *Extremely intense*). On Days 1-6, participants next described their current thoughts about the event using their randomly assigned perspective. We included short writing prompts to ensure that participants understood how to write using a first- or third-person perspective. Participants in the first-person control [distanced self-reflection] condition were instructed to use the pronouns I/me [she/her, he/his, they/theirs, their name] as much as possible while describing “the event and their stream of thoughts.” We further provided an example. For the first-person control condition, we stated “For example, you might write “I think... I feel...” For the distanced self-reflection condition, we stated “For example, if your name were Chris, you might write “Chris thinks...; Chris feels...” (see Table 1 for exact wording).

Day 7 of each week was a free-writing day. On Day 7, participants were not instructed to adopt a particular self-reflective language, effectively serving as a process check by enabling us to measure the degree to which participants’ writing about a social event (randomly chosen from the events they reported in the prior week) corresponded to their assigned condition.

**Table 1***Manipulation Instructions in Studies 1 and 2*

Instruction	Condition		
	Distanced self-reflection	First-Person control	No-Instruction control
Event Recall	To facilitate your recall, please try to visualize this social event from a <b>third-person</b> perspective. Picture yourself in the event and ask yourself, “Why is <b>he/she</b> [referring to yourself] feeling or behaving this way?”	To facilitate your recall, please try to visualize this social event from a <b>first-person</b> perspective. Picture yourself in the event and ask yourself, “Why <b>am I</b> feeling or behaving this way?”	To facilitate your recall, please try to visualize this social event. Picture yourself in the event and ask yourself, why you are feeling or behaving the way you do.
Stream-of-Thoughts	Please describe your stream of thoughts about today's social event from a <b>third-person perspective</b> in detail below. To help you take the third-person perspective, use your name as much as possible as you describe the event and your stream of thoughts. For example, <b>if your name were Chris</b> , you might write, “ <b>Chris</b> thinks... <b>Chris</b> feels...”	Please describe your stream of thoughts about today's social event from a <b>first-person perspective</b> in detail below. To help you take the first-person perspective, use the pronouns <b>I/me</b> as much as possible as you describe the event and your stream of thoughts. For example, you might write, “ <b>I</b> think... <b>I</b> feel...”	Please describe your stream of thoughts about today's social event in detail below. To help you visualize the event, try to focus on your feelings and thoughts as much as possible as you describe the event and your stream of thoughts.

*Note.* Study 1 included the Distanced self-reflection and First-Person control conditions. Study 2 included all three conditions. Bold-faced segments were presented as bold-faced, to highlight the key aspects of the instructions.

***Pre-/Post-diary measures***

A week before and after the training intervention (i.e., 4-week daily diary), participants visited the laboratory. After providing informed consent, an experimenter accompanied participants to a computer, with further instructions provided via a display interface. First, participants read a standardized definition of a difficult social event and recalled either the most recent social conflict/argument or the most recent annoying/irritating interaction (see SOM-R for verbatim prompts). By providing standardized prompts, we restricted the scope of social conflicts to reduce heterogeneity in the types of social conflicts participants recalled across

laboratory sessions (see also analyses controlling for conflict type below). Participants recalled the experience via the Event Reconstruction Method (Schwarz, Kahneman, & Xu, 2009), providing the first name of the other person(s) involved in the event, contextual information (e.g., day of the week, location), and a detailed description of the event. Upon reconstructing the event, participants spent at least 30 seconds reflecting on the difficult social event. The screen did not advance until 30s had passed. Subsequently, participants wrote at least one paragraph describing the thoughts that came to mind as they reflected on the event. We coded these reflections to quantify wise reasoning pre- and post-intervention.

Participants then completed an exploratory questionnaire of reasoning processes, included to compare rater-coded spontaneous reflections to scale-based self-reports of reasoning (see SOM-R for nomological net analyses). On a subsequent computerized task, we obtained an estimate of participant's non-verbal fluid intelligence via a version of the Raven's Progressive Matrices (Raven, 1989). This estimate was part of our nomological net analyses and control covariates.

***Manipulation check.*** Following the pre-registered protocol, we examined whether participants in the distanced self-reflection (vs. control) condition used third-person more than first-person language in their stream-of-thought descriptions on Day 7 of each week (i.e., when no instructional prompts were provided). To this end, a coder unaware of the condition counted the number of first- and third-person singular pronouns and references to a participant's name in each description. We focused on the relative proportion of first- to third-person language usage to control for people's general degree of self-reference. We fit a linear mixed model with participants as a random factor and experimental condition as a between-subjects predictor. Results indicated that the manipulation was successful. Relative to a sum of first- and third

person references, third-person references were 10% more likely to appear in the free writing narratives of participants in the distanced self-reflection condition ( $M = .16$ , 95%  $CI [.12, .19]$ ) compared to the control condition ( $M = .06$ , 95%  $CI [.01, .10]$ ),  $B = 0.10$ ,  $SE = 0.03$ ,  $t(107.59) = 3.59$ ,  $p < .001$ .

***Quantifying wise reasoning in laboratory narratives.*** Two raters unaware of the hypothesis (and with condition masked) coded the written stream-of-thought narratives for wise reasoning. Past research has established a wise reasoning coding system with five themes (Grossmann, 2017): (a) intellectual humility, (b) recognition of world in flux/change, (c) acknowledgement of others' perspectives, (d) search for a compromise, and (e) consideration of conflict resolution. The face validity of these themes has been established in the work on the *common wisdom model* in empirical sciences (Grossmann et al., 2020), showcasing thematic convergence across working definitions of wisdom among moral psychologists and adult developmentalists (also see Grossmann et al., 2010; Study 3).

Following our pre-registered protocol, the final coding system involved the following five levels: 1 = *nothing about the theme mentioned*; 2 = *one instance of the theme is mentioned, but is not described in depth*; 3 = *several instances of the theme are mentioned, but none are described in depth*; 4 = *one or more instances of the theme are mentioned, and one of them is described in depth*; 5 = *several instances of the theme are mentioned, and two or more of them are described in depth*. Inter-rater reliability between the coders for each theme was very good (Kendall's  $W$ s  $> 0.84$ ), with disagreements resolved via discussion between coders. Levels 3 and 5 were rare (each  $< 1.3\%$  across all themes). Test-retest reliability of the coded wise reasoning across laboratory sessions was medium to high,  $r = .48$  (23% between-person variance), and

comparable to the reliability of state-level measures of other constructs such as extraversion or conscientiousness (see Fleeson & Gallagher, 2009).

Additional information on the coding system can be found in the SOM. It reports the coding manual, rationale for the 5-level coding system, and its discriminant, convergent, and predictive validity through associations with measures of cognitive abilities, alternate operationalizations of wise reasoning, and predictive validity measures of emotional balance and well-being. Also reported are post-hoc multiverse analyses using different coding systems, which yielded similar results to those reported below.

***Broad vs. narrow self-focus.*** We hypothesized that the distanced self-talk in the diary would promote a shift from a narrower self-focus to a broader, psychologically distant self-focus (Kross & Ayduk, 2017). We examined whether the experimental training promoted changes in self-focus between participants' pre- and post-intervention self-reflection on social conflicts. We subsequently tested whether changes in self-focus accounted for changes in wise reasoning.

No participant referred to themselves in third person during the laboratory sessions. In hindsight, this observation is not surprising—distanced self-reflections after completing a standard Event Reconstruction Method (which explicitly directs people to reconstruct an experience from a first-person perspective) would have suggested that participants did not follow our instructions. Therefore, we used a measure of broad vs. narrow self-focus from prior research (Grossmann & Kross, 2010; Pennebaker, Mehl, & Niederhoffer, 2003) encompassing the proportion of interdependent references (1<sup>st</sup>-person plural pronouns; “us”/”our”) relative to narrow self-focused references (1<sup>st</sup>-person singular pronoun; “me”/”mine”), controlling for total number of pronouns.

### ***Completion rates***

On average, participants completed nine training sessions ( $M = 8.74$ ,  $Mdn = 8$ ,  $SD = 4.65$ ,  $Range = 2-19$ ). Based on initial pilot data estimates of the frequency of each social event included in our daily diary, this estimate appears typical of the number of the targeted social events people report over the course of a month. The total number of completed diary days, including no-training days (i.e., when participants reported experiencing none of the social events in question) but not free-writing days, was higher ( $M = 16.35$ ,  $Mdn = 18$ ,  $SD = 5.54$ ,  $Range = 2-24$ ).

On average, participants completed 71% of all daily diaries. The retention rate between the first diary day and the post-intervention laboratory session was 81% (57<sub>training</sub>/63<sub>control</sub> participants in the final session), which is higher than typical retention rates in clinical studies (Geraghty, Wood, & Hyland, 2010) and longitudinal surveys (Roberts, Walton, & Viechtbauer, 2006). We provide further attrition-bias-probing analyses in the SOM.

### ***Exclusions***

Following the pre-registered protocol (osf.io/egcn3), we excluded 15 participants (8<sub>training</sub> / 7<sub>control</sub>) who reported fewer than two social events across four diary weeks. The rationale was that a single self-reflection in a diary would not provide a sufficient basis for notable training differences.

### ***Analytical procedure***

Following the pre-registered analytic plan, we used a full information maximum-likelihood estimator to fit mixed models and parsimoniously account for missing data with minimal information loss (Enders & Bandalos, 2001). This approach allows to control for attrition between different measurement points. A mixed model framework also allowed us to

enhance power and generalizability, with responses from respective themes of wise reasoning nested within participants.

Following the pre-registered analytic plan, we fit a linear mixed effects model with time (pre- vs. post-intervention) as a Level 1 predictor, experimental condition as a Level 2 predictor, and wise reasoning scores nested in participants and coders. Because the dependent variable was right-skewed (skewness = 2.66), we transformed the dependent variable to Normal Scores with the same mean and *SD* via the *QuantPsyc* package (Fletcher, 2012). Results were similar when using (a) a generalized linear mixed model with gamma distribution as another way to account for skewness in the data; (b) use of Bayesian multilevel model with scores as an ordinal variable; and (c) when running a multilevel logistic model with coded responses as a binomial variable (presence/no presence of a theme; SOM). We used Nakagawa and Schielzeth (2013) procedure to approximate pseudo- $R^2$  for each model, and used model comparison approach to estimate partial effect due to each predictor in the model. We followed Funder and Ozer's (2019) guidelines, converting all pseudo- $R^2$  estimates into  $r$  as a common metric for effect size in psychological research.

## **Results**

### ***Training effects for wise reasoning***

Our key hypothesis was that participants in the distanced self-reflection condition would show more wise reasoning when reflecting on interpersonal challenges post- (vs. pre-) intervention than participants in the control condition. In line with our prediction, we observed a Time X Condition interaction,  $t(2638.02) = 2.70, p = .007, r = .084$  (see Figure 1). Consistent with random assignment, participants in both conditions did not significantly differ in wise reasoning before the intervention,  $t(147.03) = 1.12, p = .264, r = .049$ . Focusing on post-

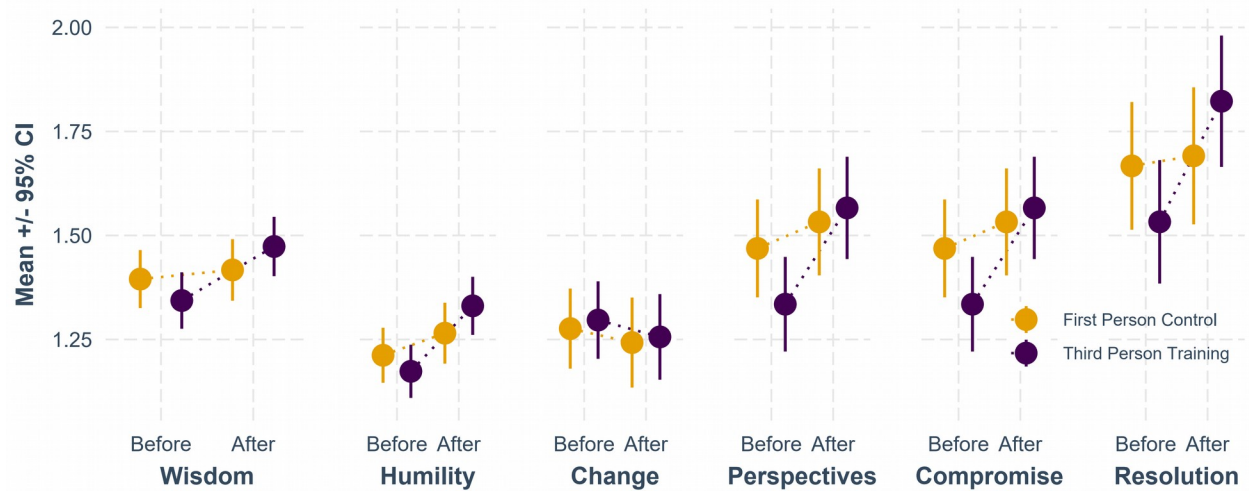
intervention session, we observed a non-significant trend of participants in the distanced self-reflection condition reporting greater wise reasoning than participants in the control condition,  $t(118.15) = 1.00, p = .320, r = .052$ . Turning to the pre-registered tests, we observed that participants in the distanced self-reflection condition showed more wise reasoning after (vs. before) the intervention,  $B = 0.13, SE = 0.03, t(1,364.15) = 4.78, p < .001, r = .117$ , whereas wise reasoning in the control condition did not change as a function of time,  $B = 0.02, SE = 0.03, t(1269.02) = 0.73, p = .464, r = .019$ .

To account for possible variance in type of interpersonal challenge pre- and post-intervention, we quantified conflicts by target (other person involved: same vs. different), place (e.g., home, work), and type of social conflict (e.g., intimate relationship, family, work; see SOM-R). When performing separate mixed effect analyses with these covariates, we also observed a Time X Condition interaction,  $t(2,652.98) = 2.80, p = .005, r = .055$ . Participants in the distanced self-reflection condition continued to show more wise reasoning after (vs. before) the intervention,  $B = 0.14, SE = 0.03, t(1,339.04) = 4.69, p < .0001, r = .103$ , whereas wise reasoning in the control condition still did not change across timepoints,  $B = 0.03, SE = 0.03, t(1,269.75) = 0.89, p = .375, r = .033$ . The interaction effect also held when controlling for the following potential confounds: number of adverse experiences during the diary-based training, contextual differences between social conflicts people reasoned about (i.e., time of day event occurred, length of conflict), and narrative word count,  $t(2,468.99) = 3.19, p = .001, r = .063$ . In a separate analysis, the interaction effect was also robust when controlling for age, gender, ethnicity, and fluid intelligence (assessed pre- and post-intervention),  $t(2,356.63) = 3.44, p < .001, r = .066$ .



**Figure 1**

*Effects of Distanced Self-Reflection Training (vs. Control) on Wise Reasoning in Study 1*



*Note.* Panels represent average total wisdom scores (left panel) and estimates for each theme. Mean estimates with 95% confidence intervals.

**Table 2**

*Estimates of Training on Growth for each Wise Reasoning Theme in Study 1*

Theme	Condition	<i>B</i>	<i>SE</i>	<i>t</i>	<i>df</i>	<i>p</i>	
<i>Intellectual Humility</i>	Third-person training	<b>0.10</b>	<b>0.03</b>	<b>3.21</b>	<b>2542</b>	<b>.001</b>	.2
	First-person control	0.03	0.03	1.12	2546	.265	.0
<i>Recognition of Change</i>	Third-person training	-0.02	0.03	0.73	2543	.465	.0
	First-person control	-0.01	0.03	0.40	2546	.691	.0
<i>Consideration of Others' Perspectives</i>	Third-person training	<b>0.11</b>	<b>0.03</b>	<b>3.70</b>	<b>2543</b>	<b>&lt; .001</b>	.1
	First-person control	0.03	0.03	0.85	2546	.394	.0
<i>Search for Compromise</i>	Third-person training	0.02	0.03	0.79	2543	.432	.0
	First-person control	-0.01	0.03	0.06	2546	.954	.0
<i>Search for Conflict Resolution</i>	Third-person training	<b>0.12</b>	<b>0.03</b>	<b>3.86</b>	<b>2542</b>	<b>&lt; .001</b>	.1
	First-person control	0.01	0.03	0.26	2546	.795	.0

*Notes.* Effects from simple effect of time (post vs. pre-intervention) by condition with Kenward-Roger method for estimating degrees of freedom for estimates from linear mixed models. Boldface indicates  $p < .05$ .  $ns = p > .265$ . We used false-discovery rate approach (Benjamini & Hochberg, 1995) to control for multiple testing in these post-hoc simple effect analyses.

### ***Theme-specific analyses of training-based growth in wise reasoning***

Figure 1 and Table 2 show significant training-contingent growth in three of the five themes of wise reasoning. Namely, intellectual humility, consideration of others' perspectives, and search for conflict resolution showed significant change after compared to before the intervention.

### ***Training effects for broader vs. narrow self-focus***

Participants in the distanced self-reflection condition demonstrated a significant increase in the proportion of broad vs. narrow self-references from pre- to post-intervention,  $b = -0.05$ ,  $SE = 0.02$ ,  $t(135) = 2.07$ ,  $p = .040$ ,  $r = .158$ . There was no difference from pre- to post-intervention observed in the control condition,  $B = 0.004$ ,  $SE = 0.02$ ,  $t(138) = 0.17$ ,  $p = .864$ . Next, we explored whether the condition-based growth in wise reasoning was statistically mediated by change in self-focus. To this end, we focused on the intervention group to test whether change in wise reasoning before and after the intervention statistically relates to change in self-focus. Adding broad/narrow self-focus as a covariate into the model with wise reasoning as a dependent variable and time point as a predictor indicated a significant effect of self-focus,  $B = 0.41$ ,  $SE = 0.14$ ,  $t(df = 859.73) = 3.01$ ,  $p = .003$ ,  $r = .098$ , as well as a significant effect of time (after vs. before),  $B = 0.11$ ,  $SE = 0.03$ ,  $t(df = 1373.17) = 3.91$ ,  $p < .001$ ,  $r = .086$ . Indirect effects analyses (Tingley, Yamamoto, Keele, & Imai, 2014; 5000 simulations) with self-focus as a mediator of the training effect on growth in wise reasoning revealed a significant indirect effect,  $B = 0.02$ , 90% CI [0.01, 0.03],  $p = .004$ , with self-focus accounting for 13.77% of the total growth effect in wise reasoning. This partial mediation effect suggests that broader self-focus plays a role in the training-based growth in wise reasoning, though it does not fully explain it.<sup>1</sup>

---

<sup>1</sup> Analogous supplementary analyses probing indirect effects of the training for each theme of wise reasoning revealed that the indirect effect of training on change wise reasoning was driven by the moral aspiration component: Analysis for search for conflict resolution theme suggested a partial mediation, with broader self-focus accounting 12.5% of the total effect of change after the intervention compared to before the intervention (see SOM-R).

## Study 2

In Study 2, we tested the replicability of promoting wise reasoning about interpersonal challenges via distanced self-reflections. We designed a week-long training intervention, used a larger sample, and included an additional no-instruction control condition that was assumed to operate similarly to the first-person condition. Similar to Study 1, people reconstructed and reflected on the central event of each of the seven days, following the instructions of their randomly assigned condition. In addition to the third- and first-person pronoun instructions from Study 1, we instructed a third group of participants to reflect on the event but did not provide explicit instructions on which pronouns to use. We examined wise reasoning in participants' reflections on social challenges pre- and post-intervention, predicting that distanced self-reflection would provide unique benefits for growth in wise reasoning as compared to first-person and no-instruction control conditions.

### Method

#### *Participants*

The pre-registered study ([osf.io/8pg63](https://osf.io/8pg63)) was reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE # 30862). We recruited American and Canadian Amazon Mechanical Turk (MTurk) workers to “examine how people reason about social events in their daily lives” for the opportunity to earn up to US\$34. We followed the power estimates outlined in Study 1 ( $N = 290$  across two conditions), aiming to recruit 150 participants for each of the three conditions. Of the 454 recruited participants for the initial survey, 11 participants decided not to partake in any follow-up surveys, thus disqualifying for the post-intervention survey. Of the 443 participants who qualified for the post-intervention session, 412 completed the final survey (93% retention rate). We excluded participants whose

age and gender did not match on pre- and post-intervention surveys (for suspicion of being different people filling out surveys;  $n = 15$ ) and participants who did not provide meaningful responses to open-ended questions. The final sample included 406 participants for the pre-intervention survey (134<sub>training</sub>/ 135<sub>first-person control</sub>/ 137<sub>no-instruction control</sub>;  $M_{\text{age}} = 35.04$ ,  $SD_{\text{age}} = 10.57$ ,  $Range_{\text{age}} = 18-70$ ; 45.02% female; 49% without a 4-year college degree;  $Mdn$  household income = \$35,001-\$50,000; 72% White, 7% Asian, 6% Hispanic/Latinx, 9% African/African-American, 4% mixed, 2% other ethnicity), and 382 participants (127<sub>training</sub>/ 128<sub>first-person control</sub>/ 127<sub>no-instruction control</sub>) for the post-intervention survey. Thus, the attrition was minimal and comparable across conditions. On average, participants completed 6 of the 7 daily diaries.

