Experience similarity, mindful awareness, and accurate interpersonal understanding

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Abstract

Objectives: Understanding other people's thoughts and feelings is important for successful relationships. The current study examined potential benefits and pitfalls of experience similarity and mindful awareness in relation to accurate interpersonal understanding.

Methods: Participants (n=77) watched a video of a speaker sharing a real-life story, rated the speaker's emotions throughout the story, and recalled factual details of the story. Measures of accuracy included factual accuracy when recalling facts about the story and empathic accuracy in understanding the speaker's feelings. Participants also indicated whether they did or did not have experiences in the past that were similar to the ones from the speaker's video, and self-reported their levels of mindful attention and awareness.

Results: Having, compared to not having, a similar past life experience was associated with lower factual and empathic accuracy. Individuals with higher mindful attention and awareness were more likely to show higher empathic accuracy, being able to more accurately infer the speaker's emotions throughout the story. This relationship was driven most strongly by individuals who did not have similar past experience as the speaker, such that mindfulness was associated with higher empathic accuracy only among individuals with no similar past experiences.

Conclusions: Experience similarity may diminish the benefit of mindfulness on the ability to accurately infer the target's mental states. Considering potential pitfalls and biases that may hinder accurate interpersonal understanding can help provide skillful support that is most suited to the needs of specific individuals.

Keywords: skillful means; experience similarity; empathic accuracy; factual recall; interpersonal communication

Experience similarity, mindful awareness, and accurate interpersonal understanding

The ability to accurately understand another is at the heart of successful support behavior. Accurate interpersonal understanding is generally associated with positive relationship outcomes (Sened et al., 2017), whereas lack of understanding can profoundly disturb social and emotional functioning (Frith, 2001). Understanding others' experience is difficult in part because each person's experience is unique. The "same" event may vary wildly in its specific details across individuals; even events that might seem very similar in their surface features may still elicit different responses, depending on the individual histories of those who are involved. This difficulty of capturing people's idiosyncratic experiences is emphasized in the notion of "skillful means" in Buddhist traditions. Skillful means broadly refers to ways of expressing compassion, based on wisdom that considers context-sensitive needs of another (Schroeder, 2004). *Unskillful* qualities such as delusion and ignorance, by contrast, stem from biases about reality and can perpetuate a continuous cycle of suffering (Ṭhānissaro, 1996). In comparison to the extensive examination of skillful means and its relevance to compassion in the Buddhist tradition, the concept of skillful means is much less theorized and tested within the contemporary scientific literature on compassion.

Having "been there," or sharing a similar past life event, can help quickly make sense of others' experiences. However, evidence is mixed as to the effects of experience similarity on promoting interpersonal outcomes. On one hand, having experienced a similar life event may motivate helping behavior (Hofelich Mohr et al., 2016) by increasing the ease of perspective taking (Gerace et al., 2015) and feelings of empathy (Batson et al., 1996; Hodges et al., 2010). On the other hand, experience similarity may mislead people into viewing others' unique experience through a biased lens colored by personal history (e.g., curse of knowledge; Camerer

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et al., 1989). Egocentric bias in interpersonal communication is resistant to correction without explicit feedback (Damen, van Amelsvoort, et al., 2021), and confidence in one's ability to accurately infer what others are thinking and feeling can further undermine the interpersonal accuracy (Damen, Pollmann, et al., 2021). Instead of relying on existing knowledge, gaining new information, by simply asking, can be a more effective strategy that can help understand another's experience. For example, getting another person's perspectives by directly asking increased interpersonal accuracy, whereas taking another person's perspective by imagining their thoughts did not (Eyal et al., 2018). Further, the personal impact of emotion tends to wane over time, and incorrectly underestimating prior distress can cause people to evaluate those who are currently enduring similar struggles more harshly (Ruttan et al., 2015). Together, evidence suggests that experience may help or hurt support outcomes depending on various contexts, by potentially motivating both a desire to help, as well as an incorrect understanding of others' experience.

