Mind-Mindedness versus Mentalistic Interpretations of Behavior: Is Mind-Mindedness a Relational Construct?

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Abstract

Mind-mindedness is a measure of the tendency to represent significant others in internal-state terms and is central to supportive parent-infant relationships. The two studies reported here explored whether mind-mindedness generalizes to representations of unknown individuals, using a novel task that assessed individual differences in adults' tendency to interpret others' behavior with reference to their internal states: the Unknown Mother–Infant Interaction Task (UMIIT). We compared UMIIT performance to measures of mind-mindedness from (a) adults' descriptions of close friends and partners (Study 1, N=96), and (b) mothers' appropriate versus non-attuned comments on their infants' internal states (Study 2, N=56). In line with the proposal that mind-mindedness is a relational construct, UMIIT performance was unrelated to mind-mindedness in both studies.

Keywords: Mind-mindedness, mentalising, parent-infant interaction.

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Acknowledgements and Declaration of Conflicting Interests

Thanks to Corinne Lee, Ellie Allen, Hajar Al-Naqshbandi, Samantha Harris and Zaynah Arshad for assistance with transcription. The authors declare no conflict of interest.

Ethics

All testing was carried out in accordance with guidelines published by the American Psychological Association and the British Psychological Society and ethical approval was obtained.

Funding

Study 2 was supported by grant ES/K010719/1, Economic and Social Research Council. https://esrc.ukri.org awarded to the final author. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

IS MIND-MINDEDNESS A RELATIONAL CONSTRUCT?

Abstract

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Mind-Mindedness versus Mentalistic Interpretations of Behavior: Is Mind-Mindedness a Relational Construct?

Research over the last two decades has demonstrated positive associations between caregivers' *mind-mindedness* (Meins, 1997) and children's cognitive and behavioral development (see McMahon & Bernier, 2017, for a review). In particular, there are well established links between caregivers' ability to be mind-minded about their children—to view them as individuals with their own thoughts, feelings, desires, and beliefs—and secure attachment spanning the first decade of life (Lundy, 2003; Meins, Bureau, & Fernyhough, 2018; Meins, Fernyhough, Fradley, & Tuckey, 2001; Meins, Fernyhough, Russell, & Clark-Carter, 1998; Meins et al., 2012; Miller, Kim, Boldt, Goffin, & Kochanska, 2019). Long-term predictive relations have also been reported for children's understanding of other people (Centifanti, Meins, & Fernyhough, 2016) and educational attainment (Meins, Fernyhough, & Centifanti, 2019). Caregiver mind-mindedness is central to supportive parent–child relationships and has important implications for children's mental health (Colonnesi et al., 2019; Hughes, Aldercott, & Foley, 2017).

In the studies mentioned above, mind-mindedness has been assessed using both the describe-your-child measure (Meins et al., 1998) in early childhood, and the observation-based measure (Meins et al., 2001, 2012) in infancy. The former assesses mind-mindedness in terms of caregivers' tendency to focus on mental characteristics when given an open invitation to describe their children. The latter indexes mind-mindedness during infant–caregiver interaction in terms of the extent to which caregivers make appropriate versus non-attuned comments on their infants' internal states. Appropriate comments indicate accurate internal state attributions, whereas

non-attuned comments index caregivers' misinterpretations of their infants' putative thoughts and feelings. There is some research demonstrating concordance between the observational and describe-your-child measures, suggesting longitudinal continuity in caregivers' mind-mindedness. For example, Meins et al. (2003) found that appropriate mind-related comments at age 6-months correlated with mind-minded descriptions at 4 years of age (r = .40), and McMahon, Camberis, Berry, and Gibson (2016) reported longitudinal continuity from ages 7 to 19 months (r = .20). Previous research has also focused on assessing mind-mindedness in other types of relationship. The description measure of mind-mindedness has been adapted to assess adults' mind-mindedness in relation to friends and romantic partners (Meins, Fernyhough, & Waller, 2014; Meins, Harris-Waller, & Lloyd, 2008), and children's mind-mindedness in relation to best friends (Davis, Meins, & Fernyhough, 2014; Meins, Fernyhough, Johnson, & Lidstone, 2006). These studies have established that mind-mindedness varies widely across all of these different types of relationship.

With respect to the observational indices of mind-mindedness in the first year of life, mothers vary in the extent to which they comment in both appropriate and non-attuned ways on their infants' internal states, with non-attuned comments being produced less frequently than appropriate comments (e.g., Meins et al., 2012). In both fathers and mothers, lower levels of mind-mindedness are associated with lower emotion regulation in infants (Zeegers, et al., 2018) and more reported behavioral difficulties in early childhood (Colonnesi et al., 2019; Meins, Centifanti, Fernyhough, & Fishburn, 2013). Therefore, understanding individual differences in mind-mindedness has implications for infant and child mental health.

Crucially, an individual's tendency to be mind-minded in relation to others appears to depend on the nature of the relationship. Meins et al. (2014) found that adults were more likely to focus on mental characteristics when describing their romantic partners than when describing their friends, and when describing a friend or partner than a famous person or work of art. Moreover, there was no relation between levels of mind-mindedness in adults' descriptions of friends and their descriptions of works of art or famous people they did not personally know. While some participants did use internal state language to describe famous figures or works of art, this type of engagement with mental states did not correlate with their mind-minded tendency to represent significant others in terms of their mental and emotional characteristics. The internal state language elicited by the images of famous figures and works of art therefore cannot be interpreted as mind-mindedness. Meins et al. thus argued that mind-mindedness is a quality of specific close relationships, rather than a trait-like construct. In line with this proposal, mind-mindedness has been shown to be unrelated to adults' underlying theory of mind abilities (Barreto, Fearon, Osório, Meins, & Martins, 2016; Devine & Hughes, 2017), suggesting that individuals' understanding of other minds is necessary but not sufficient for them to be mind-minded when representing a person.