### ***Pre-/Post-intervention measures***

Three days before and one day after the intervention (i.e., one-week daily diary), participants completed a survey online. After providing informed consent, participants read a definition of a difficult social event (either a social conflict or irritating interaction) as in Study 1. They then recalled and reconstructed such an event, guided by the Event Reconstruction Method (Schwarz et al., 2009), which included writing a detailed description of the event. After reconstructing the event, participants spent at least 30 seconds reflecting on the difficult social event, with the screen not advancing before 30s had passed. Subsequently, participants wrote at least one paragraph describing the thoughts that came to mind as they reflected on the event. Finally, participants completed additional questionnaires about their post-reflection appraisal of the situation (see SOM-R) and reported their demographics.

***Quantifying wise reasoning in narratives.*** Two raters unaware of the hypothesis and the condition coded the written descriptions and stream-of-thought narratives, quantifying the degree of wise reasoning on the five previously established dimensions of wise reasoning (see Study 1

method for more detail; Grossmann, 2017). Inter-rater reliability for each dimension was very good (Kendall's  $W$ s > 0.79), with disagreements resolved via discussion between coders, in consultation with the first author.

***Experimental manipulation.*** Prior to beginning the week-long diary intervention, participants were randomly assigned to one of three self-reflection conditions: distanced (i.e., using 3rd-person pronouns like s/he, her/him, they/them, and using their name to refer to themselves), first-person control (i.e., using 1st-person pronouns like I, me, my, and mine), or no-instruction control (i.e., no specific instructions about pronoun usage).

The daily diary surveys became available to participants on each afternoon of a respective day and were active for a 19hr period. The daily diary method was identical to Study 1. We included short writing prompts to ensure that participants understood how to write using a first- or third-person perspective. Participants in the first- [third-] person condition were instructed to use the pronouns I/me [she/hers, he/his, they/theirs, their name] as much as possible when describing “the event and their stream of thoughts.” Participants in the no-instruction control condition did not receive pronoun-usage instructions. The remaining instructions for this condition were identical to the two other conditions (Table 1). The pronoun manipulation was successful, showing carry-over effects to the post-intervention survey, which did not include instructional prompts (Figure S7).

### ***Analytical procedure***

Following Study 1, we fit a general linear model with the dependent variable transformed via the *Normalize* function in *QuantPsyc* (Fletcher, 2012) to account for violation of the normality assumption (skewness = 1.65). Our model included time (pre- vs. post-intervention) as a within-person Level 1 predictor, and self-reflection condition as a between-person Level 2

predictor, with wise reasoning scores nested in participants and coders. As in Study 1, we used false-discovery rate approach (Benjamini & Hochberg, 1995) to control for multiple testing in these post-hoc simple effect analyses. We used Nakagawa and Schielzeth (2013) procedure to approximate pseudo- $R^2$  for each model, to compare partial effect due to each predictor in the model and when contrasting magnitude of change in different conditions. Subsequently converting  $R^2$  estimates into  $r$  as a common metric for effect size (Funder & Ozer, 2019).

## Results

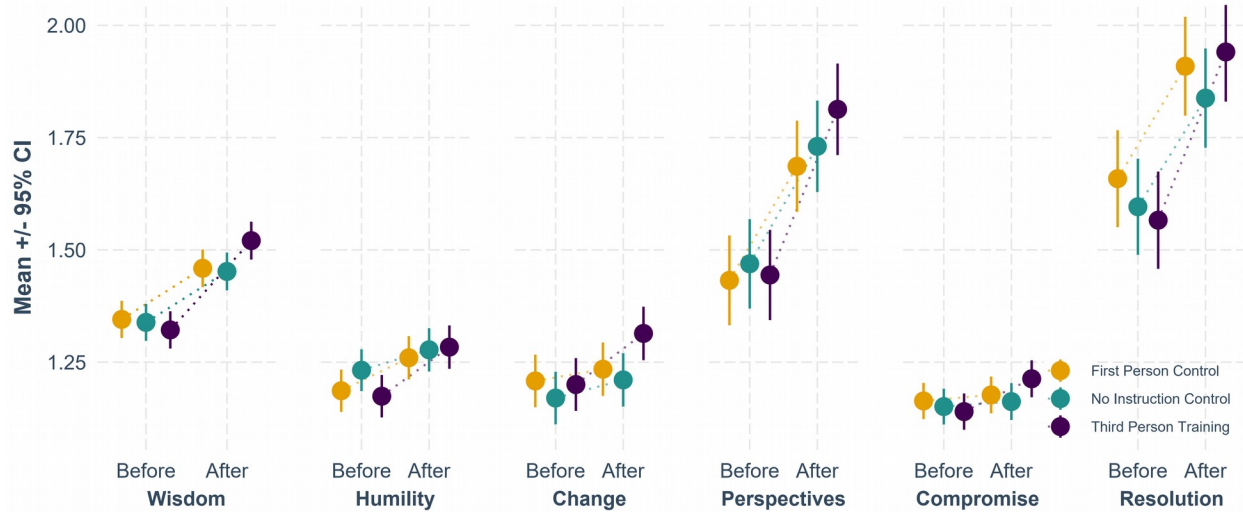
The results indicated a main effect of diary-based reflection exercise,  $B = 0.14$ ,  $SE = 0.01$ ,  $t(df = 7,647.61) = 12.50$ ,  $p < .001$ ,  $r = .141$ . In line with predictions, this effect was qualified by a Time X Condition interaction,  $Wald \chi^2(2, 7871) = 12.52$ ,  $p < .002$ ,  $r = .045$  (see Figure 2). Consistent with random assignment, conditions did not significantly differ from each other before the intervention,  $ts < 0.84$ ,  $p = .679$ . After the intervention, participants in the distant self-reflection condition showed significantly more wise reasoning than participants in the first-person condition,  $t(df = 718) = 2.17$ ,  $p = .045$ ,  $r = .080$ , and no-instruction control conditions,  $t(df = 727) = 2.42$ ,  $p = .045$ ,  $r = .080$ , whereas these two control conditions were not significantly different from each other,  $t(df = 726) = 0.25$ ,  $p = .805$ .

The key hypothesis was that training would result in wiser reasoning than habitual reflections (first-person and no-instruction controls). Examining this pre-registered hypothesis about condition-dependent change in wise reasoning revealed that participants in the distanced self-reflection condition showed more wise reasoning after (vs. before) the intervention,  $B = 0.31$ ,  $SE = 0.03$ ,  $t(df = 2,522.04) = 10.71$ ,  $p < .001$ ,  $r = .186$ , compared to participants in the first-person and no-instruction control conditions: first-person:  $B = 0.16$ ,  $SE = 0.03$ ,  $t(df = 2,536.02) = 5.93$ ,  $p < .001$ ,  $r = .102$ ; no-instruction:  $B = 0.13$ ,  $SE = 0.02$ ,  $t(df = 2,557.52) = 5.28$ ,

$p < .001$ ,  $r = .089$ . In separate models with covariates, the Time X Condition interaction effect was robust when controlling for age, gender, and household income,  $\chi^2(2, 7841) = 12.85$ ,  $p = .002$ ,  $r = .045$ , and when controlling for characteristics of recalled events at each time point (time, duration, and recurrence of the event),  $\chi^2(2, 7601) = 4.02$ ,  $p < .001$ ,  $r = .037$ .

**Figure 2**

Effects of Distanced Self-Reflection Training (vs. Controls) on Wise Reasoning in Study 2



*Note.* Panels represent total wisdom score (left panel) and estimates for each theme. Mean estimates with 95% confidence intervals.

Finally, we examined results for each of the five themes of wise reasoning. As Figure 2 and Table 3 indicate, participants in the distanced self-reflection condition showed significant change after the intervention in each of the five themes of wise reasoning. Similar to Study 1, the training-driven growth in wise reasoning was particularly pronounced for intellectual humility and the social cognitive themes of wise reasoning: consideration of others' perspectives and search for conflict resolution. To evaluate condition-specific growth in each theme of wise reasoning, we can compare respective effect sizes of change in the experimental and control conditions (Table 3). Difference in effect size estimate  $r$  varied between .114 and .170 ( $M$

= .144), suggesting a small-medium effect size for the intervention effect (Funder & Ozer, 2019) on change in wise reasoning.

**Table 3**

*Estimates of Training on Growth for each Wise Reasoning Theme in Study 2*

<i>Theme</i>	<i>Condition</i>	<i>B</i>	<i>SE</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>r</i>
Intellectual Humility	Third-person training	0.06	0.01	3.97	1202	< .001	.154
	First-person control	0.04	0.01	2.6	1202	.008	.105
	No-instruction control	0.02	0.01	1.65	1213	.100	.062
Recognition of Change	Third-person training	0.01	0.01	4.38	1203	< .001	.150
	First-person control	0.01	0.01	1.01	1203	.312	.041
	No-instruction control	0.02	0.01	1.56	1215	.118	.071
Consideration of Others' Perspectives	Third-person training	0.18	0.02	7.96	1198	< .001	.266
	First-person control	0.13	0.02	5.51	1197	< .001	.211
	No-instruction control	0.13	0.02	5.66	1207	< .001	.210
Search for Compromise	Third-person training	0.04	0.01	3.59	1190	< .001	.120
	First-person control	0.01	0.01	0.66	1191	.509	.022
	No-instruction control	0.01	0.01	0.55	1199	.585	.021
Search for Conflict Resolution	Third-person training	0.19	0.03	6.61	1193	< .001	.233
	First-person control	0.13	0.03	4.43	1194	< .001	.151
	No-instruction control	0.12	0.03	4.27	1204	< .001	.158

*Notes.* Effects from simple effect of time (post vs. pre-intervention) by condition with Kenward-Roger method for estimating degrees of freedom for estimates from linear mixed models.

A comparison of Figures 1 and 2 reveals a few points of divergence between Study 1 and Study 2. Whereas Study 1 reported no main effect of diary writing for changes in wise reasoning, this effect was significant in Study 2. We consider possible explanations for this point of divergence in the General Discussion.



## General Discussion

Two interventions demonstrated the effectiveness of distanced self-reflection for promoting wiser reasoning about interpersonal challenges, relative to control conditions. The effect of using distanced self-reflection on wise reasoning was in part statistically accounted for by a corresponding broadening of people's habitually narrow self-focus into a more expansive sense of self (Aron & Aron, 1997). Distanced self-reflection effects were particularly pronounced for intellectual humility and social-cognitive aspects of wise reasoning (i.e., acknowledgement of others' perspectives, search for conflict resolution). This project provides the first evidence that wisdom-related cognitive processes can be fostered in daily life. The results suggest that distanced self-reflections in daily diaries may cultivate wiser reasoning about challenging social interactions by promoting spontaneous self-distancing (Ayduk & Kross, 2010).

Additional results in Study 1 (see Supplemental Material) indicate that distanced self-reflection and growth in wise reasoning can foster greater breadth and evenness in people's representation of negative emotions (SOM-R). Further supplementary results from the Study 1 intervention show enhanced positive (rather than negative) feelings toward close others in conflict situations, as evidenced by a one-month follow-up survey on social conflicts experienced by participants after the intervention. These results dovetail with emerging conclusions that wise reasoning provides prospective benefits for interpersonal feelings (Peetz & Grossmann, 2020) and well-being (Santos & Grossmann, 2020)<sup>2</sup>.

The present work contributes to the literature on training cognition (Larrick, Morgan, & Nisbett, 1990; Perkins & Grotzer, 1997) and attempts to reduce cognitive biases (Larrick, 2004).

---

<sup>2</sup> Furthermore, Study 1 suggests that distanced self-reflection and growth in wise reasoning promote greater alignment of forecasted and experienced feelings toward a close person when encountering disagreements and social conflicts.

Prior cognitive training efforts have largely focused on working memory or formal reasoning, which differ from wise reasoning in several aspects. The former is abstract and decontextualized, whereas the latter is embedded in the social pragmatics and often involves personally relevant matters (Grossmann et al., 2020). Moreover, past work has highlighted the difficulties in extending domain-general training effects to novel situations (Kassai, Futo, Demetrovics, & Takacs, 2019; Sala & Gobet, 2019).

An additional contribution of this work is a demonstration of how laboratory insights concerning the benefits of distanced self-reflection for self-regulatory (Kross et al., 2014) and wisdom-related processes (Grossmann & Kross, 2014) can be extended to training-based interventions in the field. The training used in the current experiments suggests the usefulness of situating repeated training sessions in the ecological context of daily real-world experiences. Because people trained across a range of interpersonal challenges over the course of one (Study 2) or four (Study 1) weeks, this intervention may have facilitated the development of a general tendency (Fleeson & Jayawickreme, 2015) to self-distance in the face of social conflicts. Through repeated training across diverse situations, this intervention increases the likelihood the target characteristic will be applied to novel situations. The present approach also makes use of meaningful firsthand experiences people encounter in their lives, suggesting greater generalizability and durability compared to laboratory training on hypothetical scenarios.

There may be practical implications of the current results. The present intervention provides proof-of-concept for the viability of training cognitive techniques such as spontaneous self-distancing. Much prior research indicates that in the heat of an argument or reflection on traumatic social events, people tend to spontaneously immerse themselves in the experience, narrowing their focus on the here-and-now (Grossmann & Kross, 2010; Kross & Ayduk, 2017;

McIsaac & Eich, 2004; Wegner & Giuliano, 1980). Such narrow self-focus can be adaptive in the short-term, allowing people to redirect resources to immediate concerns and actions. However, narrow self-focus and the resulting egocentrism can prevent one from considering the bigger picture, beyond one's immediate emotional reactions and actions in a conflict situation (Chambers & De Dreu, 2014). Identifying effective ways to combat maladaptive egocentric tendencies is central both to research on wisdom and clinical practice (e.g., Bernstein et al., 2015).

Several caveats are in order before concluding. First, our work included participants from English-speaking parts of North America. Given cultural differences in wise reasoning (Grossmann et al., 2012) and self-focus (Cohen, Hoshino-Browne, & Leung, 2007; Grossmann & Kross, 2010), future research ought to test the effects' generalizability in other languages and cultural contexts.

Second, the observed effects of the training were small-to-moderate in size ( $.118 \leq r \leq .267$ ), which is consistent with typical effect sizes in psychological research (Funder & Ozer, 2019). The lower part of the range is comparable to the well-established effect of attributing failure to bad luck ( $r = .10$ ) whereas the higher part is comparable to effect of men weighting more than women ( $r = .26$ ; see Funder & Ozer, 2019, for a review of effect size benchmarks in psychological science). While the effect sizes are in line with other psychological findings, distanced self-reflection may not be uniformly effective when people face challenging interpersonal situations in their lives. Moreover, confidence in the findings' robustness awaits independent replication.

Third, although there were consistent effects across both studies, there also was some divergence, suggesting possible ways to isolate conditions facilitating training effects. Whereas

Study 1's post-intervention session took place in the laboratory one week after completing the training, the equivalent session in Study 2 was administered online, one day after the diary training. This difference may explain why diary training in Study 2 resulted in a main effect of diary writing, but not Study 1. Web-based testing also resulted in shorter reflection essays than laboratory-based testing. Essay length, together with the shorter duration of the intervention in Study 2 (one week vs. four weeks in Study 1) may have contributed to further differences between the studies. Repeated distanced self-reflection may be more effective when administered over longer time periods than one week (Dorfman, Oakes, Santos, & Grossmann, 2019).

Fourth, because writing a diary can provide socio-emotional benefits (Pennebaker, 1997) and facilitates self-distancing in its own (Grossmann, Gerlach, & Denissen, 2016; Park, Ayduk, & Kross, 2016), we did not include a no-diary control condition. To further unpack the mechanisms through which distance and self-reflection jointly facilitate wise reasoning, future work may consider including no-diary condition.

Fifth, the training-based intervention used here focused on interpersonal social challenges, raising the question whether such training can generalize to wise reasoning during intergroup conflicts, political challenges, or challenges of a non-interpersonal nature (e.g., financial decision making). Last, it is worth pointing out that not all types of third-person self-reflection may be similarly effective. Whereas the present studies focused on distanced self-reflection via third-person language in diaries to promote broader self-focus (Kross & Ayduk, 2017), third-person language may also be used strategically in communication, with the goal of advantageous self-presentation or self-promotion. Under such public circumstances, it is less likely to bring wisdom-related benefits due to the more self-focused nature of strategic use of

third-person language. We demonstrate this point in a supplementary pre-registered experiment (see SOM-R).

## Conclusion

Wisdom concerns a balanced, open approach to reasoning that seeks reconciliation of disparate viewpoints (Grossmann et al., 2020). It predicts a host of desirable outcomes, from harmonious interpersonal relationships (Brienza et al., 2018; Grossmann et al., 2017) to personal well-being (Santos & Grossmann, 2020). The current work showed that wisdom is not the purview of just a few fortunate individuals. Utilizing the ancient practice of distanced self-reflection, we demonstrated that referring to oneself in the third person during repeated reflections on daily events affords a more expansive self-focus, in turn facilitating wiser reasoning. The results from two field experiments suggest that training distanced self-reflection can bolster wise reasoning in everyday life.

**Author contributions:** I.G. provided study concept for Study 1 and Supplementary Study 3 and I.G., A. D. and K.V. provided study concept for Study 2. I.G., H.O., and A.S. designed Study 1, I.G. and A.D. designed Study 2, and I.G. designed Supplementary Study 3. I.G. and A.D. pre-registered studies. I.G. and H.S. collected data for Study 1. I.G. and A.D. collected data for Study 2, and I.G. collected data for Supplementary Study 3. I.G. and A.D. carried out data analysis for Study 1, I.G. carried out data analyses for Studies 2-3. I.G. drafted the initial version of the manuscript. All authors contributed to revision of the manuscript and approved the final manuscript for submission.

**Acknowledgments:** Takuya Shibayuma, Nadine Bolineu, Mane Kara-Yakoubian, Oliver Twardus, and Tianrong Sun provided valuable assistance qualitative coding, whereas Sonia Vintan and Konstantyn Sharpinsky provided assistance with data integrity cross-validation. The present research was funded by Social Sciences and Humanities Research Council of Canada Insight Grant 435-2014-0685 (to I.G.), Early Researcher Award ER16-12-169 from the Ontario Ministry of Research and Innovation (to I.G.), Templeton Science of Prospection Award (to I.G. and K.V.) and Templeton Pathways to Character Award (to I.G.).

## References

- Aron, A., & Aron, E. N. (1997). Self-expansion motivation and including the other in self. In S. Duck (Ed.), *Handbook of personal relationships: Theory, research, and interventions* (Vol.