Another individual difference variable that may affect interpersonal communication outcomes is mindfulness, characterized by having a present-moment attention to and awareness of internal and external experiences (Baer et al., 2006; Brown & Ryan, 2003). Mindfulness, both dispositional and trained, has been associated with prosocial outcomes such as empathic concern, compassion, and helping behaviors (for a meta-analysis, see Donald et al., 2019). However, evidence is mixed as to whether mindfulness promotes the *accuracy* of interpersonal understanding, and therefore whether the resulting concern and helping behaviors are optimally effective. At least one study reported that a brief mindfulness training increased the ability to infer targets' emotional experience based facial expressions (Tan et al., 2014) during the "Reading the Mind in the Eyes Test" (Baron-Cohen et al., 2001). By contrast, other studies that

assessed the effect of mindfulness on interpersonal accuracy using the same or similar approaches showed little to no effect (Lim et al., 2015; Ridderinkhof et al., 2017). For example, participants who completed mindfulness training did not show greater gains in empathic accuracy compared to those who completed control activities, measured by the degree to which participants correctly inferred targets' emotions based on their facial (Lim et al., 2015; Ridderinkhof et al., 2017) and vocal emotions expressions (Lim et al., 2015). Further, a mindfulness-based intervention, compared to cognitive behavioral group therapy, did not improve empathic accuracy, measured by target-perceiver correlations of emotion ratings among individuals experiencing social anxiety (Morrison et al., 2019). Other studies found that the effect of mindfulness on empathic accuracy depended on individual difference variables such as narcissistic traits (Ridderinkhof et al., 2017), conscientiousness, and extraversion (Winning & Boag, 2015).

The mixed results in previous studies that examined the association between mindfulness and empathic accuracy might in part be attributable to the issue of measurement. It is, for example, possible that mindful attention is useful in deciphering more complex social information that involves naturalistic and dynamic expressions of genuine emotional experiences that fluctuate across time, but less useful in response to static and posed emotions as in the Reading the Mind in the Eyes task (Johnston et al., 2008; Prevost et al., 2014). Further, it is unclear whether the previously shown effects of mindfulness training on interpersonal outcomes extend to a person's untrained tendency. Mindfulness consists of multiple sub-components (Baer et al., 2006) that may be associated with social outcomes in different ways (Kang et al., 2012). In particular, the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) is designed to capture individuals' tendency to mindfully attend to and be aware of the present moment

experience. Taken to the interpersonal communication context, individuals who tend to maintain mindful awareness during a conversation might be more likely to accurately understand another's emotional experience based on the content of the story and subtle changes in facial and vocal expressions.

The attention and awareness components of mindfulness may further interact with the perceived similarity of past experience to someone else's story. When someone else's story is similar to one's own past life experience, having a heightened awareness of thoughts and feelings associated with that memory may diminish the benefit of mindfulness on the ability to accurately infer the target's mental states. Therefore, accurate interpersonal understanding may require skillful and balanced mindfulness that heeds potential biases that may result from having experienced similar past life events.

In this study, we examined the effect of having a similar prior experience on the ability to understand another person's life story. We further examined the association between individual differences in mindful awareness and interpersonal accuracy, and whether this relationship was moderated by experience similarity. We show that the benefit of mindfulness on accuracy may be undermined by potential biases that may come with having similar past experiences. We assessed two behavioral indices of accurate understanding, including the factual accuracy of the perceiver's recall of the story, and empathic accuracy that assessed the match between a target's self-rated emotional experience and a perceiver's inference of it.

Methods

Participants

We recruited 77 participants (all identified as female, M_{age}=21.16 years, SD_{age}=1.91; 71 White, 1 Asian, 1 Hispanic, 2 Mixed, 2 Other) who responded to an online advertisement and

flyers for a study on storytelling and listening. Only people who identified as heterosexual and female were invited based on previous work on sex and gender differences in empathic responses (Batson et al., 1996; Gadassi et al., 2011) and to avoid difference in responses to a female narrator as potential confounds. Other eligibility criteria were based on self-reports collected via an online prescreen survey and included ages between 18-25 to match the speaker's age group, native English speaking, no history of serious psychiatric/medical conditions, and no current/recent use of controlled drugs or psychotropic medications. The current study was a part of a larger investigation about compassion training and intersubject neural response, and additional criteria from this parent study that were unrelated to the current report included standard functional near infrared spectroscopy (fNIRS) neuroimaging eligibility (i.e., scalp and hair conditions favorable for the use of fNIRS and right-handedness) and no prior experience with compassion or lovingkindness meditation practice. Participants with usable data were included in final analyses linking experience similarity to factual (n=71) and empathic accuracy outcomes (n=72). The sample size was determined by the larger data collection protocol, but the sensitivity analysis using G*Power (Faul et al., 2007) suggested that the available sample size of n=77 would allow us to detect an effect size of f^2=.17 with 80% power (alpha=0.05, two tailed) for main and interaction effects.