- 2nd, pp. 251–270). Chichester: Wiley.
- Ayduk, Ö., & Kross, E. (2010). From a distance: Implications of spontaneous self-distancing for adaptive self-reflection. *Journal of Personality and Social Psychology*, 98(5), 809–829.  
<https://doi.org/10.1037/a0019205>
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, 57(1), 289–300. <https://doi.org/10.1111/j.2517-6161.1995.tb02031.x>
- Bernstein, A., Hadash, Y., Lichtash, Y., Tanay, G., Shepherd, K., & Fresco, D. M. (2015). Decentering and Related Constructs. *Perspectives on Psychological Science*, 10(5), 599–617. <https://doi.org/10.1177/1745691615594577>
- Brienza, J. P., Kung, F. Y. H., Santos, H. C., Bobocel, D. R. R., & Grossmann, I. (2018). Wisdom, bias, and balance: Toward a process-sensitive measurement of wisdom-related cognition. *Journal of Personality and Social Psychology*, 115(6), 1093–1126.  
<https://doi.org/10.1037/pspp0000171>
- Chambers, J. R., & De Dreu, C. K. W. (2014). Egocentrism drives misunderstanding in conflict and negotiation. *Journal of Experimental Social Psychology*, 51, 15–26.  
<https://doi.org/10.1016/j.jesp.2013.11.001>
- Cohen, D., Hoshino-Browne, E., & Leung, A. K. y. (2007). Culture and the structure of personal experience: Insider and outsider phenomenologies of the self and social world. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 39, pp. 1–67).  
[https://doi.org/10.1016/S0065-2601\(06\)39001-6](https://doi.org/10.1016/S0065-2601(06)39001-6)
- Dahlsgaard, K., Peterson, C., & Seligman, M. E. P. (2005). Shared Virtue: The Convergence of Valued Human Strengths Across Culture and History. *Review of General Psychology*, 9(3),

- 203–213. <https://doi.org/10.1037/1089-2680.9.3.203>
- Dorfman, A., Oakes, H., Santos, H. C., & Grossmann, I. (2019). Self-distancing promotes positive emotional change after adversity: Evidence from a micro-longitudinal field experiment. *Journal of Personality*, jopy.12534. <https://doi.org/10.1111/jopy.12534>
- Enders, C., & Bandalos, D. (2001). The Relative Performance of Full Information Maximum Likelihood Estimation for Missing Data in Structural Equation Models. *Structural Equation Modeling: A Multidisciplinary Journal*, 8(3), 430–457. [https://doi.org/10.1207/S15328007SEM0803\\_5](https://doi.org/10.1207/S15328007SEM0803_5)
- Ferrari, M., & Potworowski, G. (2008). *Teaching for Wisdom*. [https://doi.org/10.1007/978-1-4020-6532-3\\_4](https://doi.org/10.1007/978-1-4020-6532-3_4)
- Finkel, E. J., Slotter, E. B., Luchies, L. B., Walton, G. M., & Gross, J. J. (2013). A Brief Intervention to Promote Conflict Reappraisal Preserves Marital Quality Over Time. *Psychological Science*, 24(8), 1595–1601. <https://doi.org/10.1177/0956797612474938>
- Fleeson, W., & Gallagher, P. (2009). The implications of Big Five standing for the distribution of trait manifestation in behavior: Fifteen experience-sampling studies and a meta-analysis. *Journal of Personality and Social Psychology*, 97(6), 1097–1114. <https://doi.org/10.1037/a0016786>
- Fleeson, W., & Jayawickreme, E. (2015). Whole trait theory. *Journal of Research in Personality*, 56, 82–92. <https://doi.org/10.1016/j.jrp.2014.10.009>
- Fletcher, T. D. (2012). *QuantPsyc: Quantitative Psychology Tools. R package version 1.5*. Retrieved from <https://cran.r-project.org/package=QuantPsyc>
- Funder, D. C., & Ozer, D. J. (2019). Evaluating Effect Size in Psychological Research: Sense and Nonsense. *Advances in Methods and Practices in Psychological Science*, 2(2), 156–

168. <https://doi.org/10.1177/2515245919847202>

Garland, E. L., Fredrickson, B., Kring, A. M., Johnson, D. P., Meyer, P. S., & Penn, D. L.

(2010). Upward spirals of positive emotions counter downward spirals of negativity:

Insights from the broaden-and-build theory and affective neuroscience on the treatment of emotion dysfunctions and deficits in psychopathology. *Clinical Psychology Review*, 30(7),

849–864. <https://doi.org/10.1016/j.cpr.2010.03.002>

Geraghty, A. W. A., Wood, A. M., & Hyland, M. E. (2010). Attrition from self-directed

interventions: Investigating the relationship between psychological predictors, intervention content and dropout from a body dissatisfaction intervention. *Social Science & Medicine*,

71(1), 30–37. <https://doi.org/10.1016/j.socscimed.2010.03.007>

Grossmann, I. (2017). Wisdom in Context. *Perspectives on Psychological Science*, 12(2), 233–

257. <https://doi.org/10.1177/1745691616672066>

Grossmann, I., Brienza, J. P., & Bobocel, D. R. (2017). Wise deliberation sustains cooperation.

*Nature Human Behaviour*, 1(0061). <https://doi.org/10.1038/s41562-017-0061>

Grossmann, I., Karasawa, M., Izumi, S., Na, J., Varnum, M. E. W., Kitayama, S., & Nisbett, R.

E. (2012). Aging and wisdom: Culture matters. *Psychological Science*, 23(10), 1059–1066.

<https://doi.org/10.1177/0956797612446025>

Grossmann, I., & Kross, E. (2010). The Impact of Culture on Adaptive Versus Maladaptive Self-Reflection. *Psychological Science*, 21(8), 1150–1157.

<https://doi.org/10.1177/0956797610376655>

Grossmann, I., & Kross, E. (2014). Exploring Solomon's Paradox: Self-distancing eliminates the

self-other asymmetry in wise reasoning about close relationships in younger and older

adults. *Psychological Science*, 25(8), 1571–1580.



<https://doi.org/10.1177/0956797614535400>

Grossmann, I., Gerlach, T. M., & Denissen, J. J. A. (2016). Wise reasoning in the face of everyday life challenges. *Social Psychological and Personality Science*, 7(7), 611–622.

<https://doi.org/10.1177/1948550616652206>

Grossmann, I., Na, J., Varnum, M. E. W., Park, D. C., Kitayama, S., & Nisbett, R. E. (2010).

Reasoning about social conflicts improves into old age. *Proceedings of the National*

*Academy of Sciences of the United States of America*, 107(16), 7246–7250. [https://doi.org/](https://doi.org/10.1073/pnas.1001715107)

[10.1073/pnas.1001715107](https://doi.org/10.1073/pnas.1001715107)

Grossmann, I., Oakes, H., & Santos, H. C. (2019). Wise Reasoning Benefits from Emdiversity, Irrespective of Emotional Intensity. *Journal of Experimental Psychology: General*.

<https://doi.org/10.1037/xge0000543>

Grossmann, I., Weststrate, N. M., Ardelt, M., Brienza, J. P., Dong, M., Ferrari, M., ... Vervaeke, J. (2020). The Science of Wisdom in a Polarized World: Knowns and Unknowns.

*Psychological Inquiry*, 31(2), 103–133. <https://doi.org/10.1080/1047840X.2020.1750917>

Kassai, R., Futo, J., Demetrovics, Z., & Takacs, Z. K. (2019). A meta-analysis of the experimental evidence on the near- and far-transfer effects among children's executive function skills. *Psychological Bulletin*, 145(2), 165–188.

<https://doi.org/10.1037/bul0000180>

Kross, E., & Ayduk, O. (2017). Self-Distancing: Theory, Research, and Current Directions.

*Advances in Experimental Social Psychology*, 55, 81–136.

<https://doi.org/10.1016/bs.aesp.2016.10.002>

Kross, E., Bruehlman-Senecal, E., Park, J., Burson, A., Dougherty, A., Shablack, H., ... Ayduk,

O. (2014). Self-talk as a regulatory mechanism: How you do it matters. *Journal of*

- Personality and Social Psychology*, 106(2), 304–324. <https://doi.org/10.1037/a0035173>
- Kross, E., & Grossmann, I. (2012). Boosting wisdom: Distance from the self enhances wise reasoning, attitudes, and behavior. *Journal of Experimental Psychology: General*, 141(1), 43–48. <https://doi.org/10.1037/a0024158>
- Larrick, R. P. (2004). Debiasing. In *Blackwell Handbook of Judgment and Decision Making* (pp. 316–338). <https://doi.org/10.1002/9780470752937.ch16>
- Larrick, R. P., Morgan, J. N., & Nisbett, R. E. (1990). Teaching the use of cost-benefit reasoning in everyday life. *Psychological Science*, 1(Journal Article), 362–370.
- Lenth, R. (2020). emmeans: Estimated Marginal Means, aka Least-Squares Means (R package version 1.4.7). <https://cran.r-project.org/package=emmeans>
- McIsaac, H. K., & Eich, E. (2004). Vantage point in traumatic memory. *Psychological Science*, 15(4), 248–253. <https://doi.org/10.1111/j.0956-7976.2004.00660.x>
- Nakagawa, S., & Schielzeth, H. (2013). A general and simple method for obtaining R<sup>2</sup> from generalized linear mixed-effects models. *Methods in Ecology and Evolution*, 4(2), 133–142. <https://doi.org/10.1111/j.2041-210x.2012.00261.x>
- Orvell, A., Ayduk, Ö., Moser, J. S., Gelman, S. A., & Kross, E. (2019). Linguistic Shifts: A Relatively Effortless Route to Emotion Regulation? *Current Directions in Psychological Science*, 096372141986141. <https://doi.org/10.1177/0963721419861411>
- Park, J., Ayduk, Ö., & Kross, E. (2016). Stepping back to move forward: Expressive writing promotes self-distancing. *Emotion*, 16(3), 349–364. <https://doi.org/10.1037/emo0000121>
- Peetz, J., & Grossmann, I. (2020). Wise Reasoning About the Future Is Associated With Adaptive Interpersonal Feelings After Relational Challenges. *Social Psychological and Personality Science*, 194855062093198. <https://doi.org/10.1177/1948550620931985>

- Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science*, 8(3), 162-166.
- Pennebaker, J. W., Mehl, M. R., & Niederhoffer, K. G. (2003). Psychological aspects of natural language use: Our words, our selves. *Annual Review of Psychology*, 54(1), 547–577.
- Perkins, D. N., & Grotzer, T. A. (1997). Teaching intelligence. *American Psychologist*, 52, 1125–1133.
- Raaflaub, K. A., & Strassler, R. B. (2017). *The Landmark Julius Caesar: The Complete Works: Gallic War, Civil War, Alexandrian War, African War, and Spanish War*. New York: Pantheon.
- Raven, J. (1989). The Raven Progressive Matrices: A review of national norming studies and ethnic and socioeconomic variation in intelligence of students. *Journal of Educational Measurement*, 26, 1–16.
- Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, 132(1), 1–25. <https://doi.org/10.1037/0033-2909.132.1.1>
- Sala, G., & Gobet, F. (2019). Cognitive Training Does Not Enhance General Cognition. *Trends in Cognitive Sciences*, 23(1), 9–20. <https://doi.org/10.1016/j.tics.2018.10.004>
- Santos, H. C., & Grossmann, I. (2020). Cross-temporal Exploration of the Relationship between Wisdom-related Cognitive Broadening and Subjective Well-being: Evidence from a Cross-validated National Longitudinal Study. *Social Psychological and Personality Science*. <https://doi.org/10.1177/1948550620921619>
- Schäfer, T., & Schwarz, M. A. (2019). The Meaningfulness of Effect Sizes in Psychological Research: Differences Between Sub-Disciplines and the Impact of Potential Biases.

*Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.00813>

- Schwarz, N., Kahneman, D., & Xu, J. (2009). Global and episodic reports of hedonic experience. In R. Belli, D. Alwin, & F. Stafford (Eds.), *Calendar and time diary: Methods in life events research* (pp. 157–174). Newbury Park, CA: Sage Publications.
- Staudinger, U. M., & Baltes, P. B. (1996). Interactive minds: A facilitative setting for wisdom-related performance? *Journal of Personality and Social Psychology*, 71(4), 746–762.
- Sternberg, R. J. (2014). Building wisdom and character. In S. J. Lynn, W. O'Donohue, & S. Lilienfeld (Eds.), *Health, happiness, and well-being: Better living through psychological science* (pp. 296–316). Thousand Oaks, CA: Sage.
- Sternberg, R. J., Jarvin, L., & Reznitskaya, A. (2008). Teaching for Wisdom Through History: Infusing Wise Thinking Skills in the School Curriculum. In M. Ferrari & G. Potworowski (Eds.), *Teaching for Wisdom* (pp. 37–57). [https://doi.org/10.1007/978-1-4020-6532-3\\_3](https://doi.org/10.1007/978-1-4020-6532-3_3)
- Tingley, D., Yamamoto, T., Keele, L., & Imai, K. (2014). mediation: R package for causal mediation analysis. *Journal of Statistical Software*, 59(5), 1–38. Retrieved from <http://www.jstatsoft.org/v59/i05/>
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, 117(2), 440–463.
- Wegner, D. M., & Giuliano, T. (1980). Arousal-induced attention to self. *Journal of Personality and Social Psychology*, 38(5), 719–726.

**Supplementary Online Materials - R**  
**for**  
**Training for Wisdom: The Distanced Self-Reflection Diary Method**

Author Line:

Igor Grossmann\*, Anna Dorfman, Harrison Oakes, Henri C. Santos, Kathleen D. Vohs, Abigail A. Scholer

Author Affiliations:

I. Grossmann <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [igrossma@uwaterloo.ca](mailto:igrossma@uwaterloo.ca) [ORCID ID: 0000-0003-2681-3600](https://orcid.org/0000-0003-2681-3600)

Anna Dorfman <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [anna.dorfman@uwaterloo.ca](mailto:anna.dorfman@uwaterloo.ca)

Harrison Oakes <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [hoakes@uwaterloo.ca](mailto:hoakes@uwaterloo.ca)

Henri C. Santos <sup>2</sup>, 120 Hamm Drive, Lewisburg, PA, USA 17837, e-mail: [hsantos@geisinger.edu](mailto:hsantos@geisinger.edu)

Kathleen D. Vohs <sup>3</sup>, 321 19th Avenue South, Minneapolis, MN, USA 55455, e-mail: [kvohs@umn.edu](mailto:kvohs@umn.edu)

Abigail A. Scholer <sup>1</sup>, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, e-mail: [ascholer@uwaterloo.ca](mailto:ascholer@uwaterloo.ca)

1 University of Waterloo, Canada.

2 Autism and Developmental Medicine Institute, Geisinger Health System, U.S.A.

3 Carlson School of Management, University of Minnesota, U.S.A.

Corresponding Author: Igor Grossmann, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, Tel. +1 519 888-4567 ext. 31793, e-mail: [igrossma@uwaterloo.ca](mailto:igrossma@uwaterloo.ca).

Keywords: wisdom, intervention, perspective-taking, intellectual humility, affective forecasting

## Table of Contents

Condition.....	10
Distanced self-reflection.....	10
First-Person control.....	10
No-Instruction control.....	10
Event Recall.....	10
To facilitate your recall, please try to visualize this social event from a third-person perspective. Picture yourself in the event and ask yourself, “Why is he/she [referring to yourself] feeling or behaving this way?”.....	10
To facilitate your recall, please try to visualize this social event from a first-person perspective. Picture yourself in the event and ask yourself, “Why am I feeling or behaving this way?”.....	10
To facilitate your recall, please try to visualize this social event. Picture yourself in the event and ask yourself, why you are feeling or behaving the way you do.....	10
Stream-of-Thoughts.....	10
Please describe your stream of thoughts about today's social event from a third-person perspective in detail below. To help you take the third-person perspective, use your name as much as possible as you describe the event and your stream of thoughts. For example, if your name were Chris, you might write, "Chris thinks... Chris feels...".....	10
Please describe your stream of thoughts about today's social event from a first-person perspective in detail below. To help you take the first-person perspective, use the pronouns I/ me as much as possible as you describe the event and your stream of thoughts. For example, you might write, "I think... I feel...".....	10
Please describe your stream of thoughts about today's social event in detail below. To help you visualize the event, try to focus on your feelings and thoughts as much as possible as you describe the event and your stream of thoughts.....	10
Study 1.....	41
Methods.....	41
Structure and Timeline.....	41
General Analytical Notes.....	41
Supplementary power analyses of wise reasoning.....	42
Laboratory Sessions Before and After the Diary Intervention.....	42
Event reconstruction, reasoning, and post-stream-of-thought self-report questionnaire.....	42
Quantifying wise reasoning performance by coding essays.....	43
Measuring Emotional Balance.....	43
Measuring Affective Forecasting.....	44

Nomological network of wise reasoning.....	46
Multiverse analyses.....	48
Training effects on change in emodiversity.....	52
Training effects on alignment of forecasts and experiences.....	53
Growth in wise reasoning qualifies alignment between forecasts and experiences.....	55
Probing Attrition-Based Bias.....	55
Does sub-sample (subject pool students vs. community) qualify effects of wise reasoning? .....	55
Controlling for heterogeneity of events recalled before and after the intervention.....	55
Indirect effect of growth in wise reasoning via broader/narrower self-focus by sub- components.....	57
Distinctiveness of the post-training events.....	58
Does distant self reflection promote emphasis of one's social role?.....	58
Does the training effect of distant self reflection hold when controlling for emotion regulation tendencies?.....	58
Training effects on the self-reported wise reasoning questionnaire.....	59
Training effects on alignment of forecasts for general mood and experiences.....	59
Study 2.....	60
Methods.....	60
General Analytical Notes.....	60
Online Sessions Before and After the Diary Intervention.....	60
Results.....	61
Manipulation checks.....	61
Distinctiveness of the post-training events.....	62
Multiverse analysis – Growth curve model of change with condition as a predictor.....	62
Supplementary Study 3: When does Distant Self-Reflection Promote Wise Reasoning?.....	63
Method.....	63
Recruitment.....	63
Procedure.....	64
Wise Reasoning.....	64
Results.....	65
Manipulation check.....	65
Effects of goals of distant self-reflection on wise reasoning.....	66
Item-wise analyses.....	67
Supplementary Appendix I.....	68

Manipulation Instructions in Studies 1 and 2.....	68
Instructions in Supplementary Study 3.....	68
Supplementary Appendix II.....	72
WISE REASONING STUDY CODEBOOK (5-point scale).....	72
GENERAL CODING INSTRUCTIONS AND COMMON ISSUES.....	72
Reasons for updating coding categories (vs. validated procedure) from Grossmann et al., (2010; <i>PNAS</i> ).....	73
Characterizations of shallow and deep utterances.....	74
Theme-specific instructions.....	75
Recognition of Limits of Knowledge.....	75
Recognition of Many Ways Situation May Unfold / Recognition of Possibility of Change.....	75
Consideration/Recognition of (Different) Perspectives in the Narrative.....	75
Integration of Perspectives/Compromise.....	75
Search for Resolution.....	76
Supplementary References.....	77



# Study 1

## Methods

**Table S1**  
Structure and Timeline

Stage	Content	Timeline
1	Recruitment & Demographics Survey	Schedule intake survey Email online survey
2	Pre-Diary Laboratory Session	~90 min 2-week delay, then diary begins
3	Diary Study + Forecasting (final Day 7)	15 min/daily 4 weeks
4	Post-Diary Laboratory Session	~90 min A week after diary completion
5	One-Month Follow-Up Survey	~20-30 min 1-month post second laboratory session

### General Analytical Notes

Content-analytic measures often violate assumptions of linearity and normality due to right-skewed distribution and because different levels of the content codes cannot plausibly be interval-scaled. Therefore, we normalized dependent variables involving wise reasoning and feelings toward close others that violated the normality assumption in general linear model analyses by converting the scores to normal scores using the *QuantPsyc* package in R (Fletcher, 2012), maintaining the original mean and standard deviation. In a spirit of multiverse analyses, we also performed series of further analyses accounting for or bypassing the normality assumption. First, we conducted a generalized linear mixed model with gamma distribution to account for skewness in the data. Second, we collapsed the coded categories into a dichotomous score (0 = no mentioning of a theme / 1 = mentioning of a theme), performing analyses with a generalized linear mixed model with a binomial distribution. Third, we conducted a series of Bayesian Generalized (Non-)Linear Multivariate Multilevel Model with coded scores as an ordinal variable (adjacent category family). Each of these analyses which yielded close to identical and in case of Bayesian analyses conceptually very similar results (see R notebook on the OSF page of the research project, at [osf.io/gb7js](https://osf.io/gb7js)).

We used *lme4* (Bates et al., 2015) to perform general and generalized multilevel analyses. We used *brms* package (Bürkner, 2017) for Bayesian multilevel models. We used *jtools* (Long, 2018) to provide estimates of significance and to perform simple slopes analyses for the purposes of understanding two- and three-way interactions.

## Supplementary power analyses of wise reasoning

Supplementary GPower (3.1.9) analyses of the conventional  $\alpha$  (5%) with  $\beta/\alpha$  ratio of 4, assuming an average effect size in social psychology of  $r = 0.21$  (Richard et al., 2003), indicated that the observed sample of 149 pre-diary participants for training wise reasoning produced a power estimate of .76. Simulations of the power for the Time X Condition effect of wise reasoning ( $n = 20$ ) via the *simr* package (Green & MacLeod, 2016) with the Kenward-Roger method for estimation of observed effect size of 0.11 suggested that the power of the study was 75% [50.90, 91.34].

## Laboratory Sessions Before and After the Diary Intervention

**Social event description.** Upon being welcomed by an experimenter, most of the instructions were administered via a computer. For descriptions of social events, participants received a definition of a difficult social event first:

*Our social life can be a source of great joy, but it can also produce great distress. For instance, some people face conflicts or arguments with other people, such as an argument with a family member, a relationship conflict with one's partner, or a disagreement with colleagues at work. Other people encounter social interactions with other people involving annoyances or other things that irritate them. For example, some people are annoyed/irritated by a friend who constantly monopolizes their conversations, a partner forgetting to do something they promised to do or having to eat at a restaurant they particularly dislike because a family member insists on having a birthday celebration there.*

## Event reconstruction, reasoning, and post-stream-of-thought self-report questionnaire

Participants' recall of social events was guided by probes that encouraged detailed reconstruction of the experience. This procedure has previously been shown to attenuate recall biases (Schwarz et al., 2009). Participants recalled "*what [they] did and how [they] felt during this event.*" Subsequently, participants provided (1) the first name of the other person involved in the event; (2) details about the event (i.e., day of the week, time of day, location, length); and (3) described the event in writing in as much detail as possible.