Procedure

Participants provided informed consent and completed a 2-3-hour study protocol during which they filled out surveys and completed study tasks while being video recorded. First, participants filled out a survey that assessed their levels of mindful attention and awareness as well as demographic information. Next, as part of a larger study, participants were randomized to and completed either a compassion or control condition, which was not the focus of the current

investigation. Participants then watched the video recording of the speaker's emotional life story (story listening task), inferred the speaker's emotions throughout the story (listener emotion rating task), and recalled factual details of the story (retelling task). Finally, participants indicated whether they had an experience similar to the ones shared by the speaker during the story listening task. All measures were embedded among other tasks and surveys, and participants completed some of the tasks while their brain data were collected using fNIRS. Brain data from fNIRS are not reported here. Self-reports were collected using an online survey tool (Qualtrics), and scanner tasks were presented using PsychoPy2 (Peirce, 2007). Please see https://github.com/cnlab/accuracy/ for a full description of study protocol and complete list of survey measures included in the project.

   Story listening. Immediately prior to the story listening task, participants were randomized to either a compassion or control condition as part of a larger study, which is not the focus of the current investigation; all models below controlled for this variable (i.e., entered the condition as a covariate in regression models), and results were parallel controlling vs. not controlling for the condition variable. In the story listening task, participants were told that they would watch a video recording of another participant sharing a particularly emotional real-life story from her past (Please see Supplementary Information 1 [SI1] for speaker tasks). While viewing, participants were asked to simply listen without verbally responding and pay attention as they would be asked to respond to this story later. No participant reported having seen the speaker prior to study participation. Watching a video-recorded story from a speaker that the participant doesn't personally know has been used in previous studies on empathic accuracy (Jospe et al., 2020; Zaki et al., 2009), but is less common in studies that examined effects of

mindfulness on interpersonal processes (Donald et al., 2019) (Please see the "Limitations and Future Research" section for discussion).

Listener emotion rating. Participants re-watched the same video for a second time while providing continuous ratings estimating how the speaker felt while she spoke, using a slider with a scale that ranged from -5 (negative) to 5 (positive). Importantly, they were asked to rate how the speaker felt while she was talking, and not necessarily how she felt during the described events at the time they happened. The participants' emotion ratings were used to create empathic accuracy scores based on the speaker's emotion ratings of the same video (see Measures).

Retelling. To assess how accurately the participants remembered the speaker's story, participants were asked to retell the story from the video that they saw as though it were their own story, i.e., by telling the speaker's story in the first person as though the events happened to them. The retelling was videotaped and later coded for factual accuracy (see Measures).

Measures

Factual accuracy. An accuracy rubric was created based on the details of the speaker's story to include items corresponding to each fact segment the speaker provided. The speaker's story was broken down into key segments by three independent coders. Each coder's rubric was compared and consolidated to develop a final scoring rubric that contained 66 fact segments about the speaker's story. Participants' retelling videos were then transcribed and coded for accuracy by two independent coders blind to the condition assignment and study hypotheses. The coders independently fact-checked the participants' retelling against the rubric, giving 1 point for a correct and 0 for incorrect or unmentioned fact (possible score range=0-66). The coders then compared their scores and discussed the ones that they disagreed on (8.7% of all fact segments) to generate the final factual accuracy score for each participant.

Empathic accuracy. We used a modified Ickes' Paradigm (Ickes et al., 1990; Zaki et al., 2009) to calculate participants' empathic accuracy, operationalized as the match between a target's self-rated emotional experience and a perceiver's inference of it. Specifically, the degree of correlation between the speaker's and listener's emotion ratings in response to the speaker's story was used to calculate an empathic accuracy score for each participant. Emotion rating scores from the speaker and listeners were sampled at 20hz and downsampled to 1 point per second (1Hz) by taking the averages per second. Each 1 second mean corresponded to 1 point in subsequent time-series analysis (279 points in total). The speaker's emotion ratings were then correlated to listeners' emotion ratings of the speaker. To make these correlational indices more normally distributed, we performed a Fisher's r to z transformation on the scores (Pollmann & Finkenauer, 2009), which showed acceptable range of normality after transformation (skewness from -0.87 to 0.17, kurtosis from 1.03 to 0.34). The resulting correlation coefficient for each participant was referred to as empathic accuracy. Please see [SI2] for results using non-Fisher z transformed empathic accuracy scores.

Self-reports.

Experience similarity. Participants self-reported whether they had experiences in the past that were similar to the ones that the speaker shared in the video ("Did you previously have similar experiences the speaker described?"). The answer options included 1 (No), 2 (I had a kind of similar experience), and 3 (I had the same experience). Only one participant chose option 3. Therefore, answer options 2 and 3 were grouped together in subsequent analyses to indicate participants with similar (n=31) vs. no similar (n=41) prior experience as categories. Please see [SI3] for results treating the experience similarity as a continuous variable and without regrouping.