Following the narratives (which subsequently were analyzed for wise reasoning), participants completed the Situated Wise Reasoning Scale (SWiS; Brienza et al., 2018). The items were presented in random order over three pages. The instructions on each page read:

*As you reflected on and wrote about your most recent difficult social event, to what extent did you engage in the following thoughts? None of the statements listed below are supposed to be "good" or "bad." We are simply interested in how people approach difficult situations.*

Participants reported the extent to which they engaged in four themes of wisdom-related reasoning while reflecting on their recalled social conflict: (i) intellectual humility, which involves recognizing the limits of one's knowledge (4 items; sample item: "*Looked for any extraordinary circumstances before forming my opinion*";  $\alpha = 0.76$ ), (ii) recognition of change (4 items; sample item: "*Believed the situation could lead to a number of different outcomes*";  $\alpha = 0.77$ ), (iii) recognition of others' perspectives (4 items; sample item: "*Made an effort to take the other person's perspective*";  $\alpha = 0.80$ ), (iv) consideration or search for compromise and conflict

resolution (5 items; sample item: “*Tried my best to find a way to accommodate both of us*”;  $\alpha = 0.78$ ). All items were rated on a 5-point scale (0 = *not at all* to 4 = *very much*). We excluded the fifth component of the SWiS, adopting an outsider’s perspective, because it was not assessed in the performance measure of wise reasoning.

### Quantifying wise reasoning performance by coding essays

We expanded and clarified earlier coding system (1 = *not at all*; 2 = *partial (indirect)*; 3 = *full (explicit) consideration of each theme*; Grossmann et al., 2010), to provide greater differentiation between explicit, in-depth consideration of a theme and multiple indirect, shallow considerations. We borrowed insights from the autobiographical interview (Levine et al., 2002), which differentiates between single and multiple instances of mentioning a particular theme. A priori, we also considered a *single* explicit consideration as higher in the coding system than *two* indirect/implied conditions of the same theme. We operationalized the explicit consideration as involving an in-depth elaboration/explanation of a given theme. Here, we followed an established tradition in cognitive science and social psychology, according to which elaboration and explanation are signs of more cognitively complex reasoning compared to mere restatement of a given theme (e.g., Lombrozo & Carey, 2006; Petty & Cacioppo, 1986).

The final coding system involved the following five levels: 1 = *nothing about the theme mentioned*, 2 = *one instance of the theme is mentioned, but is not described in depth*, 3 = *several instances of the theme are mentioned, but none are described in depth*; 4 = *one or more instances of the theme are mentioned, and one of them is described in depth*; 5 = *several instances of the theme are mentioned, and two or more of them are described in depth*<sup>3</sup>. Inter-rater reliability between the coders for each theme was very good (Kendall’s  $W_s > 0.84$ ), with disagreements resolved via discussion between the raters. Test-retest reliability of the coded wise reasoning across laboratory sessions was medium-high,  $r = .48$  (23% between-person variance), and comparable to reliability of state-level measures of other constructs such as extraversion or conscientiousness (see Table 3 in Fleeson & Gallagher, 2009).

### Measuring Emotional Balance

Numerous traditions in philosophy and some psychological scientists associate wisdom with the idea of emotional equanimity (Bangen et al., 2013)—the ability to respond to aversive events in a balanced and even-handed fashion. To probe the *nomological network* of wise reasoning, we examined how our training and wise reasoning impact emotional balance when reflecting on their experience. In conflict situations, an emotionally-balanced person may report distinct emotions more evenly, considering whether they are annoyed, ashamed, and upset (vs. reporting feeling uniformly angry; Grossmann et al., 2016; Lindquist & Barrett, 2010). To capture emotional balance, we estimated emodiversity (Ong et al., 2018; Quoidbach et al., 2014), corresponding to the relative breadth and evenness in reported emotions. In past research, emodiversity has been shown to be associated with mental and physical health benefits (Ong et al., 2018; Quoidbach et al., 2014).

**Assessing emotions.** After reconstructing the conflict event in the lab and describing their stream of thoughts, participants rated the extent to which they experienced 10 negative

---

<sup>3</sup> Levels 3 and 5 were rare (each < 1.3% across all themes). SOM-R shows results of post-hoc multiverse analyses using alternate binary (mention/no mention of a theme) and 4-level coding systems (1 = *nothing mentioned*, 2 = *one shallow instance of the theme*, 3 = *several instances are mentioned and/or one of them is described in depth*; 4 = *several instances of the theme are mentioned, and two or more of them are described in depth*), which replicate the training effect results reported in the main manuscript.

emotions (afraid, angry, guilty, sad, nervous, annoyed, ashamed, alone, irritable, blue) and 10 positive emotions (happy, proud, joyful, strong, delighted, confident, cheerful, calm, relaxed, at ease) emotions, presented randomly (0 = *Not at all*; 6 = *Very much*). Emotions were selected from PANAS-X (Watson & Clark, 1999) and augmented to include low-arousal positive emotions.

**Assessing emotional complexity via emodiversity.** We followed established methods to quantify state-level emotional complexity by examining emodiversity (Grossmann et al., 2016)—i.e., the breadth and evenness of participants’ emotions (for further details, see

Quoidbach et al., 2014). We applied Shannon’s entropy formula  $\sum_{i=1}^s (p_i \times \ln p_i)$  via the *vegan*

package in *R*. Because a key focus of the reflection concerned a negative experience, we performed separate analyses for positive and negative emotions. As in prior work (Grossmann et al., 2016, 2019), we regressed out average positive and negative intensity and performed subsequent analyses on unstandardized residuals, thereby limiting confounding by emotional intensity.

### Measuring Affective Forecasting

A number of traditions in philosophy further link wisdom to “knowing thyself,” which includes accurate forecasts about how one may feel in challenging situations (Seligman et al., 2016; Wilson & Gilbert, 2003). Treating these components as a further criterion of wisdom, we sought to examine how our training and wise reasoning impacts post-intervention alignment of forecasted feelings toward close others with subsequent experiences. In our pre-registered hypotheses, we hypothesized that the training group would show greater alignment and that greater growth in wise reasoning would foster such alignment.

On the last day of the diary (which did not include experimental instructions), 100 participants (54<sub>training</sub> / 36<sub>control</sub>) completed measures about common social interactions with family and friends. First, participants thought of someone (an adult) they had a close relationship with and with whom they would likely interact frequently over the next month. Participants indicated the person’s initials, and their relationship to the person (e.g., partner, best friend).

**Forecasting accuracy scenarios and prompts.** During the post-intervention laboratory session, participants read about six common social events that could occur between themselves and a person to whom they are close. Participants read the following instructions:

*Over the next few pages, you will read about 6 common social events that could happen between you and [Person X] over the next month. For each event, briefly write how you think this event might unfold between you and [Person X] and answer a few questions about how you might feel about these events.*

*Although you may find some of these events unlikely, please try to consider as best as you can how you would feel about such events if they did happen.*

The six common social events were presented in random order. After reading a brief description of each event, participants wrote 1-2 sentences about how they thought the event with Person X could unfold, to help participants reflect on the experience. These responses were short and were therefore not analyzed for the purposes of this project.

Participants read, “[Person X] does something that makes you lose some trust in him/her. This can include lying to you, failing to keep a promise, or speaking badly about you to others.” (betrayal of trust)

*“[Person X] makes you feel left out. This can include failing to invite you to an activity, failing to include you in a conversation, or otherwise ignoring you.”* (exclusion).

*“You disagree about something with [Person X] and this turns into a heated argument with him/her.”* (disagreement)

*“You are going through a difficult time and [Person X] is there for you. This can include staying with you when you are sick, being a good listener, or giving you some help to get through a problem.”* (support)

*“You are hanging out with [Person X], and this can include activities like having dinner together, a celebration, or meeting to do an activity you all enjoy like watching sports or playing games.”* (Informal gathering of friends)

*“You are talking with [Person X], and you feel understood and appreciated during this interaction.”* (Pleasant conversation)

Participants described how each event could unfold and forecasted their future emotions if it were to occur. Participants first rated their anticipated mood if the event were to occur (1 = *Very unhappy*; 7 = *Very happy*). Next, they rated their anticipated feelings toward the other person—i.e., the extent to which they would feel warm, upset, trustful, angry, liking, frustrated, and content toward *Person X* if the event were to occur (1 = *Not at all*; 7 = *Very much*). Lastly, participants indicated the likelihood that each of the six events would occur in the context of that relationship over the next month (1 = *Not at all likely*, 5 = *Very likely*).

**One-month follow-up survey.** One month from the date of each participants’ post-diary laboratory visit, 66 participants (30<sub>training</sub> / 36<sub>control</sub>; 600 experiences) completed a follow-up survey online. It started by reminding them that a month ago they considered six events that might happen between them and a close other. Participants were first reminded of the close other they selected a month ago. Next, participants were presented with the list of the six events in a randomized order. For each event, participants first indicated whether it had indeed occurred. If the event occurred, they briefly described it using the ERM, and then rated their feelings toward the other person using the same items from the forecasting session. We used these responses as a proxy for participants’ *emotional well-being* in response to concrete social experiences to test predictive validity of wise reasoning. Further, by comparing forecasted vs. experienced feelings, we further probed the role of training and growth in wise reasoning for *forecasting accuracy*.

**Completion rates for the one-month follow-up.** The follow-up survey one-month after the post-intervention laboratory survey showed a retention rate (55%) that is comparable to retention rates in clinical studies (Geraghty et al., 2010) and longitudinal surveys examining personality change (Roberts et al., 2006).

**Post-hoc power analyses for affective forecasting.** We used a power size calculator for the general linear multivariate model with Gaussian errors (<http://glimmpse.SampleSizeShop.org/>). Specifically, we used the group means and pair-wise correlations, specifying clustering and within-cluster correlation ( $icc = .80$ ; each participant responded to 3 emotions for respective cluster of positive and negative emotions), between subject predictor (condition), and two within-subject variables (pre-post: 2 levels / valence: 2 levels), and specifying group size for forecasting sample (100 participants; approximating 50 per group) and the one-month follow-up sample (66 participants; approximating 33 per group). We examined power for the 3-way interaction (condition X pre-post X valence). Given that we had a pre-registered directional prediction concerning alignment of forecasted feelings with later reported feelings in the training, but not the control conditions, we set Type I error  $\alpha$  at .10.



Finally, we used the Means scale factor of 1.50, and the variability scale factor of 1.00 in our estimation. Based on these values, we estimated  $\beta$  to range between .68 (forecasted sample) and .53 (follow-up sample), suggesting that the affective forecasting estimates should be interpreted with caution.

## Results

### Nomological network of wise reasoning

We collected additional measures to evaluate discriminant, convergent, and predictive validity of our operationalization of wise reasoning. Our chief analyses focused on the preferred operationalization of wise reasoning through the 5-level coding scheme discussed in depth in the supplementary methods. We contrasted this preferred operationalization of wise reasoning with an alternative operationalization involving dichotomous scores reflecting presence vs. no presence of a wise reasoning theme, to evaluate if the 5-point coding system more accurately represent a nomological network of wise reasoning compared to a dichotomous classification. Given the non-normal distribution of the wise reasoning (see Figure S2 below), we used Spearman's *rho* correlations to evaluate the nomological network structure.

To establish *discriminant validity*, we examined association of wise reasoning with the performance on the Raven's advanced progressive matrices test, a typical test for assessing fluid cognitive abilities. Theoretically, wise reasoning performance should be positively related to general cognitive abilities, but the relationship should be in the weak-moderate range, suggesting that the present performance measure is distinct from the performance on test of general intelligence.

To establish *convergent validity*, we examined the degree to which the present operationalization is similar to the other operationalizations of wise reasoning. To this end, we examined relationship (total and each theme) to the scores on the questionnaire capturing self-reported state-level wise reasoning scale (SWISS; Brienza et al., 2018). This scale can be separated into facets consisting of items capturing similar themes to those we quantified via coding: intellectual humility, recognition of change, acknowledgement of diverse perspectives, search for compromise and conflict resolution. We focused both on performance on the scale in total and theme-specific correlations.

To establish *predictive validity*, we focused on (a) emotional balance or equanimity—a common associate of wisdom (Bangen et al., 2013; Brienza et al., 2018; Grossmann et al., 2019), and (b) emotional well-being participants reported in the face of future social events a month later—a classic Aristotelian outcome wisdom theoretically should be related to (Darnell et al., 2019; Grossmann et al., 2013). We predicted that the preferred operationalization of wise reasoning would be uniquely associated with balance of different emotions in a conflict situation. We further predicted that wise reasoning will be associated with greater emotional well-being (more positive feelings and fewer negative feelings toward close others) in the context of social events that occurred a month later.

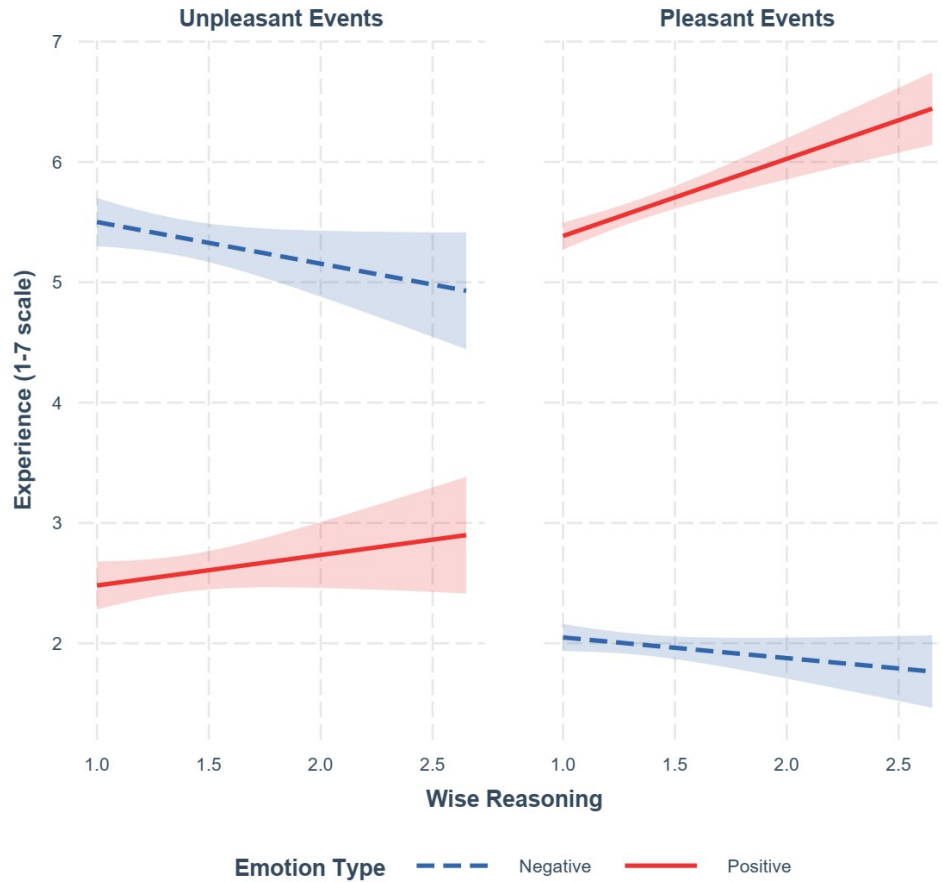
Correlation matrix							
	wise.reasoning	dichotom.wisdom	Raven	SWISS	neg.emodiversity	pos.emodiversity	
wise.reasoning	1.00	0.82	0.15	0.15	0.16	0.03	
dichotom.wisdom	0.82	1.00	0.11	0.08	0.08	0.07	
Raven	0.15	0.11	1.00	-0.02	0.18	0.08	
SWISS	0.15	0.08	-0.02	1.00	0.13	0.02	
neg.emodiversity	0.16	0.08	0.18	0.13	1.00	0.25	
pos.emodiversity	0.03	0.07	0.08	0.02	0.25	1.00	
Probability values							

	wise.reasoning	dichotom.wisdom	Raven	SWISS	neg.emodiversity	pos.emodiversity
wise.reasoning	0.00	0.00	0.02	0.01	0.01	0.67
dichotom.wisdom	0.00	0.00	0.09	0.21	0.20	0.23
Raven	0.02	0.09	0.00	0.74	0.00	0.23
SWISS	0.01	0.21	0.74	0.00	0.04	0.78
neg.emodiversity	0.01	0.20	0.00	0.04	0.00	0.00
pos.emodiversity	0.67	0.23	0.23	0.78	0.00	0.00

As results in the table above indicate, wise reasoning performance was significantly positively associated with performance on the Raven test. The effect size was in the small-moderate range, indicating discriminant validity of wise reasoning vis-à-vis general intelligence. Wise reasoning performance was also significantly positively associated with the self-reported performance on the SWISS, indicating convergent validity of wise reasoning. Notably, as table above indicates, both Raven's scores of general intelligence and performance on the SWISS showed stronger associations with the 5-level index of wise reasoning compared to the alternative dichotomous index. We replicated these positive associations for each theme, intellectual humility,  $\rho = .08$ ,  $p = .200$ , consideration of change,  $\rho = .12$ ,  $p = .050$ , acknowledgement of diverse viewpoints,  $\rho = .11$ ,  $p = .080$ , search for compromise,  $\rho = .14$ ,  $p = .020$ , and search for conflict resolution,  $\rho = .16$ ,  $p = .010$ .

As a first test of predictive validity, we examined associations between wise reasoning and emodiversity – an index of breadth and evenness in representation of emotions in *reflection on the experience*. We observed a significant positive association between wise reasoning and emodiversity of negative emotions in a moderate range, replicating prior research (Grossmann et al., 2019) and indicating that wiser reasoning was linked to richer and more balanced representation of negative emotions. There was no relationship to positive emotions, which were not at center of reflection on social conflicts. Notably, estimates of discriminant, convergent, and predictive validity examined so far showed more meaningful associations with the 5-level wise reasoning index compared to the alternative dichotomous index.

As a second test of predictive validity, we considered how wise reasoning relates to emotional well-being—i.e., positive and negative feelings *toward close others*. To this end, we examined participants' responses to questions about their feelings toward close others in six situations (3 positive and 3 negative) occurring in their lives a month after the second assessment of wise reasoning. Given our interest in general effect of wise reasoning, we averaged responses across pre- and post-intervention laboratory sessions to obtain a trait-level baseline (Fleeson & Jayawickreme, 2015), to use as predictor of positive and negative feelings across these six situations. We observed no significant Wise Reasoning X Event Type X Emotion Type interaction,  $t(928.72) = 0.53$ ,  $p = .596$ . As Figure S1 indicates, both in pleasant and unpleasant events, wiser reasoning was associated with more positive and less negative feelings toward close others a month later, Wise Reasoning X Emotion Type interaction,  $t(929.71) = 4.43$ ,  $p < .001$ . Simple slopes indicate that wise reasoning was associated with significantly more positive feelings,  $B = 0.449$ ,  $SE = 0.178$ , 95%  $CI [0.097; 0.799]$ , and a non-significant trend toward fewer negative feelings,  $B = -0.259$ ,  $SE = 0.178$ , 95%  $CI [-0.610; 0.092]$ . Relationship of wise reasoning with more positive vs. negative feelings was particularly pronounced for pleasant events,  $t(929) = 4.12$ ,  $p < .001$ , and less pronounced for unpleasant events,  $t(929) = 1.72$ ,  $p < .087$ . These results conceptually replicate other work showing that wise reasoning is prospectively related to less negative feelings in the context of interpersonal relationships (Peetz & Grossmann, 2020) and extend prior research on the relationship between wise reasoning and well-being (Grossmann et al., 2013). They provide further evidence of the predictive validity of the preferred (5-level) operationalization of wise reasoning.



*Figure S1. Effects of wise reasoning (average across both measurement points) on emotional wellbeing, operationalized through experienced feelings towards a significant other in the context of pleasant and unpleasant events. Estimates are from a multi-level model. Confidence bands represent 95% intervals around the estimate.*

## Multiverse analyses

As Figure S2 shows, proportion of different levels of wise reasoning was not evenly or normally distributed. Therefore, we performed a series of supplementary analyses, probing whether observed Condition X Time interaction) and direction of effects generalizes across different methods. As Figure S2 and results below indicate, this was indeed the case for each approach yielding a significant growth in wise reasoning in the training condition, but not in the control condition. Results below are for overall effect. See R notebook on the OSF page of the research project ([osf.io/gb7js](https://osf.io/gb7js)) for component-specific analyses.