Mindful attention and awareness. Individual differences in mindful attention and awareness were measured by the 15-item Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS assesses an individual's tendency to attend to and be aware of the present-moment's experience, rated on a 1 (almost always) to 6 (almost never) scale. All scores were coded for higher values to reflect higher mindful attention and awareness. An example item is, "I tend not to notice feelings of physical tension or discomfort until they really grab my attention." The scale's internal consistency in the current study (α=.88) was high.

Demographics. Participants self-reported their age and ethnicity. All participants identified as heterosexual female.

Data Analyses

We conducted a series of regression analyses to examine the links between experience similarity (similar vs. no similar experience as categories), mindfulness, and empathic and factual accuracy in response to a speaker's life story. In two separate regression models, we tested experience similarity, mindfulness, and their interaction terms as predictors of 1) factual accuracy and 2) empathic accuracy. As noted in the Measures section, the empathic accuracy correlational scores were transformed using Fisher's *r* to *z* transformation to be more normally distributed, and all variables were mean-centered. All analyses controlled for the condition assignment for which participant completed compassion training or control activity as part of a parent study. There were no significant interactions between our primary predictors and the intervention condition (*p*s>.30). We report standardized (β) and unstandardized (B) regression coefficients, standard error for unstandardized regression coefficients (SE_B), and 95% confidence intervals ($CI_{95\%}$) for all results. All reported *p* values are two-tailed. Analyses were performed in

R (v3.6.1, www.r-project.org) using the R-studio interface (v1.2.1335). Please see

https://github.com/cnlab/accuracy/ for data, analysis scripts, and output statistics.

Results

Two separate models tested the relationships among experience similarity (similar experience vs no similar experience), mindful attention and awareness assessed by the MAAS scale, and two indices of interpersonal accuracy, including factual and empathic accuracy. The coefficients and statistics for all models are reported in Table 1.

The first model tested experience similarity, mindfulness, and their interaction terms as predictors of factual accuracy. First, we found that having had a similar experience to the speaker's story was associated with less factual accuracy: Participants who had similar past experiences with the speaker, compared to those who did not, were less accurate on factual details about their recall of the speaker's story (B=-3.351, p=.0.042). We did not find any link between the MAAS scores and factual accuracy (B=0.127, p=.932), or any significant interaction between experience similarity and mindfulness predicting factual accuracy (B=0.848, p=.684).

The second model tested experience similarity, mindfulness, and their interaction terms as predictors of empathic accuracy. We found main effects of experience similarity, mindfulness, and experience similarity x mindfulness interaction effects on empathic accuracy. First, experience similarity was associated with less empathic accuracy, such that those with similar past experiences, compared to those who did not have similar past experiences, made less accurate judgment about the speaker's emotional states while she spoke (B=-0.110, p=.023). Second, individuals with higher MAAS scores showed greater empathic accuracy, being able to infer the speaker's emotional states more accurately (B=0.123, p=.007). Finally, we found a significant interaction between experience similarity and the MAAS scores predicting empathic

accuracy (B=-0.130, *p*=.037). To identify the sources of interaction, we conducted two related types of follow-up analysis described below, by examining 1) whether the relationship between mindfulness and empathic accuracy differed across the two subgroups of participants who did vs. did not have similar past experience as the speaker, and 2) whether the link between experience similarity and empathic accuracy differed by the levels of MAAS scores.

To examine the main effect of mindfulness on enhanced empathic accuracy, we explored the relationship between mindfulness and empathic accuracy across the two subgroups of participants who indicated that they did (n=31) vs. did not (n=41) have similar past experience as the speaker. Results showed that the benefit of mindfulness on interpersonal accuracy diminished among those with similar experience, such that mindfulness predicted higher empathic accuracy among those who indicated that they did not have similar past experience as the speaker (β=0.346, B=0.122, SE_B=0.053, *t*(38)=2.332, *p*=.025, $CI_{95\%}$ [0.016, 0.229]). By contrast, mindfulness was not associated with empathic accuracy among participants who had similar past experience as the speaker (β=-0.048, B=-0.008, SE_B=0.029, *t*(28)=-0.285, *p*=.778, $CI_{95\%}$ [-0.067, 0.050]) (Figure 1A).

Given the mixed results in previous literature regarding the relationship between mindfulness and empathy (Luberto et al., 2018; Tipsord, 2009), we explored whether the link between experience similarity and empathic accuracy differed by individual differences in mindful attention and awareness using the same data. Simple slopes analyses (Aiken et al., 1991) were conducted to examine whether experience similarity (vs. no similarity) predicted empathic accuracy at three different levels of mindful awareness, including one standard deviation below the mean, at the mean, and one standard deviation above the mean levels of MAAS scores. Results indicated that the link between experience similarity and empathic inaccuracy was driven

most strongly by those with mean to higher levels of mindfulness. Specifically, not having a similar past experience, compared to having had a similar past experience, predicted higher empathic accuracy at higher (β=-0.482, B=-0.208, SE_B=0.065, $t(67)$=-3.201, p=.002, $CI_{95\%}$ [-0.337, -0.078]) and mean levels of mindfulness (β=-0.255, B=-0.110, SE_B=0.047, $t(67)$=-2.327, p=.023, $CI_{95\%}$ [-0.204, -0.016]). However, experience similarity was not associated with empathic accuracy at lower levels of mindfulness (β=-0.028, B=0.067, SE_B=0.028, $t(67)$=-0.180, p=.858, $CI_{95\%}$ [-0.145, 0.121]) (Figure 1B).

[Please insert Figure 1 here]

Discussion

Experiences are unique to the individual; understanding another's experience may require awareness of one's own biases. The Buddhist notion of skillful means emphasizes the importance of unbiased views that capture specific needs that are unique to the person and circumstances. The current study conceptualized accurate interpersonal understanding as an important component of skillful means and examined potential benefits and pitfalls of experience similarity and mindful awareness in relation to the accuracy of understanding. Our data highlighted the complexity with which past experiences may shape the way the mind processes new social information and how individual differences in mindful attention and awareness may moderate this relationship.

When listening to someone else's story, having a similar prior experience was associated with less accuracy in recalling details of the story and inferring the storyteller's emotional state. On the flip side, not having had a similar past experience was associated with greater empathic

accuracy. These results extend previous work that showed that egocentric bias (Damen, Pollmann, et al., 2021; Damen, van Amelsvoort, et al., 2021) and perspective taking without direct inquiry (perspective getting; Eyal et al., 2018) can undermine interpersonal accuracy, and that experience similarity can reduce compassion for others' distress (Ruttan et al., 2015). Although our data do not speak to this directly, one possibility is that the memory of one's own similar life experience may compete with the target's story, which may impose additional cognitive burden and/or bias the ways in which new social information is received. In factual recall, the cognitive load of past memory may interfere with the ability to encode new information (Sweller, 2011). In the affective domain, only a bit of similarity, or a "snapshot" reminder from someone else's story can readily invoke a similar memory and associated emotions from one's own past (Fredrickson & Kahneman, 1993), and the perceiver's memory of their own emotion from the past experience may bias the inferring processes at present. We encourage future studies to explicitly test whether perceivers' recall of their own past memory in response to a target's story explains the link between experience similarity and inaccuracy. Further, experience similarity was measured only once in the current study, after exposure to the speaker's story. Future studies may assess which parts of the story resembled the participants' past experience throughout the story to gain more fine-grained information about the precise timeline of how experience similarity may influence interpersonal communication outcomes.

Higher mindful attention and awareness was associated with greater empathic accuracy, consistent with previous research that largely supports the association between mindfulness and positive interpersonal outcomes (Kang, 2018; Mesmer-Magnus et al., 2017; van Agteren et al., 2021). Although our current data cannot explain mechanisms through which mindfulness may promote empathic accuracy, one possibility is that mindfulness may reduce self-focused biases

directly or indirectly by dampening emotional reactivity. Supporting this view, higher levels of mindfulness were previously associated with lower emotional reactivity (Brown et al., 2013), whereas emotional reactivity may hinder accurate interpersonal understanding and hurt relationship outcomes (e.g., defensiveness; Gottman, 1993; Kang, 2018). Future studies may also obtain time course measures of the listener's own emotional states while they listen to the speaker's story to test whether mindfulness lowers reactivity to emotional stimuli, thereby promoting accurate understanding.

Interestingly, mindfulness was only associated with empathic accuracy among those who had not gone through similar past experiences as the speaker. That is, the benefit of mindfulness on increased empathic accuracy diminished when participants have also gone through similar life experiences as the speaker. These results are consistent with previous findings that showed the effect of mindfulness on empathy may depend on individual difference moderators (Ridderinkhof et al., 2017; Winning & Boag, 2015). While mindful awareness may promote overall interpersonal accuracy, awareness of one's own similar past experience may potentially interfere with the ability to mindfully attend to idiosyncratic aspects of another's emotional experience, and counteract the positive effects of mindfulness. On the other hand, it is possible that coming to the listening task with fresh eyes (i.e., not reporting a similar past experience) works synergistically with mindfulness. Together, our findings suggest that in order to fully unleash the benefit of mindfulness on empathic accuracy, mindful individuals should be wary of their own past experience potentially biasing the way they perceive others' stories.