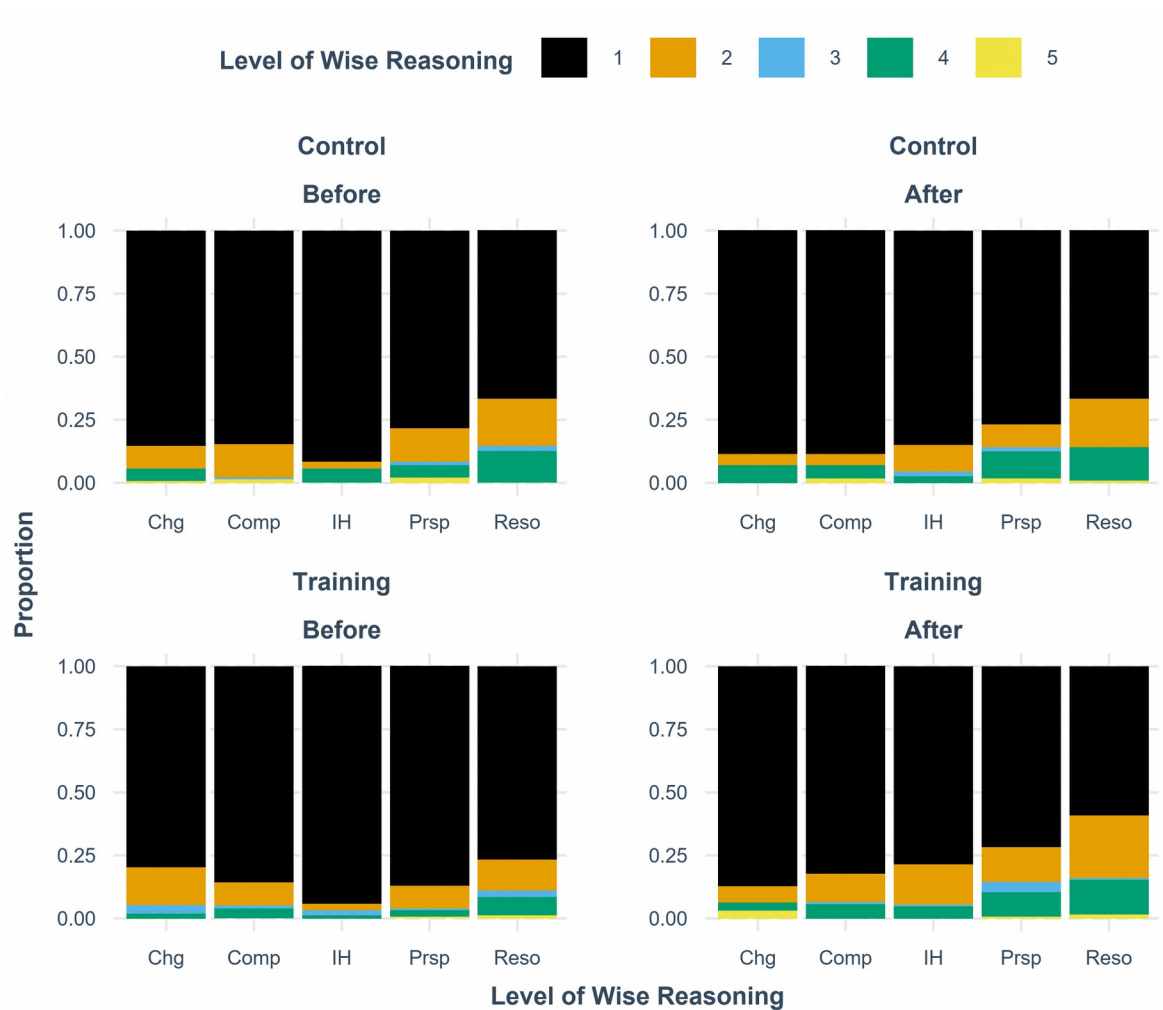


Figure S2. Proportion of wise reasoning levels for each theme in training and control conditions before and after the intervention. On most theme of wise reasoning there is a training-related change toward higher levels of wise reasoning after compared to before the intervention.

#### Gamma distribution analyses (inverse link)

	exp(Est.)	S.E.	t val.	P
(Intercept)	2.2755	0.0289	28.4065	0.0000
Time.F	0.9721	0.0162	-1.7458	0.0809
Condition.F	1.0499	0.0375	1.2998	0.1937
Time.F:Condition.F	0.9288	0.0226	-3.2623	0.0011

Condition.F = control:  
 contrast estimate SE df z.ratio p.value  
 Before - After 0.0283 0.0162 Inf 1.746 0.0809

Condition.F = training:  
 contrast estimate SE df z.ratio p.value  
 Before - After 0.1022 0.0158 Inf 6.475 <.0001

Note: contrasts are still on the inverse scale

Significant growth in the distant self condition, but only a marginal trend in the control condition.

### Bayesian Generalized Ordinal Multilevel Model

Group-Level Effects:

~subjectNumber (Number of levels: 149)

	Estimate	Est.Error	I-95% CI	u-95% CI	Rhat	Bulk_ESS	Tail_ESS
sd(Intercept)	0.70	0.08	0.56	0.87	1.01	925	1747

Population-Level Effects:

	Estimate	Est.Error	I-95% CI	u-95% CI	Rhat	Bulk_ESS	Tail_ESS
Intercept[1]	2.08	0.12	1.85	2.33	1.00	1183	2088
Intercept[2]	2.65	0.22	2.23	3.08	1.00	2489	2822
Intercept[3]	-0.84	0.23	-1.30	-0.38	1.00	2354	2886
Intercept[4]	2.88	0.27	2.37	3.42	1.00	2951	2132
Time.F1	0.09	0.08	-0.06	0.25	1.00	3265	2650
Condition.F1	-0.19	0.15	-0.49	0.09	1.01	962	1368
Time.F1:Condition.F1	0.27	0.11	0.05	0.50	1.00	3258	2921

Time X Condition interaction was significant, with the 95% credible interval of the effect not including a zero [0.05; 0.50]. As Figure S3 indicates, participants in the control condition showed similar probabilities for each level of wise reasoning before and after the period of the intervention. In contrast, participants in the training condition had a lower probability of not mentioning wise reasoning themes after the intervention compared to before the intervention, and showed a higher probability to show at least some mentioning of the theme (level 2) as well as in-depth elaboration on the theme (level 4).

### Bayesian Generalized Ordinal Multilevel Model with 4-levels (combining categories 3 and 4)

Population-Level Effects:

	Estimate	Est.Error	I-95% CI	u-95% CI	Rhat	Bulk_ESS	Tail_ESS
Intercept[1]	2.16	0.15	1.88	2.46	1.00	1269	2040
Intercept[2]	1.16	0.18	0.82	1.52	1.00	1553	2016
Intercept[3]	3.27	0.29	2.73	3.85	1.00	2602	2520
Time.F1	0.10	0.10	-0.11	0.30	1.00	3122	3191
Condition.F1	-0.21	0.19	-0.58	0.16	1.00	999	1949
Time.F1:Condition.F1	0.35	0.15	0.07	0.63	1.00	3177	3150

We run a model examining whether different ways to categorize wise reasoning would lead to different results. Specifically, we combined levels 3 (several shallow instances of a theme mentioned in the narrative) and 4 (at least one instance of a theme is described in-depth/elaborated on). Time X Condition interaction showed a significant effect, with the 95% credible interval of the effect not including a zero [0.07; 0.63]. As Figure S4 indicates, participants in the control condition showed similar probabilities for each level of wise reasoning before and after the period of the intervention. In contrast, participants in the training condition had a lower probability of not mentioning wisdom-related themes after the intervention compared to before the intervention, and showed a higher probability to show at least some mentioning of the theme (level 2) as well as in-depth elaboration/several mentioning of the theme (level 3).

### Generalized Ordinal Multilevel Model

	Est.	S.E.	z val.	p
(Intercept)	-1.821	0.183	-9.977	0.000
Time.FAfter	0.055	0.158	0.345	0.730

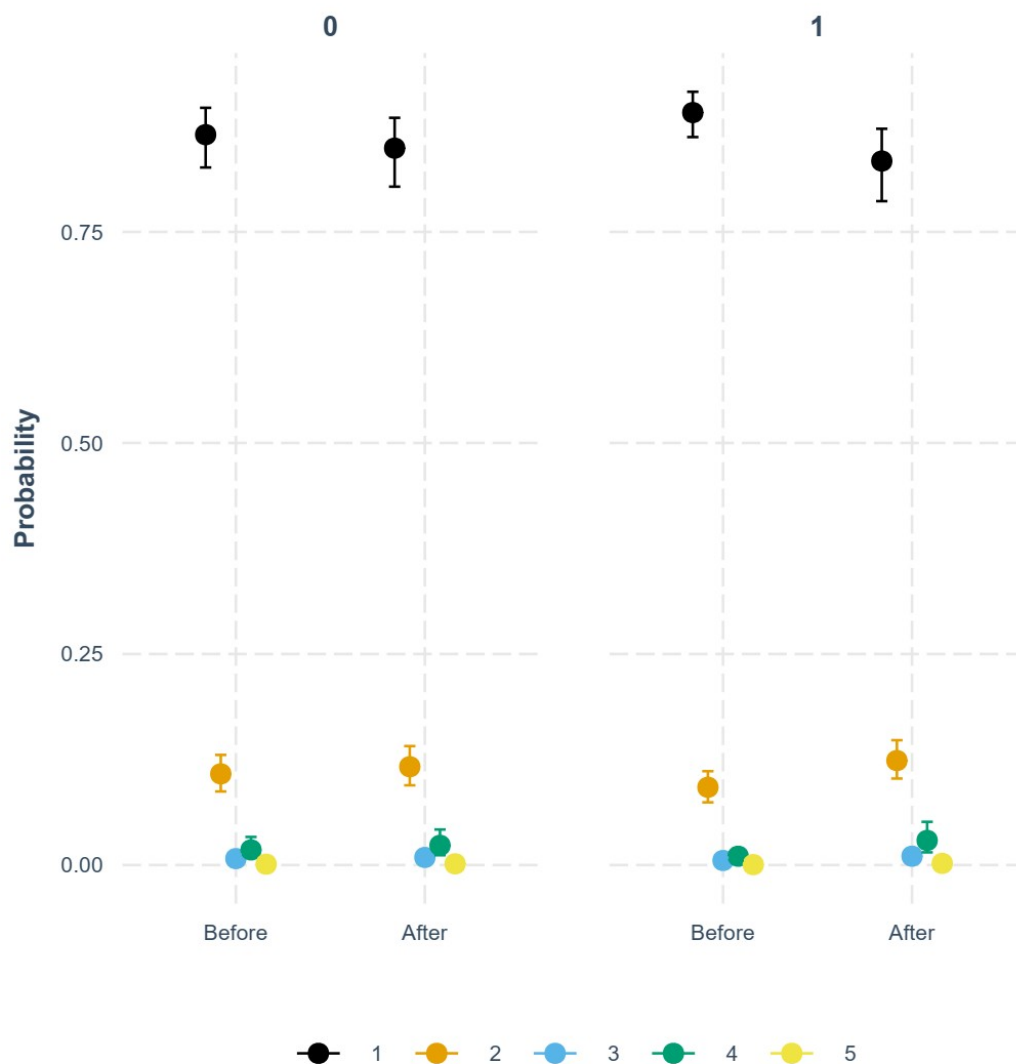
Condition.F1	-0.283	0.242	-1.170	0.242
Time.FAfter:Condition.F1	0.594	0.219	2.718	0.007

```

-----
Condition.F = control:
contrast      estimate    SE df z.ratio p.value
Before - After -0.0545 0.158 Inf -0.345 0.7302
Condition.F = training:
contrast      estimate    SE df z.ratio p.value
Before - After -0.6486 0.151 Inf -4.296 <.0001

```

We run a generalized linear mixed effects model with coded responses categorized into mentioning of wise reasoning (1) or not mentioning of wise reasoning (0). Results indicated significant growth in the distant selfcondition, but no significant difference over time in the control condition.



*Figure S3.* Conditional probabilities of being scored at different level of wise reasoning in training and control conditions before and after the intervention. Estimates from a Bayesian Ordinal Multilevel model. Error bars represent 95% credible intervals.

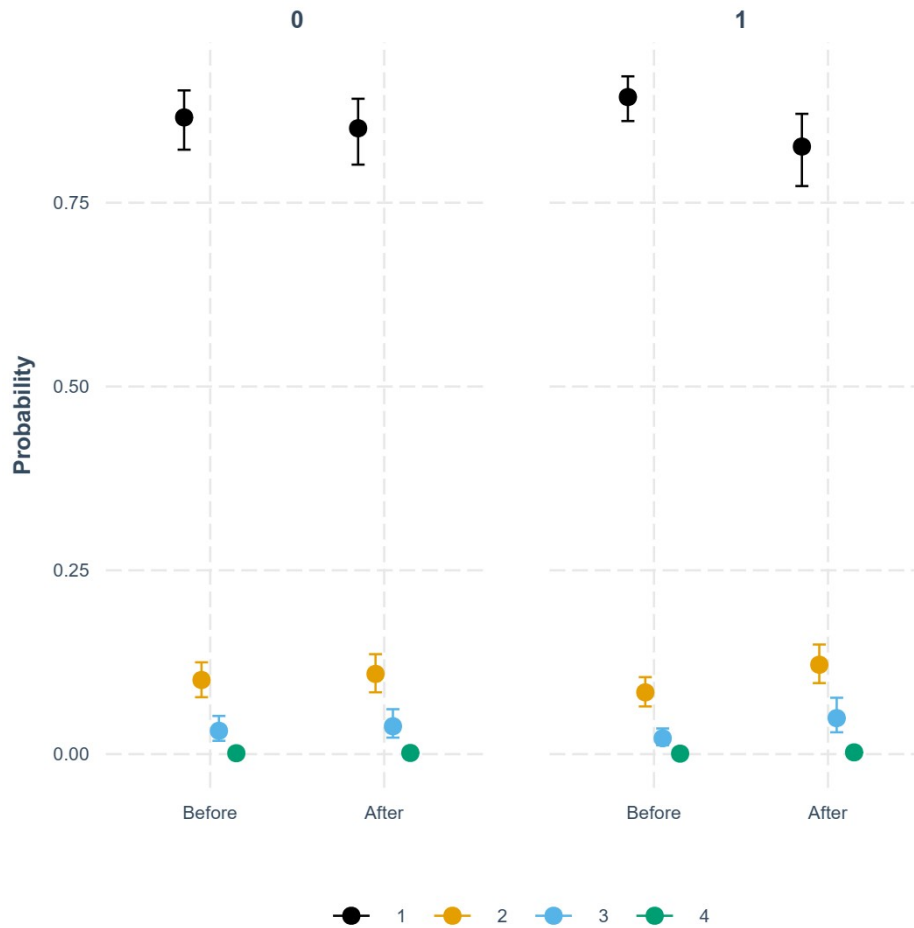


Figure S4. Conditional probabilities of being scored at different level of wise reasoning on an alternate 4-level scale, unpacking the condition X time interaction. Estimates from a Bayesian Ordinal Multilevel model. Error bars represent 95% credible intervals.

### Training effects on change in emodiversity

As reported in the section on the nomological network of wise reasoning, we observed a positive association between wise reasoning and negative emodiversity. In pre-registered analyses, we sought to explore how distant self training impacts emodiversity. We observed no pre-/post-diary change, or condition-dependent-growth in positive emodiversity, all  $t$ s  $< 1$ , *ns*. However, we observed a significant training effect for negative emodiversity, Time X Condition interaction:  $t = 2.03$ ,  $\chi^2 = 4.12$ ,  $p = .042$ : Participants in the training condition showed greater emodiversity after the intervention than before it,  $B = 0.064$ ,  $SE = 0.031$ ,  $t = 2.07$ ,  $p = .040$ . Participants in the control condition did not show significant change,  $B = -0.027$ ,  $SE = 0.033$ ,  $t = 0.84$ ,  $p = .404$ . This interaction effect was robust when controlling for demographics and the types of training experiences and events on which people reflected, Time X Condition interaction:  $t = 2.20$ ,  $\chi^2 = 4.83$ ,  $p = .028$ .

Mediation analyses further indicated that 2% of the training-driven growth in negative emodiversity was statistically accounted by training-based growth in wise reasoning,  $B = 0.002$ ,

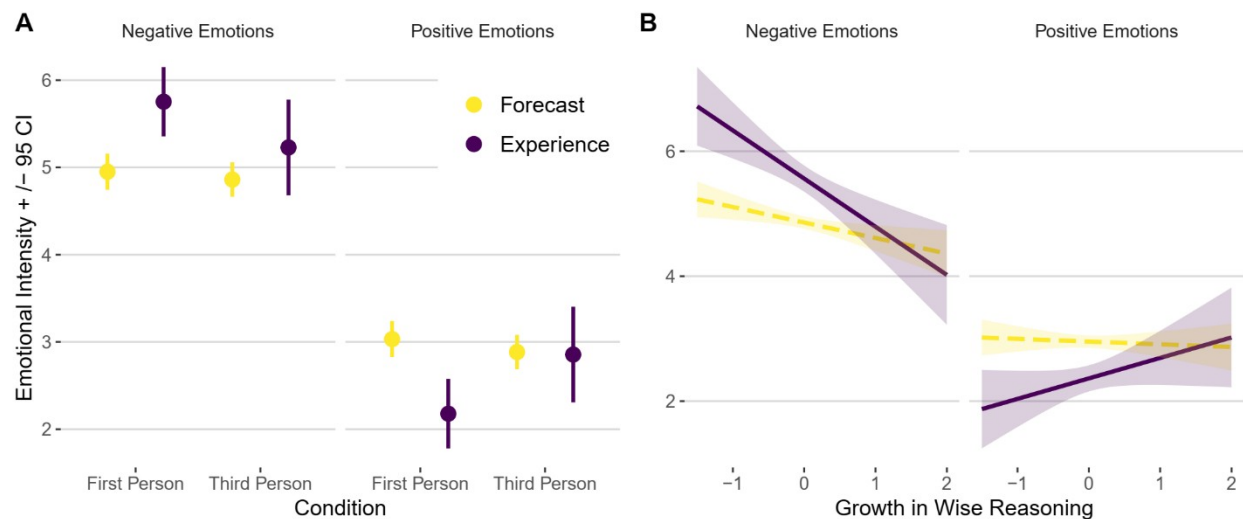
95% *CI* [0.004; 0.04],  $p = .002$ . This analysis suggests that growth in negative emodiversity may be instigated by the accompanied changes in wise reasoning.

### Training effects on alignment of forecasts and experiences

Following our pre-registered hypotheses and analytic plan, we were also interested in testing whether forecasts and experiences were more aligned in the training compared to control condition, and whether growth in wise reasoning similarly predicts greater alignment between forecasts and experiences.

In the first set of pre-registered analyses, we tested effects of the distant self training on the alignment of participants' forecasted feelings towards a close other by comparing participants' ratings of forecasted to experienced emotions, the latter of which were collected one month after the forecasts. Results of a mixed model with emotions nested in participants, valence (positive vs. negative), event type (positive vs. negative), and time (forecast vs. experience) as Level 1 within-subject predictors, and training condition as a Level 2 between-subject predictor indicated a significant 4-way interaction,  $t = 2.30$ ,  $\chi^2 = 5.30$ ,  $p = .021$ . To unpack this interaction, we examined effects separately for positive and negative events.

Training condition did not significantly impact accuracy about positive events,  $t < 1$ ,  $p = .236$ , but it did significant impact accuracy about negative events,  $t = 2.77$ ,  $\chi^2 = 7.66$ ,  $p = .006$ . For the control condition, forecasts toward close others were significantly different from their experienced feelings. Specifically, participants underestimated the intensity of their negative feelings,  $t = 3.97$ ,  $p < .0001$ , and overestimated the intensity of their positive feelings,  $t = 4.23$ ,  $p < .0001$ . In contrast, in the training condition forecasts for negative and positive feelings did not differ from reported experiences,  $ts < 1.32$ ,  $ps > .187$ . As Figure S5-A shows, the training (vs. control) participants' greater accuracy was driven by differences in the experienced emotions, rather than their forecasts.



*Figure S5.* Alignment of forecasted and experienced feelings toward a close other during negative events in Study 1. Panel A: Effects of training. Panel B: Effects of growth in wise reasoning. Mean estimates of emotional intensity with 95% confidence intervals.

Why are training-based effects on alignment between forecasted and experienced feelings most evident for negative experiences? It is possible that positive experiences during the training period were less relevant than were negative experiences for the social conflicts on which participants reflected. Even so, being able to better differentiate negative compared to positive experiences (Alves et al., 2017; Grossmann et al., 2016) may be useful when navigating the social world (Alves et al., 2017; Rozin & Royzman, 2001). Together, these streams of work suggest a viable extension of the current research by examining effects of distant self training on situations in which differentiation of positive experiences has greater ecological utility.