It is critical, however, to note that mindfulness includes a range of other components beyond metacognitive awareness that may influence communication outcomes. Researchers have argued that introspective awareness alone without the rest of core features of mindfulness may

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not characterize "a moment of full mindfulness" (Kang et al., 2012). It might even be akin to psychological conditions characterized by unhealthy levels of introspection that are negatively associated with empathic accuracy (e.g., depression; Gadassi et al., 2011; Papp et al., 2010). By contrast, mindfulness also involves observing one's own thoughts and feelings in a "distanced" manner. That is, being mindful involves taking a step back from one's internal and external experiences, which then allows individuals to observe the situation and their response to them without elaboration or rumination (Kang et al., 2012, 2014; Lutz et al., 2015). Distinct from apathy, this type of distanced and non-reactive observation is known in the literature as decentering (Shapiro et al., 2006), dereification (Lutz et al., 2015), or self-distancing (Kross & Ayduk, 2017). The decentering component of mindfulness that in theory should be key to maintaining unbiased views (Kang et al., 2012, 2014; Lutz et al., 2015), however, might not have been fully measured by the MAAS scale (Brown & Ryan, 2003) used in the current study that primarily focused on assessing mindful attention and awareness.

Another core component of mindfulness that was not assessed in the current study by the MAAS scale is the "observing" facet of mindfulness (Baer et al., 2008). Those with higher scores in the observing dimension tend to notice or attend to internal and external experiences, and therefore may be more aware of, and potentially be more affected by the changes in their own feelings and thoughts in responses to someone else's emotional narratives. Consistent with this view, higher scores on the observing facet of mindfulness were associated with *less* empathic accuracy in response to a video recording of a target person sharing negative personal narratives (Tipsord, 2009). Therefore, a more comprehensive measure of mindfulness that captures different dimensions of mindfulness, as well as interventions that cultivate all facets of

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mindfulness in a balanced way, may be associated with interpersonal understanding in the face

of biases arising from related past experiences.

Mindfulness is associated with positive interpersonal outcomes in previous work (Kang,

2018; Mesmer-Magnus et al., 2017; van Agteren et al., 2021). However, even among some

highly mindful individuals, having similar past experience diminished the potential benefit of

mindfulness on empathic accuracy in our data. This raises a question as to whether accurate

emotional understanding is always required for successful interpersonal outcomes among

mindful individuals. Evidence on the effect of empathic accuracy on relationship outcomes is

mixed (Simpson et al., 2003), and certain levels of empathic *in*accuracy might be adaptive in

situations that involve social threats. For example, higher perceived empathic accuracy predicted

lower feelings of closeness in marital partners when discussing relationship-threatening problems

(Simpson et al., 2003). Conversely, individuals who underestimated partners' potential attraction

to alternate romantic partners experienced greater relationship satisfaction compared to those

who estimated more accurately (Simpson et al., 2011). We note that these previous studies

focused on relationship-specific contexts, which differed from the current study, and it is

possible that the listeners' responses in the current study might have differed if they knew the

speaker, or the listener's understanding might have depended on the specific topic of

conversation. However, empathic accuracy of others' negative emotions has also been associated

with social anxiety, characterized by elevated perceptions of social threat (Auyeung & Alden,

2020; Auyeung & Alden, 2016), suggesting that empathic accuracy may not necessarily promote

positive social outcomes. Thus, mindfulness may promote interpersonal outcomes potentially

also through alternative paths in addition to enhancement of empathic accuracy.

Mindfulness did not moderate the relationship between experience similarity and factual accuracy. Participants with more similar personal experiences to the speaker's were less accurate, regardless of their level of mindfulness. This suggests that a heightened awareness of the past event and/or the thoughts and emotions that the memory elicits may not affect one's ability to remember details of someone else's story that is similar to their own. Instead, recall of facts may be influenced more by cognitive processes such as memory. Therefore, future studies may test whether individual differences in memory capacity interact with past experiences.

Limitations and Future Research

We note several limitations of this study. First, although previous studies on empathic accuracy have used similar study designs (i.e., responding to a video-recorded story from a stranger in a laboratory setting; Jospe et al., 2020; Zaki et al., 2009), naturalistic social interactions with friends or family might differ from the task we used. However, technologically mediated communication with unspecified audiences, similar to the current design, is increasingly popular (Treem et al., 2020). Second, the current results might not be comparable to previous studies on empathy and interpersonal outcomes that commonly reported interactions between known individuals (Sened et al., 2017). For example, listeners had no option to influence the topic or the manner in which the story was conveyed, contrary to two-way interactions during which both a speaker and a listener contribute to the dynamics of the storytelling and shared experience (Koudenburg, 2018). Third, responses to the empathic accuracy test were part of a laboratory task where every volunteer was asked to give their attention to the speaker and focus on her feelings. This might not represent natural reactions to social cues, where people vary in their attention to, and motivation to understand, others.

Fourth, we also note that the type of dispositional mindfulness we examined in the current study might be qualitatively different from the type of mindfulness cultivated through training. Therefore, cultivating a well-balanced set of mindful qualities through training might alter empathic abilities regardless of past experiences. Further, individual differences in reported MAAS scores do not guarantee the degree of mindful attention and awareness in the moment the task was completed. Fifth, the response format of the experience similarity question, which asked whether participants had no, similar, or the same experiences in the past. Adding a follow-up scale on degrees of similarity will allow for a more sensitive measure of the relationships between experience and accuracy. Sixth, the direction of causality cannot be inferred as to, for example, whether mindfulness increased empathic accuracy or having heightened sensitivity to others' emotions may lead people to be more mindful. Future studies may experimentally manipulate mindfulness to test the causal links among experience similarity, mindfulness, and empathic abilities. Seventh, all participants in the current study self-identified as heterosexual and female, and the current findings should be tested in all sexes, genders and sexual identities to be generalizable. Our sample also differed from the general population due to the eligibility criteria that called for hair conditions favorable for the use of fNIRS, with the majority of participants (92%) identifying as White individuals. The gap of available neuroimaging data across people of color and White people raises important concerns about disparities in theoretical knowledge applicable to the global majority population (Choy et al., 2021). Finally, the relatively small sample size might have limited our ability to detect strong interaction effects. A recent meta-analysis indicated that the reliability of mindfulness effects on prosociality was, though not entirely dependent on selective reporting, in part due to publication bias (Berry et al., 2020). Therefore, the results from the current non-preregistered report should be reviewed in

relation to other available theoretical and empirical evidence linking mindfulness, experience similarity, and interpersonal accuracy.

Despite limitations, the current study highlights that interpersonal communication does not occur in vacuum; rather, people bring rich personal history that may influence the ways in which social information is shared. Considering potential pitfalls and biases that may hinder accurate interpersonal understanding can help provide skillful support that is most suited to the needs of specific target individuals. For instance, despite the common assumption that shared experience promotes better interpersonal outcomes, our data suggest that those who have endured similar past events and are potentially more aware of them might be less likely to correctly understand others with similar experiences. Future research may identify strategies that promote interpersonal accuracy by harnessing the power of personal experience and balanced mindfulness while keeping biases that may come with the memory in check.

Conflict of Interest Statement

Emily Falk, Ph.D. is on the scientific advisory board for Kumanu, a digital well-being company, and has consulted for Google in the past year. The rest of the authors have no conflict of interest to declare.

Ethics Statement

This study was approved by the University of Pennsylvania Institutional Review Board.

Informed Consent Statement

All participants provided informed consent.

Author Contributions

YK: designed and executed the study, analyzed data, wrote the paper, and oversaw the project.

MEC: executed the study and edited the paper. KS: designed and executed the study, analyzed data. MBO: designed the study and analyzed data. EBF: designed the study, wrote the paper, and oversaw the project.

Data Availability Statement

Study protocols, survey measures, data, analysis scripts and output statistics reported in this manuscript are available in https://github.com/cnlab/accuracy/. Please see [SI4] for a positionality statement.

Citation Diversity Statement

Recent work in several fields has identified a bias in citation practices such that papers from women and other minority scholars are under-cited relative to the number of such papers in the field (Dion et al., 2018; Mitchell et al., 2013). Here we sought to consider choosing references that reflect the diversity of the field in thought, form of contribution, gender, and other factors. We obtained the predicted gender of the first and last author of each reference by using databases that store the probability of a first name being carried by a woman (Zhou et al., 2020). By this measure (and excluding self-citations to the first and last authors of our current paper), our references contain 29.83% woman(first)/woman(last), 7.65% man/woman, 25.23% woman/man, and 37.29% man/man. This method is limited in that a) names, pronouns, and social media profiles used to construct the databases may not, in every case, be indicative of gender identity and b) it cannot account for intersex, non-binary, or transgender people.

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Table 1. Regression analyses of experience similarity and dispositional mindfulness predicting accurate interpersonal understanding.