Whereas prior affective forecasting research has examined general mood or participant-centered emotions (Wilson & Gilbert, 2003), the present results uniquely concern accuracy in forecasts of feelings toward close others. We observed that the training and control groups differed in extremity of subsequently reported experiences, such that the training group appeared more balanced, with comparable intensity of experienced to forecasted feelings toward close others. In contrast, the control group was more extreme, with diverging intensity of experienced and forecasted emotions. Notably, as Figure S6 below shows, the effects were driven by training effects for experienced (rather than forecasted) emotions. In other words, training has led to lower emotional reactivity in future social conflict situations. This observation suggests that the training reduced the empathy gap (Boven et al., 2013) between forecasted and experienced feelings toward close others by moderating participants' emotional reactivity to reported experiences.

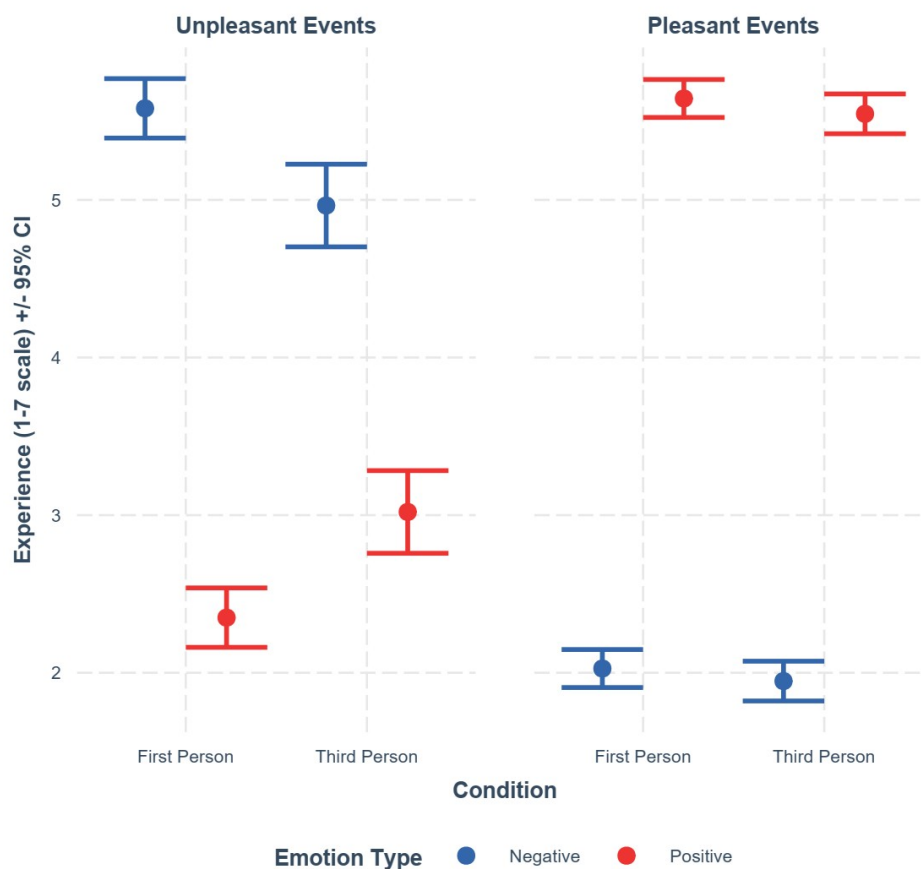


Figure S6. Experienced feelings toward a close other during pleasant and unpleasant events in Study 1. Mean estimates of emotional intensity with 95% confidence intervals.

### Growth in wise reasoning qualifies alignment between forecasts and experiences

We explored whether training-based growth in wise reasoning fostered greater alignment between forecasts and experiences. While growth in wise reasoning did not improve alignment of forecasted and experienced emotions for positive events,  $t < 1$ , *ns*, it did significantly predict alignment of forecasted and experienced emotions for negative events,  $t = 2.22$ ,  $\chi^2 = 4.94$ ,  $p = .026$ . Participants whose wise reasoning changed little ( $-1$  *SD*) from before to after the intervention reported highly inaccurate forecasts vs. experiences. Specifically, they reported more intense experiences compared to forecasted feelings toward close others for negative emotions,  $t = 4.16$ ,  $p < .0001$ , and less intense experiences compared to forecasted feelings for positive emotions,  $t = 3.33$ ,  $p = .001$ . In contrast, this lack of match between forecasted and experienced feelings toward close others was substantially attenuated among participants who showed more growth ( $+1$  *SD*) in wise reasoning due to the intervention. They showed no significant difference between forecasted and experienced feelings toward close others for both negative,  $t = 1.87$ ,  $p = .062$ , and positive emotions,  $t = 1.72$ ,  $p = .085$  (see Figure S5-B). In short, analyses with growth in wise reasoning as a moderator of emotional forecasting accuracy mirrored the pattern of results for training effects, suggesting that growth in wise reasoning leads to more balanced, less extreme experience of negative events down the road, providing further evidence of predictive validity of wise reasoning.

### Probing Attrition-Based Bias

The attrition between lab sessions was not significantly different between conditions,  $B = 0.18$ ,  $SE = 2.39$ ,  $z = 0.07$ , *ns*.

### Does sub-sample (subject pool students vs. community) qualify effects of wise reasoning?

We examined whether the training-driven effects on wise reasoning are qualified by sample (first lab-session: subject pool  $n = 92$  / community  $n = 56$ ; second lab-session: subject pool  $n = 72$  / community  $n = 48$ ). Results from analyses with sample type as a covariate revealed no significant effect of sample type, nor a significant condition X time X sample type interaction,  $ts < 0.90$ , *ns*, but a significant predicted condition X time interaction,  $t = 2.62$ ,  $p = .009$ , indicating comparable effects among subject pool students and the sample from the broader community.

### Controlling for heterogeneity of events recalled before and after the intervention

We quantified events participants recalled in three ways. First, we examined whether the target person involved in the social conflict was the same (1) or different (0) across both time points. Second, hypothesis- and condition-blind rater categorized the location where the social conflict took place, based on participants' open-ended responses to the same question, with four categories: home (58%), university (9%), work (5%), other (28%). Third, two hypothesis- and condition-blind raters categorized the type of social conflict based on participants' open-ended responses to the questions concerning description of the event and the stream of thought essays, with six categories: conflict with a loved one (16%), conflict with a family member (17%),

conflict with a friend (28%), conflict with a house/roommate (7%), conflict at work (10%), other type of conflict (22%), with raters showing very high level of interrater reliability (Kendall's  $W = .98$ ), and disagreements resolved via group discussion. Results with these covariates in the model are below, indicating a significant Condition X Time interaction, with a significant growth in wise reasoning in the training condition, but not in the control condition.

Results below indicated a significant Condition X Time interaction, along with effects of place and event type. Specifically, we observed positive change in wise reasoning in the training condition, but not in the control condition. Further, as table below shows, we observed significantly more wise reasoning for conflicts that happened at the university than at home,  $t(1,242) = 3.41, p = .003$ , as greater wise reasoning for conflicts involving a loved one as compared to other types of social conflict (e.g., conflicts at work, conflicts with family members, or otherwise).

```

F Df Df.res Pr(>F)
Time.F      16.0557 1 2656.04 0.0000632 ***
Condition.F    0.0398 1 143.80 0.8421120
same.person   0.9699 1 153.48 0.3262472
where.code    5.1322 3 1305.11 0.0015684 **
event.code.final 4.9975 5 1132.93 0.0001558 ***
Time.F:Condition.F 7.4859 1 2655.91 0.0062596 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Condition.F = control:
contrast      estimate    SE  df t.ratio p.value
Before - After -0.0244 0.0302 2657 -0.807  0.4195

Condition.F = training:
contrast      estimate    SE  df t.ratio p.value
Before - After -0.1416 0.0297 2657 -4.766  <.0001

Results are averaged over the levels of: same.person, where.code, event.code.final
Degrees-of-freedom method: kenward-roger

contrast      estimate    SE  df t.ratio p.value
family - friend -0.02975 0.0426 1255 -0.699  0.9821
family - intimate -0.14622 0.0487 1203 -3.005  0.0323
family - other  0.09023 0.0462 1039  1.952  0.3708
family - roommate -0.00268 0.0641 1013 -0.042  1.0000
family - work   0.05212 0.0677 1206  0.770  0.9725
friend - intimate -0.11647 0.0451 1100 -2.580  0.1029
friend - other   0.11998 0.0394 1236  3.041  0.0290
friend - roommate 0.02707 0.0594 1088  0.456  0.9975
friend - work    0.08188 0.0645 1167  1.270  0.8016
intimate - other  0.23645 0.0494  840  4.788  <.0001
intimate - roommate 0.14354 0.0660  958  2.176  0.2499
intimate - work   0.19834 0.0685 1288  2.895  0.0446
other - roommate -0.09291 0.0607 1149 -1.530  0.6448
other - work     -0.03810 0.0647 1183 -0.589  0.9918
roommate - work   0.05480 0.0768 1392  0.714  0.9803

Results are averaged over the levels of: Time.F, Condition.F, same.person, where.code
Degrees-of-freedom method: kenward-roger
P value adjustment: tukey method for comparing a family of 6 estimates

```

In another set of analyses, we controlled for further heterogeneity of reported conflicts (time of the day, day of the week, as well as duration of the conflict), along with length of the essays and presence of adversity during the intervention. As expected, longer essays were coded



as including more wise reasoning themes than shorter essays. However, independent of this effect once again we observed a significant Condition X Time interaction. Further, participants showed wiser reasoning for conflicts that happened later in the week and earlier in the day.

	Est.	S.E.	t val.	d.f.	p
(Intercept)	1.2677	0.0795	15.9463	243.0625	0.0000
Time.D	0.0405	0.0311	1.3030	2472.5784	0.1927
Condition.D	-0.0634	0.0438	-1.4460	192.6651	0.1498
weekday	0.0254	0.0062	4.1234	1067.1737	0.0000
time	-0.0553	0.0207	-2.6731	772.9857	0.0077
length	-0.0080	0.0104	-0.7702	810.4329	0.4414
streamwords	0.0012	0.0002	4.9468	755.2579	0.0000
adverse.events	0.0071	0.0090	0.7927	140.7894	0.4293
Time.D:Condition.D	0.1363	0.0435	3.1330	2472.9620	0.0018

*p values calculated using Kenward-Roger standard errors and d.f.*

### Indirect effect of growth in wise reasoning via broader/narrower self-focus by sub-components

We examined Indirect, Direct and Total Effects of growth (after vs. before the intervention) for each wise reasoning theme in the experimental group of Study 1. To this end, we performed indirect effect analyses (Tingley, Yamamoto, Keele, & Imai, 2014) with; 5000 simulations. Results indicated a significant partial mediation for search for conflict resolution, with the indirect effect accounting for 12.5% of the variance in the total effect of growth in this sub-component (total effect size  $\eta_p^2 = .034$ ). They also suggest a non-significant trend for an indirect effect for search for compromise in the same direction. In short, indirect effect analyses suggest that the mediation of the growth effect via change in self-focus was in a small range and chiefly driven by moral aspirational components of the wise reasoning construct.

Theme	Effect Type	<i>B</i>	90% CI Lower	90% CI Upper	<i>p</i>
Intellectual Humility Proportion Mediated of Total = .015	Indirect	0.003	-0.01	0.02	<i>ns</i>
	Direct	0.15	0.08	0.21	< .001
	Total	0.15	0.09	0.21	< .001
Recognition of Change Proportion Mediated of Total = .152*	Indirect	0.02	-0.001	0.05	.100
	Direct	-0.06	-0.18	0.05	<i>ns</i>
	Total	-0.04	-0.1816	0.07	<i>ns</i>
Consideration of Others' Perspectives Proportion Mediated of Total = .078	Indirect	0.02	-0.001	0.04	.116
	Direct	0.20	0.11	0.30	< .001
	Total	0.22	0.13	0.32	< .001
Search for Compromise Proportion Mediated of Total = .241	Indirect	0.02	0.001	0.04	.08
	Direct	0.03	-0.05	0.10	<i>ns</i>
	Total	0.04	-0.03	0.11	<i>ns</i>

Search for Conflict Resolution	<b>Indirect</b>	<b>0.04</b>	<b>0.01</b>	<b>0.07</b>	<b>.017</b>
Proportion Mediated of Total = .125	Direct	0.24	0.13	0.36	< .001
	Total	0.28	0.16	0.39	< .001

*Notes.* Effects from multi-level indirect effect tests with 5000 simulations. *CI* = Quasi-Bayesian Confidence Intervals. Boldface indicates  $p < .05$ . \* due to inconsistent sign of indirect and total effects, the proportion mediated for perspective-taking analysis should be interpreted with caution. *ns* indicates  $ps > .379$ .

### Distinctiveness of the post-training events

We hypothesized that our intervention during the diary would have carry-over effects on reasoning about a novel challenge. However, it is possible that some participants selected a recurring event in the post-diary laboratory session. To control for the novelty of the event, we performed analyses with dummy-coded event novelty as a control variable (coded by a hypothesis- and condition-blind research assistant) and wise reasoning as the outcome. Results indicated a main effect of novelty, such that wise reasoning was greater for events on which participants had previously reflected during the diary period,  $B = 0.16$ ,  $SE = 0.05$ ,  $t = 3.03$ ,  $\chi^2 = 9.18$ ,  $p = .002$ . Results also indicated a main effect of training condition, such that wise reasoning was greater post- as compared to pre-intervention,  $B = 0.05$ ,  $SE = 0.02$ ,  $t = 2.44$ ,  $\chi^2 = 5.93$ ,  $p = 0.015$ . Furthermore, controlling for novelty, this growth effect for wise reasoning continued to be qualified by a significant Condition X Time interaction,  $t = 2.53$ ,  $\chi^2 = 6.38$ ,  $p = 0.012$ . Simple slopes indicated significant growth pre- to post-intervention in the third-person training condition,  $B = 0.10$ ,  $SE = 0.03$ ,  $t = 3.48$ ,  $P < 0.001$ , but not the control condition,  $B = 0.0001$ ,  $SE = 0.03$ ,  $t = 0.01$ , *ns*.

### Does distant self reflection promote emphasis of one's social role?

We tested whether distant self-talk in reflections on events leads to greater emphasis of one's social roles by coding for presence of social role references in participants' daily diary narratives. Results indicated that such self-references were overall very rare, 2.16% (28 references in 1297 reflections). A generalized mixed model with participants as a random factor and training condition as a Level 2 predictor indicated no significant difference in social role references between the control (2.78%) and training (1.67%) conditions,  $B = 0.439$ ,  $SE = 0.455$ ,  $z = 0.97$ ,  $p = .33$ .

### Does the training effect of distant self reflection hold when controlling for emotion regulation tendencies?

During the initial and post-intervention surveys, participants filled out an emotion regulation questionnaire assessing individual differences in reappraisal and suppression regulatory tendencies (Gross & John, 2003). Both reappraisal and suppression items showed good reliability ( $\alpha s > .80$ ) and were therefore collapsed and included as covariates in the models with wise reasoning as a dependent variable. When controlling for both covariates, we replicated the growth in wise reasoning post- compared to pre-intervention in the training condition,  $B = 0.09$ ,  $SE = 0.09$ ,  $t = 3.42$ ,  $p = .001$ , but not in the control condition,  $B = 0.02$ ,  $SE = 0.03$ ,  $t = 0.61$ , *ns*.

### Training effects on the self-reported wise reasoning questionnaire

In exploratory analyses, we fit a linear mixed model with participants, and scale items as random factors, time (pre-post) as a Level 1 predictor, and training condition as a Level 2 predictor. Results indicated a significant main effect of time,  $B = -0.07$ ,  $SE = 0.03$ ,  $\chi^2 = 5.62$ ,  $p = .02$ , suggesting that participants' self-reported reasoning scores decreased after the intervention as compared to before it. This effect was qualified by condition,  $t = 1.69$ ,  $p = .090$ : Participants in the control condition showed a significant reduction in self-reported wise reasoning after (vs. before) the diary,  $B = -0.12$ ,  $SE = 0.04$ ,  $t = 2.84$ ,  $p = .005$ , whereas participants in the distant self training condition sustained a comparable degree of self-reported wise reasoning when comparing scores before and after the intervention,  $B = -0.02$ ,  $SE = 0.04$ ,  $t = 0.55$ , *ns*. Examining the wise reasoning themes revealed that this trend was driven by changes in the search for conflict resolution component in the control,  $B = -0.17$ ,  $SE = 0.08$ ,  $t = 2.19$ ,  $p = .03$  but not the training condition,  $B = -0.01$ ,  $SE = 0.07$ ,  $t = 0.15$ , *ns*., with no significant effects on other components,  $ts < 1.49$ , *ns*. These exploratory analyses suggest that the effect of training is more pronounced in the pre-registered method of coding spontaneous reasoning in written essays as compared to the subsequent self-report questionnaire. Though speculative, this discrepancy may be due to distinct levels of analysis (spontaneous open-ended responses vs. forced-choice responses prompted via a questionnaire), or the procedural flow (participants first wrote down their essays and only thereafter filled out a questionnaire). In the distant self condition, writing down reflections on the conflict could have further prompted greater consideration of meta-cognitive features thereafter (Pennebaker, 1997), resulting in the maintenance of wise reasoning across measurement points. Conversely, in the first-person control condition writing down reflections on the conflict could have resulted in avoidance of further thinking about the issue, and subsequent decline in self-reported wise reasoning over time. Future research should aim to replicate and further unpack this exploratory pattern of results.

### Training effects on alignment of forecasts for general mood and experiences

Participants' ratings of forecasted and experienced general mood were subjected to a general mixed effects model, with participants and events as random factors, event valence (positive vs. negative) and time (forecast vs. experience) as Level 1 predictors, and training condition as a Level 2 predictor. The results indicated a significant effect of event type,  $B = 2.99$ ,  $SE = 0.09$ ,  $t(653) = 34.02$ ,  $p < .001$ , showing that people reported greater happiness after positive events compared to negative events, and no significant 2- or 3-way interactions,  $ts < 1$ , *ns*, suggesting that there was no difference in anticipated vs. experienced mood, and no training effects.

## Study 2

### Methods

**Table S3**  
***Structure and Timeline***

Stage	Content	Timeline
1	Pre-Diary On-line Session	~15 min 3-day delay, then diary begins
2	Online Diary	5 min/daily 7 days
3	Post-Diary On-line Session	~15 min

### General Analytical Notes

We normalized dependent variables involving wise reasoning that violated the normality assumption by converting the scores to normal scores using the *QuantPsyc* package in R (Fletcher, 2012), maintaining the original mean and standard deviation (see R notebook on the OSF page of the research project). We used *lme4* (Bates et al., 2015) (42) to perform general multilevel analyses. We used *jtools* (Long, 2018) to provide estimates of significance and *emmeans* (Lenth, 2019) to perform pairwise comparisons for the purposes of understanding two-way interactions.