Models	β	B	B 95% CI	SE$_B$	t	p
Experience similarity × Mindfulness → Factual accuracy						
Experience similarity	-0.251	-3.351	-6.571, -0.132	1.613	-2.078	0.042
Mindfulness	0.015	0.127	-2.852, 3.106	1.492	0.085	0.932
Condition (covariate)	0.057	0.753	-2.425, 3.932	1.592	0.473	0.638
Experience similarity × Mindfulness	0.070	0.848	-3.288, 4.983	2.071	0.409	0.684
Experience similarity × Mindfulness → Empathic accuracy						
Experience similarity	-0.255	0.110	-0.204, -0.016	0.047	-2.327	0.023
Mindfulness	0.435	0.123	0.035, 0.210	0.044	2.789	0.007
Condition (covariate)	0.274	0.117	0.024, 0.210	0.047	2.509	0.015
Experience similarity × Mindfulness	-0.332	-0.130	-0.252, -0.008	0.061	-2.131	0.037

Notes: Standardized (β) and unstandardized (B) regression coefficients, 95% confidence intervals (CI), and standard error for unstandardized regression coefficients (SE$_B$) are displayed. All analyses controlled for the condition assignment as a covariate for which participant completed compassion training or control activity as part of a parent study. Please see https://github.com/cnlab/accuracy/ for the complete model output statistics.
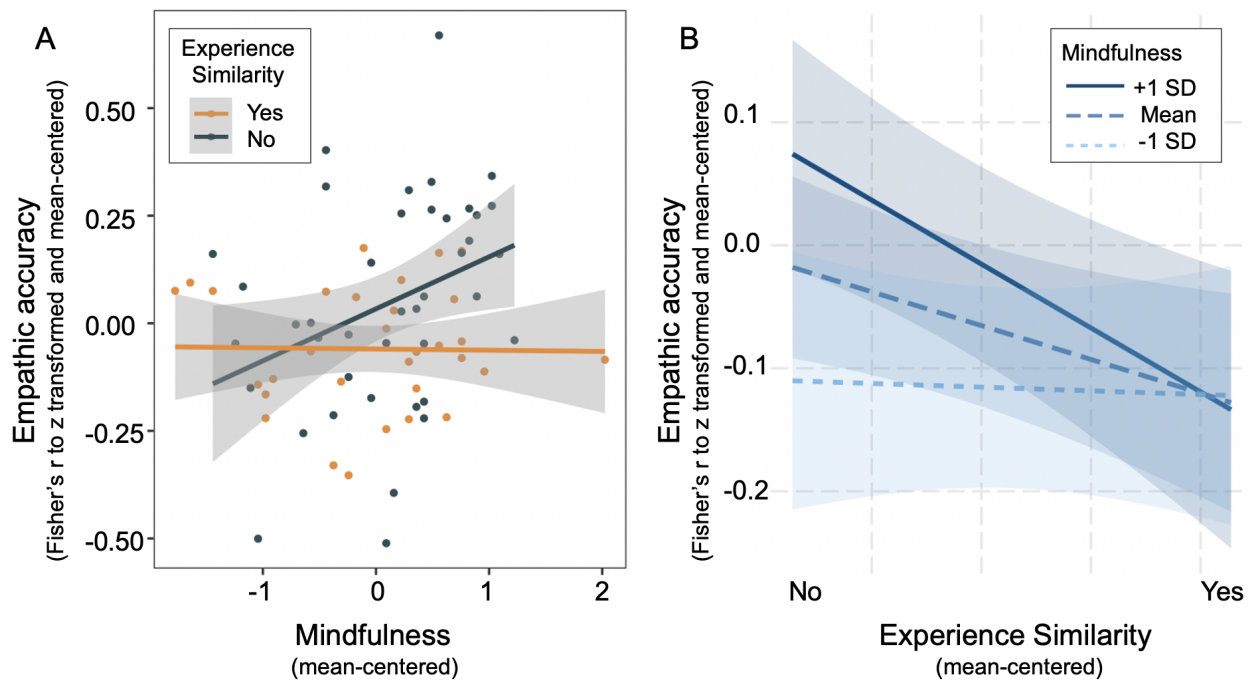
Figure 1. A. When we parsed the main effect of mindfulness on empathic accuracy, we found that mindfulness was associated with higher empathic accuracy only among participants who did not indicate having had similar past experiences as the speaker. Mindfulness was not associated with empathic accuracy among those with similar past experiences. **B.** Simple slopes analyses using the same data indicated that the experience similarity was negatively associated with empathic accuracy more strongly at higher levels of mindfulness. Notes: SD=standard deviation; Empathic accuracy refers to the time-course correlations between a speaker's self-rated emotion and a listener's inference of it. The empathic accuracy correlational scores were transformed using Fisher's *r* to *z* transformation, and all variables were mean-centered.