### Online Sessions Before and After the Diary Intervention

Social event description. All parts of the study were completed online. For descriptions of social events, participants received a definition of a difficult social event identical to Study 1. To encourage participants to reflect on a novel difficult event, the instructions after the diary intervention specifically indicated:

*We would like you to recall a major difficult social event, ideally from the last seven days (including today), either the most recent conflict/argument you had with another person or the most recent social interaction you had with another person that annoyed/irritated you.*

After reconstructing and providing a detailed description of the event, we asked participants to reflect on the event for *at least* 30 seconds. Following this reflection, we instructed participants to:

*Write at least two paragraphs describing your stream of thoughts about this social event in detail below.*

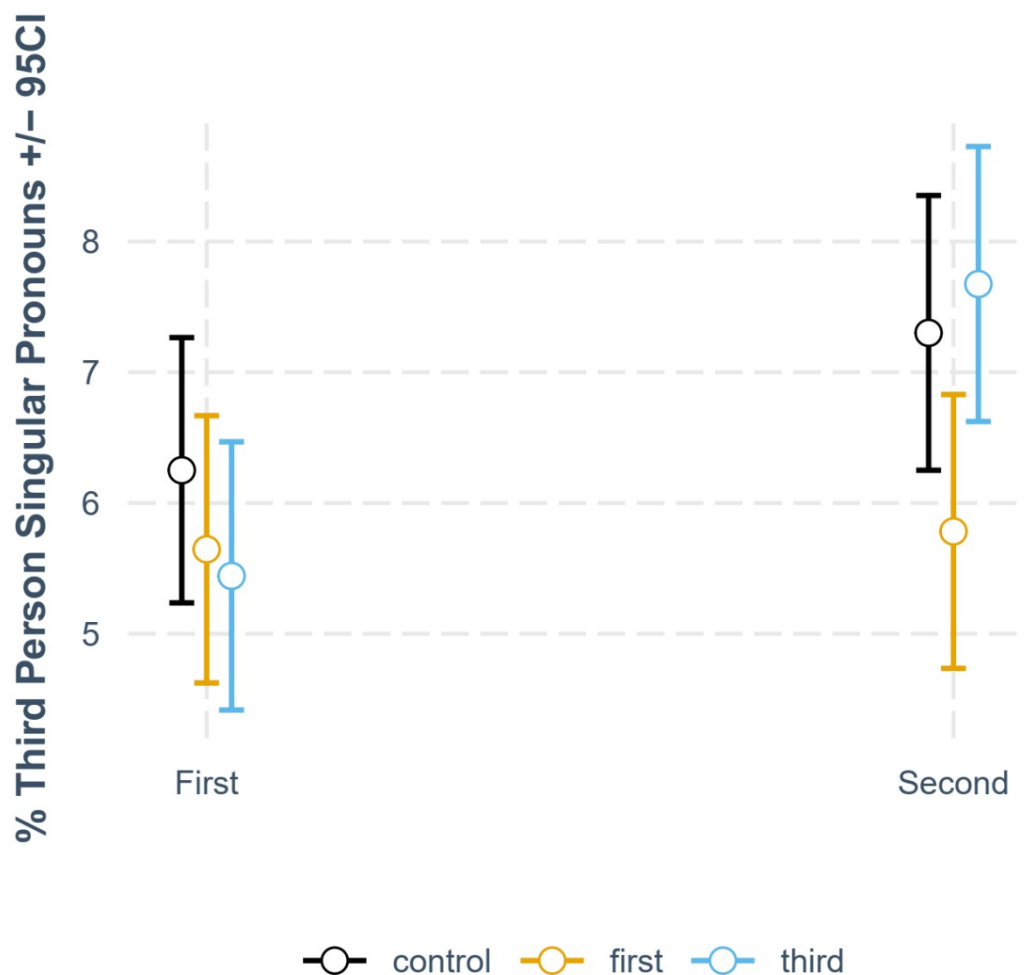
To encourage participants to provide richer responses, allowing subsequent analysis for wise reasoning, we added the following instruction:

*The quality of the data in this study is dependent on participants providing rich written responses. Please take your time to complete this task.*

## Results

### Manipulation checks

We examined training-driven shifts in percentages of third-person pronoun use (she, her, he, his) in narratives participants wrote before and after the intervention sessions, following the pre-registration protocol in Study 1. We observed a significant Condition X Time interaction,  $\chi^2 (df = 2) = 6.70, p = .035$ . As Figure S7 indicates, participants in the third-person condition demonstrated a significant increase in number of third-person pronouns after the intervention compared to before the intervention,  $B = 2.47, SE = 0.63, t = 3.92, p = .001$ . There was no significant difference from before to after intervention observed in the first-person condition,  $B = 0.19, SE = 0.63, t = 0.31, ns.$ , nor in the no-instruction control condition,  $B = 0.98, SE = 0.62, t = 1.58, p = .11$ .



**Figure S7.** Percentage of 3<sup>rd</sup> person pronouns in narratives as a function of condition in Study 2. First = Time before the intervention. Second = Time after the intervention. Mean estimates and 95% confidence intervals.

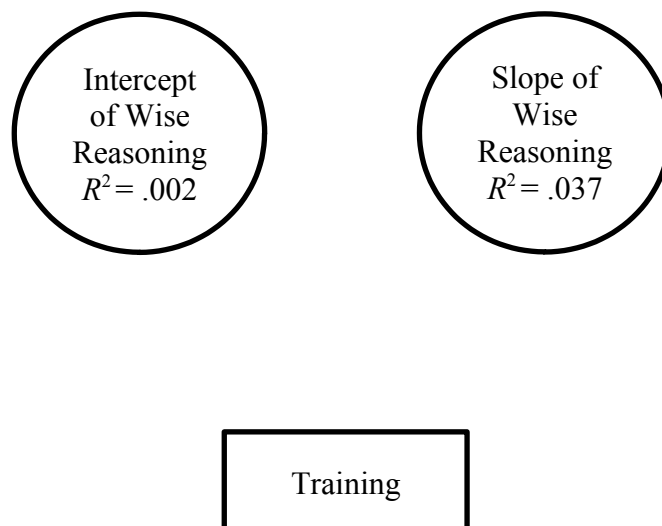
## Distinctiveness of the post-training events

To control for the novelty of the event, we performed analyses with dummy-coded event novelty of the post-intervention event as a control variable. A hypothesis- and condition-blind research assistant coded narratives for (a) mentioning that they have already described the event during the diary, and; (b) that the event occurred more than a week ago (and thus prior to the diary training). In addition to these two coded variables, we included the self-reported question concerning novel vs. recurring nature of the pre- and post-intervention event as a third covariate.

As in Study 1, results indicated a main effect of novelty, such that wise reasoning was greater for events on which participants had previously reflected during the diary period,  $B = 0.14$ ,  $SE = 0.055$ ,  $t = 2.47$ ,  $\chi^2 = 6.10$ ,  $p = 0.01$ . Further replicating Study 1, results indicated a main effect of training, such that wise reasoning was greater post- as compared to pre-intervention,  $B = 0.10$ ,  $SE = 0.02$ ,  $t = 5.79$ ,  $\chi^2 = 33.54$ ,  $p < .0001$ . Furthermore, controlling for event distinctiveness, this growth effect for wise reasoning continued to be qualified by a significant Time X Condition interaction,  $\chi^2 = 14.18$ ,  $p = .001$ . Simple effects indicated at least twice as much growth pre- to post-intervention in the third-person training condition,  $B = 0.30$ ,  $SE = 0.03$ ,  $t = 10.06$ ,  $p < .001$ ,  $R^2 = 0.04$ , compared to the first-person condition,  $B = 0.14$ ,  $SE = 0.03$ ,  $t = 5.17$ ,  $p < .001$ ,  $R^2 = 0.025$ , and the no-instruction control condition,  $B = 0.13$ ,  $SE = 0.025$ ,  $t = 5.23$ ,  $p < .001$ ,  $R^2 = 0.01$ .

## Multiverse analysis – Growth curve model of change with condition as a predictor

Though linear mixed models and growth curve models are mathematically equivalent, we sought to be informative to perform moderated growth curve modelling of change (before → after of intervention), with intervention contrast (distant self-reflection = 1 vs. first-person/ no instruction self-reflection = 0) as a regressor that influences the latent growth curve factors (i.e., its intercept and slope). Intercept and slope latent factors were made-up of the individual coded scores for each theme of wise reasoning. We used lavaan (Rosseel, 2012) to fit a linear growth curve model, as depicted in the graphical representation of the model below. Whereas the effect of training on the intercept would indicate the baseline effect before the intervention, the effect of training on the slope would indicate the incremental change after the intervention.



Regressions:						
	Estimate	Std.Err	z-value	P(> z )	Std.lv	$\beta$
intercept ~						
training	-0.024	0.031	-0.768	0.442	-0.095	-0.045
slope ~						
training	0.154	0.049	3.159	0.002	0.407	0.192

We replicated the effects from the linear mixed model, with table above showing no significant differences across training conditions (intervention vs. controls) at baseline (intercept ~ training effect), but a significant effect of training (vs. controls) on the slope of wise reasoning. Standardized estimates suggest a moderate effect size of the training effect on the growth curve in wise reasoning,  $\beta = .192$ .

## Supplementary Study 3: When does Distant Self-Reflection Promote Wise Reasoning?

In a supplementary pre-registered Study ([osf.io/kxafv](https://osf.io/kxafv);  $N = 712$ ) we examined the effects of the default intent of distant self-reflection for wise reasoning: Is the goal of distant self-reflection more akin to self-distancing or rather impression management and self-presentation? To address this question, we manipulated the goal of distant self-reflection.

Participants imagined being a housing developer accused of immoral business practices. Accusations concerned unstable buildings that may have been constructed by the company and that resulted in temporary displacement of many families in the region. Participants were instructed to use distant self-reflection on recent allegations against one's company and preparing for a press conference. Participants were randomly assigned to pursue the goal of self-presentation (to present oneself in the best possible light), self-distancing, or a control goal of merely reflecting. Participants reflected on the scenario and then answered a set of six questions tapping into their current intellectual humility, openness to diverse viewpoints, interest in balanced opinions on the issue, and consideration of change.

We tested the prediction that distant self-reflection's effect on wise reasoning would be by default (without goal instructions) equivalent to the goal of achieving self-distance, rather than the goal of self-presentation. Additionally, we aimed to show that self-presentation goal during distant self-reflection would inhibit wise reasoning relative to self-distancing goal. We hypothesized that the effect of distant self-reflection depends on one's goal: Typical reflection and self-distancing goals may foster wiser reasoning than using distant self-reflection with the goal of favorable self-presentation (i.e., defending your name).

## Method

### Recruitment

The study was reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE #20363). We recruited American and Canadian Amazon Mechanical Turk (MTurk) workers to "examine what people feel and do when encountering life challenges," for the opportunity to earn \$0.90. Based on estimates of self-distancing effects in prior MTurk studies involving self-report questionnaires (CITE;  $\eta^2 = .01$ ), an alpha of 5% and



beta of 20%, and two predictors (to ensure we can test both the contrast of self-presentation vs. self-distanced goal, and to account for the presence of the reflection control condition in the analyses), we aimed to recruit 649 participants, with a plan to oversample to 700 participants to account for attrition. Upon initial inspection of compliance with goal instructions (see screening criteria below), we sought to recruit a larger number of participants to account for non-compliance and presence of bots filling out MTurk studies. At the end we recruited 843 participants, 712 of whom (283 defend your name/242 distance the self/289 reflection control;  $M$  age = 34.14,  $SD$  age = 11.04,  $Range$  age = 18-73; 53% female; 37% without a 4-year college degree;  $Mdn$  household income = \$50,001 - \$75,000; 60% White, 7% Asian, 7% Hispanic/Latinx, 7% African/African-American, 18% mixed, 1% other ethnicity) qualified for the study.

As specified in the pre-registered protocol, we excluded participants who did not provide open-ended responses to the writing prompts, did not follow writing instructions (based on their open-ended narratives) and participants who provided nonsense responses to open-ended segments. Upon inspection of the distribution of close-ended responses, we further excluded automated *bot-style* responses, with a handful of participants providing the identical maximum score on all items on all questions (irrespective of scale direction).

## Procedure

After providing informed consent, participants read a description of a work challenge, asking them to imagine they are the president of a major construction company carrying their name and recently learned about allegations concerning unstable constructions built by the company (see verbatim instructions below). Participants were instructed to spend at least 10s thinking through the scenario when preparing to speak about the allegations at a press conference. Subsequently, participants were randomly assigned to one of the three conditions: self-presentation goal (“defend your name at all costs and present yourself in the best possible light”), self-distancing goal (“adopt a fly-on-the-wall perspective [i.e., a perspective from which you can watch others, without putting yourself in the foreground]”), or the control goal of reflection (“reflect on the issue concerning the recent allegations”). Participants in each condition were first instructed to use third-person language while reflecting on the situation, referring to themselves in a third person and using pronouns he/she as much as possible. They were next reminded of their assigned goal and asking to spend at least a minute writing down their thoughts for the press conference.

Participants then completed an exploratory questionnaire concerning manipulation check, assessing the extent to which they i) tried to present themselves in the best possible light to others; ii) tried to view the events from a third-person perspective (i.e., observed and considered events and people, without putting themselves in the foreground); iii) tried to be more focused on themselves; and iv) tried to defend their and their company's names (1 = *not at all* to 7 = *very much*). All items were presented in randomized order. The manipulation check was successful (see below). Subsequently, participants reported their wise reasoning and completed demographic questions.

## Wise Reasoning

Participants completed six questions adopted from the previously validated state-level measure of wise reasoning (Brienza et al., 2018), asking participants to indicate how much they: i) considered the perspective of the other people involved in this issue; ii) double-checked whether they had enough information about the issues, prior to presenting their opinion; iii)



considered opinions different from theirs; iv) tried to gain a balanced perspective on accusations against their company; v) tried to be clear and reasonable about this issue; and vi) considered different ways the issue might unfold after the press conference (1 = *not at all* to 7 = *very much*). Items were presented in randomized order. These items were highly consistent ( $\alpha = .86$ ,  $M_r = .52$ ).

## Results

### Manipulation check

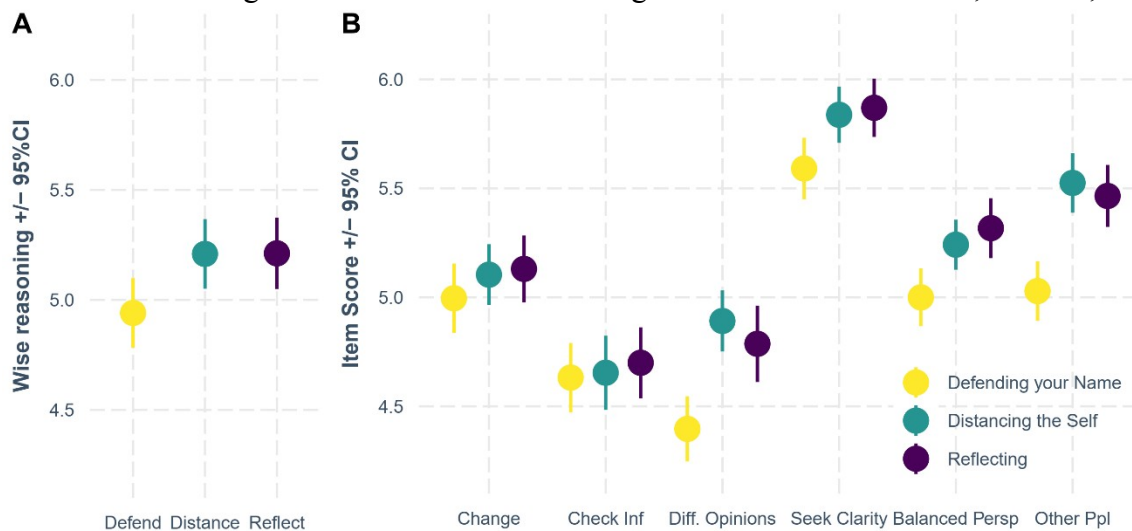
Figure S8 shows results of the manipulation check items. Three of these items (*tried to present yourself in the best possible light to others*; *tried to be more focused on yourself*; *tried to defend yours and your company's name*) aimed to assess whether participants in the self-presentation condition scored higher than participants in the self-distancing and reflection control conditions. Indeed, this was the case (see Figure S4), with the largest difference between self-presentation and self-distancing conditions,  $t_s > 7.37$ ,  $p_s < .001$ , followed by the difference between self-presentation and reflection conditions,  $t_s > 4.79$ ,  $p_s < .001$ . In comparison, the difference between self-distancing and reflection conditions was non-significant for one item (*defend your company name*),  $t = 0.84$ ,  $ns$ , or showed that participants in the self-distancing condition scored somewhat lower than participants in the reflection condition for the other two manipulation check items,  $t_s > 2.50$ ,  $p_s < .034$ . The fourth manipulation check item assessed degree of third-person viewpoint, asking participants whether they *tried to view the events from a third person perspective (i.e., observed and considered events and people, without putting yourself in the foreground)*. As Figure S8 indicates, participants in the self-distancing condition scored highest on this dimension than participants in the self-presentation condition,  $t = 3.53$ ,  $p = .001$ , and participants in the reflection condition,  $t = 2.58$ ,  $p = .028$ . Estimates of participants in the reflection condition were in-between self-distancing and self-presentation condition, though not significantly different from the latter ones,  $t = 0.91$ ,  $p = .63$ . In short, the manipulation was successful, with estimates from participants in the reflection condition closer to estimates from participants in the self-distancing condition than the self-presentation condition.



**Figure S8.** Effects of condition on manipulation check items in Study 3. Estimates with 95% Confidence Interval.

### Effects of goals of distant self-reflection on wise reasoning

We fit a general linear model, nesting responses to questions within participants, with goal condition as a Level 2 predictor. In line with our prediction, we observed a main effect of condition,  $\chi^2(df=2) = 7.39, p = .025$  (Figure S9): Participants in the self-distancing goal condition showed more wise reasoning than participants in the self-presentation condition,  $B = 0.27, SE = 0.11, t = 2.35, p = .019$ . Similarly, participants in the reflection condition showed more wise reasoning than participants in the self-presentation condition,  $t = 2.35, p = .019$ , but no difference emerged between the self-distancing and reflection conditions,  $t = 0.02, ns$ .



**Figure S9.** Boundary condition of distant self-reflection as a function of one's goal. Mean estimates with 95% confidence intervals. Panel A: Results across all items. Panel B: Item-wise results. Change = consider different ways the issue may unfold after the press conference; Check Inf = double-check whether you have enough information

about the issues, prior to presenting your opinion; Diff. Opinions = consider opinions different from yours; Seek Clarity = try to be clear and reasonable about this issue; Balanced Persp = try to gain a balanced perspective on accusations against your company; Other Ppl = consider the perspective of the other people involved in this issue.

## Item-wise analyses

As Figure S9 and Table S5 indicate, four out of six items showed a predicted effect, with self-presentation goal resulting in lower wise reasoning than self-distancing and reflection goals, with no significant difference between the latter two goals.

**Table S5**

*Item-wise analyses for wise reasoning as a function of condition in Study 3*

	Contrast	<i>t</i>	<i>p</i>
<i>consider the perspective of the other people involved in this issue</i>	Distance vs. Defend the Self	3.30	.001
	Reflect vs. Defend the Self	2.87	.004
	Distance the Self vs. Reflect	0.39	<i>ns</i>
<i>double-check whether you have enough information about the issues, prior to presenting your opinion</i>	Distance vs. Defend the Self	0.14	<i>ns</i>
	Reflect vs. Defend the Self	0.41	<i>ns</i>
	Distance the Self vs. Reflect	0.28	<i>ns</i>
<i>consider opinions different from yours</i>	Distance vs. Defend the Self	3.13	.002
	Reflect vs. Defend the Self	2.44	.015
	Distance the Self vs. Reflect	0.65	<i>ns</i>
<i>try to gain a balanced perspective on accusations against your company</i>	Distance vs. Defend the Self	1.66	.097
	Reflect vs. Defend the Self	2.16	.031
	Distance the Self vs. Reflect	0.51	<i>ns</i>
<i>try to be clear and reasonable about this issue</i>	Distance vs. Defend the Self	2.03	.042
	Reflect vs. Defend the Self	2.27	.023
	Distance the Self vs. Reflect	0.26	<i>ns</i>
<i>consider different ways the issue may unfold after the press conference</i>	Distance vs. Defend the Self	0.73	<i>ns</i>
	Reflect vs. Defend the Self	0.90	<i>ns</i>
	Distance the Self vs. Reflect	0.17	<i>ns</i>

*Note.* *ns* =  $p > .500$

## Supplementary Appendix I

### Manipulation Instructions in Studies 1 and 2

#### TRAINING CONDITION:

EVENT RECALL: To facilitate your recall, please try to visualize this social event from a third person perspective. Picture yourself in the event and ask yourself, “Why is **he/she** [referring to yourself] feeling or behaving this way?”

STREAM-OF-THOUGHTS: Please describe your stream of thoughts about today's social event from a **third person perspective** in detail below. To help you take the third person perspective, use your name as much as possible as you describe the event and your stream of thoughts. For example, **if your name were Chris**, you might write, “**Chris** thinks ... **Chris** feels ...”

---

#### [CONTROL CONDITION]

EVENT RECALL: To facilitate your recall, please try to visualize this social event from a first person **perspective**. Picture yourself in the event and ask yourself, “Why **am I** feeling or behaving this way?”

STREAM-OF-THOUGHTS: Please describe your stream of thoughts about today's social event from a **first person perspective** in detail below. To help you take the first person perspective, use the pronouns **I/me** as much as possible as you describe the event and your stream of thoughts. For example, you might write, “**I** think ... **I** feel ...”

---

#### NO-INSTRUCTION CONTROL CONDITION, STUDY 2:

EVENT RECALL: To facilitate your recall, please try to visualize this social event. Picture yourself in the event and ask yourself, why you are feeling or behaving the way you do.

STREAM-OF-THOUGHTS: Please describe your stream of thoughts about today's social event in detail below. To help you visualize the event, try to focus on your feelings and thoughts as much as possible as you describe the event and your stream of thoughts.

### Instructions in Supplementary Study 3

One of the things we're interested in is the different ways people think about life challenges. One particular type of challenge deals with problems at work. This is the type of situation we would like you to think about.

*Imagine that your name is Alex McClusky and you are the president of the major construction company carrying your name in a midsize city in the Midwest. Until recently, your company has been doing well, but recently it has been affected by the economic volatility in the region and the stiff competition from other companies. Since last year, your company has been providing a special discount house building program for large families.*

*An hour ago, you learned from your secretary about recent allegations against your company. These allegations concern unstable buildings that may have been constructed by your company. The severe structural problems resulted in temporary displacement of a large number of families in the region. You have not been directly aware of these allegations, though it is possible that some of your employees may have tried to cut corners.*

You are now preparing to speak about the allegations at a press conference.

Please, spend **at least** 10 sec thinking about this scenario.

---

We would like you to put yourself in Alex McClusky's shoes.

As Alex McClusky, your chief goal is to **reflect on the issue concerning the recent allegations against your company**. [REFLECTION]

As Alex McClusky, your chief goal is to adopt a **third-person, "fly-on-the-wall" perspective (i.e., a perspective from which you can watch others, without putting yourself in the foreground)**. [SELF-DISTANCING]

As Alex McClusky, your chief goal is to **defend your name at all costs and to present yourself in the best possible light**. [SELF-PRESENTATION]

Please, close your eyes and imagine sitting at a press conference, with reporters waiting for your statement.

---

REFLECTION: Recent research indicates that talking in a third person, using your's and your company's name "Alex McClusky" and pronouns **he/she** as much as possible can be helpful to reflect on such situations. This is exactly what we would like you to do:

You are Alex McClusky and you **refer to yourself exclusively in a third person**, only using your's and your company's name "Alex McClusky" and pronouns **he/she** as much as possible

NEXT PAGE As a reminder, your chief goal is to **reflect on the issue** concerning the recent allegations against your company. To make sure you understand this goal, please write down this chief goal in the box below:

NEXT PAGE: As Alex McClusky, you prepare your thoughts for the press conference, keeping your chief goal in mind.

To this end, you refer to yourself **exclusively in a third person**, only using your's and your company's name "Alex McClusky" and pronouns **he/she** as much as possible. For example, you may write "McClusky thinks... McClusky feels... " Please take at least a minute to prepare your thoughts for the press conference, following these guidelines, and write them in the box below. We will notify you when you can continue.

---

SELF-DISTANCING: Recent research indicates that talking in a third person, using your's and your company's name "Alex McClusky" and pronouns he/she as much as possible can be helpful to reflect on such situations from a third-person, "fly-on-the-wall" perspective (i.e., a perspective from which you can watch others, without putting yourself in the foreground). This is exactly what we would like you to do:

You are Alex McClusky and you **refer to yourself exclusively in a third person** when thinking what you want to share at the press conference, only using your's and your company's name "Alex McClusky" and pronouns he/she as much as possible.

NEXT PAGE: As a reminder, your chief goal is to **adopt a third-person, "fly-on-the-wall" perspective (i.e., a perspective from which you can watch others, without putting yourself in the foreground)**. To make sure you understand this goal, please write down this chief goal in the box below:

NEXT PAGE: As Alex McClusky, you prepare your thoughts for the press conference, keeping your chief goal in mind.

To this end, you refer to yourself **exclusively in a third person**, only using your's and your company's name "Alex McClusky" and pronouns **he/she** as much as possible. For example, you may write "McClusky thinks... McClusky feels... " Please take at least a minute prepare your thoughts for the press conference, following these guidelines, and write them in the box below. We will notify you when you can continue.

---

SELF-PRESENTATION: Recent research indicates that talking in a third person, using your's and your company's name "Alex McClusky" and pronouns he/she as much as possible can be helpful for defending one's name at all costs and for presenting oneself in the best possible light. This is exactly what we would like you to do:

You are Alex McClusky and you **refer to yourself exclusively in a third person** when thinking what you want to share at the press conference, only using your's and your company's name "Alex McClusky" and pronouns he/she as much as possible.

NEXT PAGE: As a reminder, your chief goal is to **defend your name at all costs and to present yourself in the best possible light**. To make sure you understand this goal, please write down this chief goal in the box below:

NEXT PAGE: As Alex McClusky, you prepare your thoughts for the press conference, keeping your chief goal in mind.

To this end, you refer to yourself **exclusively in a third person**, only using your's and your company's name "Alex McClusky" and pronouns **he/she** as much as possible. For example, you may write "McClusky thinks... McClusky feels... " Please take at least a minute prepare your thoughts for the press conference, following these guidelines, and write them in the box below. We will notify you when you can continue.

---

Do you want to see the scenario again?

yes no

*Imagine that your name is Alex McClusky and you are the president of the major construction company carrying your name in a midsize city in the Midwest. Until recently, your company has been doing well, but recently it has been affected by the economic volatility in the region and the stiff competition from other companies. Since last year, your company has been providing a special discount house building program for large families.*

*An hour ago, you learned from your secretary about recent allegations against your company. These allegations concern unstable buildings that may have been constructed by your company. The severe structural problems resulted in temporary displacement of a large number of families in the region. You have not been directly aware of these allegations, though it is possible that some of your employees may have tried to cut corners.*

*You are now preparing to speak about the allegations at a press conference.*

## Supplementary Appendix II

### WISE REASONING STUDY CODEBOOK (5-point scale)

#### STANDARD OPERATING PROCEDURE

Review this codebook before starting and code responses. Keep notes per coded narrative in the comments column for additional patterns in the data noticed (please keep information indicating the participant and survey type number).

#### **Context:**

You will be coding participants' reflections about a recent adverse event.

Participants were asked to reflect on a negative event that happened to them during the past week, which they reported as part of this study.

Participants received 2 prompts to do it, including a description and reflection on the event. You will be coding both of them.

The column labelled "event" should provide context for the situation you are to be coding. The prompt that participants were asked was

*"In the textbox below, please describe in as much detail as possible your most recent difficult social event."*

For the column you are coding the prompt is

*"Please write a paragraph or two detailing what thoughts come to your mind as you reflect on the event."*

#### **You will be coding the following dimensions:**

I. Recognition of Limits of Knowledge

II. Recognition of Multiple Ways Situation May Unfold / Recognition of Possibility of Change

III. Consideration/Recognition of (Different) Perspectives in the Narrative

IV. Integration of Perspectives/Compromise

V. Search for Resolution

#### GENERAL CODING INSTRUCTIONS AND COMMON ISSUES

1. First, we rule out people who do not have any responses to the questions (or wrote "I don't know," "no idea" or nonsense). Mark the Inclusion column with a 0 (the default value is 1). These participants will not be included in further analyses.
2. If you sense that some participants are not taking the test seriously, please mark the Flag Other column with a 1 and write your reason for possible exclusion. Nevertheless, still code it as you would any other response in the event we decide that it was valid.
3. We distinguish between **explicit** mentioning of a theme reflecting a particular dimension vs. an **indirect/implied** consideration of the theme. Responses that are vague, that merely imply the dimension, or only contain some components of the dimension receive a **partial** score. In general, you judge the statement as explicitly stating the dimension-specific theme (not necessarily exact words) when deciding to give an **in-depth** score.
4. Note that we are evaluating specific themes that guide participants' reasoning. Some participants may have great ideas and analyses – but use none of the targeted themes; they get a 0. Other participants may have their facts all wrong but admit lack of information or acknowledge change; they would then get a 1 or 2 depending on the degree.
5. Some dimensions (e.g., recognition of the limits of knowledge and the possibility of change; perspective-taking and perspective-integration) may overlap with each other. If a statement contains indications of both, then code them as such. Remember each time to pay attention to



whether the statement indicates partial or full status of each dimension. It is also possible to code for one dimension but not for the other.

### Reasons for updating coding categories (vs. validated procedure) from Grossmann et al., (2010; *PNAS*)

1) Whereas the initial coding (Grossmann et al., 2010) has focused on reflections about the future/present, the present set-up instructs participants to focus and reflect on recent autobiographical experiences (i.e., *past* events). Therefore, the updated codes applied to past-oriented reflections, though the codes did not include mere recounting of the social conflict participants reflected on:

- Recounting an event - simply restating the sequence of events that happened (X occurred, then Y, then Z, and so on) - is not enough for meeting any of the dimensions.
- Rather, participants need to show that they are **reflecting** on the event, which can range from considering how they or the involve parties felt at the time of the event, thinking about how new information they were unaware of/hindsight would have enticed them to act differently, to considering different actions that could have been taken, etc.

2) The initial 3-level coding system (i.e., not at all vs. partial (indirect/implied) vs. full (explicit) mentioning of each dimension; Grossmann et al., 2010) presented methodological challenges for establishing inter-rater reliability for two reasons: a) Low scale range does not provide sufficient information for researchers to learn from to improve interrater reliability. Moreover, restricted range is known to underestimate interrater reliability (Sackett et al., 2002); b) Experience with training coders for the wise reasoning system over the past decade has revealed challenges with establishing a reliable differentiation between partial and full consideration of a given dimension. This challenge was chiefly due to inability to clearly differentiate between explicit mentioning of a dimension and *multiple* indirect/implied statements referring to the same dimension. Given that the current study focused on autobiographical reflections, we borrowed insights from the autobiographical interview (Levine et al., 2002), which differentiates between single and multiple instances of mentioning a particular theme. Additionally, because we focus on depths of reflections, we viewed a *single* in-depth reflection on a given theme as higher in the coding system than *two* shallow mentioning of a theme. In-depth reflection was operationalized as involving an elaboration/explanation of a given theme. In social psychology and cognitive science, elaboration/explanation are customarily viewed as signs of more cognitively complex reasoning compared to mere restatement of a given theme (e.g., Lombrozo & Carey, 2006; Petty & Cacioppo, 1986).

The coding scale was changed to improve coder reliability (from 0 - Not Applicable / 1 – Partial / 2 – Full consideration of a theme) to:

- (1) Nothing about the theme is mentioned.
- (1) One instance of the theme is mentioned, but it is not described in depth.
- (2) Several instances of the theme are mentioned, but none are described in depth.
- (3) One or more instances of the theme are mentioned, and one of them is described in depth.
- (4) Several instances of the theme are mentioned, and 2+ are described in depth.

Please bear in mind that “instances” refers to the number of unique times a theme is described, not the number of examples of the theme (following Levine et al., 2002).

### Characterizations of shallow and deep utterances

- 1) **Shallow:** (Using **Search for Resolution** as an example) Participants indicate desire to resolve the situation
- 2) Participants acknowledge the importance of doing so, or indicate they are seeking a resolution but do not specify how.
- 3) Participant reflect and mention that they "ought to have" or "should have" considered/tried to reach/search for a resolution.
- 4) Participants briefly describe the example but *do not elaborate upon it*.

#### Depth:

- Requires that participants elaborate on the point
- The participant has to **demonstrate holistically a theme-oriented mindset** when discussing the conflict.
  - By Holistic, we mean a stream/event in which the general context and tone match what we are looking for a given dimension, in addition the participant providing concrete, explicit examples.
  - By contrast (using **Search for Resolution** as an example), some participants may provide a detailed resolution that would meet the depth criteria (and be coded as a 4), but the tone in their text might come across as dismissive. For example, they might focus more on their frustrations and their grievances, and then only grudgingly offer a resolution, which wouldn't be a "resolution-oriented" mindset.

## Theme-specific instructions

### Recognition of Limits of Knowledge

- The participant acknowledges that they may not have sufficient knowledge about a particular situation to make a fair judgement or response.
- Indicates they may lack knowledge about the factors that led to the behaviour of the individuals involved in the event behave in a particular way.
- When reflecting on the situation, the participant essentially gives the participant the benefit of the doubt and comes up with multiple possible reasons/explanations that may have contributed to how the event unfolded.
- Repeated statements of questioning situation or implying uncertainty (e.g. multiple perhaps, maybe)
- Recognition of misinterpretation of events/conflicts, which includes reflecting on how new information changes their perception of the event.

### Recognition of Many Ways Situation May Unfold / Recognition of Possibility of Change

- Participant specifies that there are multiple alternative trajectories that the situation could have unfolded in.
- Talks about two possible trajectories and explicitly links between them (“This might happen BUT this alternative sequence of events might also happen”)
- Setting up a trajectory then saying that something else could happen along the way. (“This might happen BUT THEN this might happen”)
- Explicitly mentions the concept of change in the future or brings up the idea of the world being in flux in the future (right now, not in the past).

### Consideration/Recognition of (Different) Perspectives in the Narrative

They give active consideration of how past, present, or future events might be viewed by the other party, and how it might influence them.

- Involves both seeing feelings and motivations and also seeing the reasoning behind that.
- Explains the reasoning behind these thoughts and how they came about.
- Shows the participant’s effort in trying to take the perspective of the characters.
- **If the conflict is not interpersonal in nature** (ex. car breaking down, suffering from a migraine), perspective taking involves taking a perspective different from one’s own.

### Integration of Perspectives/Compromise

- Aims to integrate different perspectives
- Participant specifies what Compromise(s) they’re seeking to implement, what they or both parties would have to do
- Details what the expected outcome of the compromise would look like
- Might describe in-depth the feasibility of pursuing such a compromise
- **If the conflict is not social in nature** (ex. car breaking down, suffering from a migraine, etc), compromise/ integration includes integration & balance of different opinions

## Search for Resolution

- Participant specifies how they're or have been (in the past) seeking to resolve the issue, why it's important they find a resolution, etc.
- Includes examples, with explanations of how that resolution would/could look like? Not merely just stating the example.
- They reflect on the potential consequences
- How/Why could it resolve the issue?
- If the participant described in depth how feasible it is for a resolution to be reached (if that avenue were pursued).
- Resolutions must be for the central conflict being described by the participant
- **If the conflict is not social in nature** (ex. car breaking down, suffering from a migraine), Search for Resolution involves reflecting about possible ways to resolve the issue (not just describing the participant's action to resolve the problem).

## Supplementary References

- Alves, H., Koch, A., & Unkelbach, C. (2017). Why Good Is More Alike Than Bad: Processing Implications. *Trends in Cognitive Sciences*, 21(2), 69–79.  
<https://doi.org/10.1016/j.tics.2016.12.006>
- Bangen, K. J., Meeks, T. W., & Jeste, D. V. (2013). Defining and assessing Wisdom: A review of the literature. *The American Journal of Geriatric Psychiatry*, 21(12), 1254–1266.
- Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, 67(1), 1–48.  
<https://doi.org/10.18637/jss.v067.i01>
- Boven, L. Van, Loewenstein, G., Dunning, D., & Nordgren, L. F. (2013). Changing Places: A Dual Judgment Model of Empathy Gaps in Emotional Perspective Taking. In M. P. Zanna & J. M. Olson (Eds.), *Advances in Experimental Social Psychology* (pp. 117–171). Academic Press. <https://doi.org/10.1016/B978-0-12-407188-9.00003-X>
- Brienza, J. P., Kung, F. Y. H., Santos, H. C., Bobocel, D. R. R., & Grossmann, I. (2018). Wisdom, bias, and balance: Toward a process-sensitive measurement of wisdom-related cognition. *Journal of Personality and Social Psychology*, 115(6), 1093–1126.  
<https://doi.org/10.1037/pspp0000171>
- Bürkner, P.-C. (2017). brms: An R Package for Bayesian Multilevel Models Using Stan. *Journal of Statistical Software*, 80(1), 1–28. <https://doi.org/10.18637/jss.v080.i01>
- Darnell, C., Gulliford, L., Kristjánsson, K., & Paris, P. (2019). Phronesis and the Knowledge-Action Gap in Moral Psychology and Moral Education: A New Synthesis? *Human Development*, 1–29. <https://doi.org/10.1159/000496136>
- Fleeson, W., & Gallagher, P. (2009). The implications of Big Five standing for the distribution of trait manifestation in behavior: Fifteen experience-sampling studies and a meta-analysis. *Journal of Personality and Social Psychology*, 97(6), 1097–1114.  
<https://doi.org/10.1037/a0016786>
- Fleeson, W., & Jayawickreme, E. (2015). Whole trait theory. *Journal of Research in Personality*, 56, 82–92. <https://doi.org/10.1016/j.jrp.2014.10.009>
- Fletcher, T. D. (2012). *QuantPsyc: Quantitative Psychology Tools*. R package version 1.5. (1.5). <https://cran.r-project.org/package=QuantPsyc>
- Geraghty, A. W. A., Wood, A. M., & Hyland, M. E. (2010). Attrition from self-directed interventions: Investigating the relationship between psychological predictors, intervention content and dropout from a body dissatisfaction intervention. *Social Science & Medicine*, 71(1), 30–37. <https://doi.org/10.1016/j.socscimed.2010.03.007>
- Green, P., & MacLeod, C. J. (2016). simr: an R package for power analysis of generalised linear mixed models by simulation. *Methods in Ecology and Evolution*, 7(4), 493–498.  
<https://doi.org/10.1111/2041-210X.12504>
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348–362. <https://doi.org/10.1037/0022-3514.85.2.348>
- Grossmann, I., Huynh, A. C., & Ellsworth, P. C. (2016). Emotional complexity: Clarifying definitions and cultural correlates. *Journal of Personality and Social Psychology*, 111(6), 895–916. <https://doi.org/10.1037/pspp0000084>
- Grossmann, I., Na, J., Varnum, M. E. W., Kitayama, S., & Nisbett, R. E. (2013). A route to well-being: Intelligence versus wise reasoning. *Journal of Experimental Psychology: General*,

- 142(3), 944–953. <https://doi.org/10.1037/a0029560>
- Grossmann, I., Na, J., Varnum, M. E. W., Park, D. C., Kitayama, S., & Nisbett, R. E. (2010). Reasoning about social conflicts improves into old age. *Proceedings of the National Academy of Sciences of the United States of America*, 107(16), 7246–7250. <https://doi.org/10.1073/pnas.1001715107>
- Grossmann, I., Oakes, H., & Santos, H. C. (2019). Wise Reasoning Benefits from Emodiversity, Irrespective of Emotional Intensity. *Journal of Experimental Psychology: General*. <https://doi.org/10.1037/xge0000543>
- Lenth, R. (2019). *emmeans: Estimated Marginal Means, aka Least-Squares Means* (R package version 1.3.4). <https://cran.r-project.org/package=emmeans>
- Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psychology and Aging*, 17(4), 677–689. <https://doi.org/10.1037/0882-7974.17.4.677>
- Lindquist, K. A., & Barrett, L. F. (2010). Emotional complexity. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *The Handbook of Emotions* (pp. 513–530). Guilford.
- Lombrozo, T., & Carey, S. (2006). Functional explanation and the function of explanation. *Cognition*, 99(2), 167–204. <https://doi.org/10.1016/j.cognition.2004.12.009>
- Long, J. A. (2018). *jtools: Analysis and Presentation of Social Scientific Data* (R package version 1.1.1). <https://cran.r-project.org/package=jtools>
- Ong, A. D., Benson, L., Zautra, A. J., & Ram, N. (2018). Emodiversity and biomarkers of inflammation. *Emotion*, 18(1), 3–14. <https://doi.org/10.1037/emo0000343>
- Peetz, J., & Grossmann, I. (2020). Wise Reasoning About the Future Is Associated With Adaptive Interpersonal Feelings After Relational Challenges. *Social Psychological and Personality Science*, 194855062093198. <https://doi.org/10.1177/1948550620931985>
- Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science*, 8(3), 162.
- Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 19, pp. 123–205). Academic Press.
- Quoidbach, J., Gruber, J., Mikolajczak, M., Kogan, A., Kotsou, I., & Norton, M. I. (2014). Emodiversity and the emotional ecosystem. *Journal of Experimental Psychology: General*, 143(6), 2057–2066.
- Richard, F. D., Bond Jr., C. F., & Stokes-Zoota, J. J. (2003). One Hundred Years of Social Psychology Quantitatively Described. *Review of General Psychology*, 7(4), 331–363. <https://doi.org/10.1037/1089-2680.7.4.331>
- Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, 132(1), 1–25. <https://doi.org/10.1037/0033-2909.132.1.1>
- Rosseel, Y. (2012). lavaan - An R Package for Structural Equation Modeling. *Journal of Statistical Software*, 48(2), 1–36. <http://www.jstatsoft.org/v48/i02/>
- Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5(4), 296–320.
- Sackett, P. R., Lazo, R. M., & Arvey, R. D. (2002). The effects of the range restriction on estimates of criterion interrater reliability: Implications for validation research. *Personnel Psychology*, 55(4), 807–825. <https://doi.org/10.1111/j.1744-6570.2002.tb00130.x>
- Schwarz, N., Kahneman, D., & Xu, J. (2009). Global and episodic reports of hedonic experience.

- In R. Belli, D. Alwin, & F. Stafford (Eds.), *Calendar and time diary: Methods in life events research* (pp. 157–174). Sage Publications.
- Seligman, M. E. P., Railton, P., Baumeister, R. F., & Sripada, C. (2016). *Homo Prospectus*. Oxford University Press.
- Watson, D., & Clark, L. A. (1999). The PANAS-X: Manual for the positive and negative affect schedule-expanded form. In *Department of Psychology Publications*. University of Iowa.
- Wilson, T. D., & Gilbert, D. T. (2003). Affective forecasting. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology: Vol. Volume 35* (pp. 345–411). Academic Press.  
[https://doi.org/10.1016/s0065-2601\(03\)01006-2](https://doi.org/10.1016/s0065-2601(03)01006-2)