Fishburn et al. (2017) investigated the relational nature of mind-mindedness by exploring mind-mindedness in adoptive parents, foster carers, and biological parents whose children were the subjects of child protection plans due to concerns over abuse or neglect. Caregiver–child relationships in non-biological dyads are reported as being less close than those in biological dyads (Loehlin, Horn, & Ernst, 2010; Rueter, Keyes, Iacono, & McGue, 2009), and relationships where there are

child protection concerns are clearly non-optimal. In a series of studies, Fishburn et al. reported that adoptive parents, foster carers, and parents who were suspected of abuse or neglect demonstrated lower mind-mindedness compared with community samples of biological parents. These group effects did not appear to be due to differences in comparison with the community sample in relation to parental mental health, children's behavioral difficulties, or caregivers' views about parenting. The finding that mind-mindedness is lower when relationships are dysfunctional or less close is in line with the proposal that mind-mindedness is a quality of close relationships.

The two studies reported here took a different approach to exploring the proposal that mind-mindedness is a relational construct. As discussed above, Meins et al. (2014) concluded that mind-mindedness is a quality of close relationships on the basis of a lack of association between adults' descriptions of significant others and those of famous people or works of art. However, it could be that describing unknown people or works of art does not engage individuals' emotional and psychological attention sufficiently to provoke their capacity to focus on internal states. The stimuli used in Meins et al.'s studies were static photographs of famous figures or paintings and thus did not require participants to interpret an individual's behavior in terms of their underlying internal states. In contrast, viewing interactions between other people may be more likely to prompt participants to consider the thoughts and feelings governing the observed behavior, thus inducing more mind-minded interpretations. This may be the case particularly if the interactions involve internal state language. By using richer stimuli, in which unknown others are observed interacting and using internal state language, positive associations between mind-mindedness in relation to significant others and internal state language about unknown individuals might

emerge. This would suggest that mind-mindedness is not strictly a feature of close relationships, but is rather a more general tendency to take the intentional stance toward others.

To test this hypothesis, we developed a novel task to measure adults' tendency to focus on internal states in relation to unknown individuals: the Unknown Mother–Infant Interaction Task (UMIIT). The UMIIT involves participants viewing clips of unknown mothers and their preverbal infants interacting, some of which included (a) explicit internal state language that matched the infant's internal state (i.e., appropriate mind-related comments), (b) explicit internal state language that was at odds with the infant's internal state (i.e., non-attuned mind-related comments) or the mother's behavior (e.g., the mother stated that a toy was the infant's favorite, but then took it away from the infant and replaced it with a different toy), or (c) no internal state language. We reasoned that observing this range of interactions involving a variety of internal states would be likely to cue participants to consider the thoughts and feelings of these strangers. Our initial aim was thus to establish whether the UMIIT was a valid task for eliciting internal-state interpretations of the behavior of unknown individuals.

Our main aim was to test the proposal that mind-mindedness is a quality of close relationships, rather than a trait-like construct. If mind-mindedness is a relational construct, one would predict no strong association between individuals' use of internal state interpretations during the UMIIT and their mind-mindedness in relation to a significant other. The individuals in the UMIIT are not known to the participants, and therefore internal state interpretations of their behavior cannot be considered indicative of mind-mindedness. However, if mind-mindedness is a trait-

like tendency to interpret any individual's behavior with reference to their internal states, positive associations should be observed between internal state interpretations during the UMIIT and mind-mindedness. Such positive associations would suggest that previous null findings were due to the nature of the stimuli used to prompt descriptions of unknown individuals. Finding a positive association between mind-minded interpretations of others' behavior in the UMIIT and mind-mindedness in relation to significant others would thus warrant a re-evaluation of the proposal that mind-mindedness is specific to close personal relationships. The two studies reported here investigated relations between UMIIT performance and mind-mindedness as assessed from mind-minded descriptions of significant others (Study 1) and mind-mindedness when interacting with one's infant (Study 2).

Study 1

Method

Participants

Participants were 96 adults (80 women) recruited via online advertisements at university campuses and neighborhood forums, and by word of mouth. All participants were living in the United Kingdom. The mean age of participants was 32.8 years (*SD*= 11.57, range 18–68); 27 of the participants were parents. Most participants (*n*= 85) were White; of the remaining 11 participants, seven were Asian, one was mixed race, and three were Black. All but four participants were either attending university or had completed a university degree, and 45 participants had completed a post-graduate qualification. The majority of participants (*n* = 69) were in a romantic relationship, which varied in length from 1 month to 45 years (*M* = 7.93 years, *SD* = 8.72). The study received ethical approval from the relevant university

committee and participants gave informed consent to participate. All testing was carried out in accordance with guidelines published by the American Psychological Association and the British Psychological Society.

Materials and Methods

All tasks were completed on a laptop in a quiet room in a university building. After providing informed consent, participants first completed an attentional processing of emotion task (not reported here), and then an online questionnaire in which they were asked to provide basic demographic details about themselves as well as a written description of a friend and their current partner (where applicable). Finally, participants completed the UMIIT. The entire procedure took approximately 45 minutes. Participants were not given any incentive to participate, apart from research participation credit in the case of university undergraduates.

Measures

Mind-mindedness. Participants completed this part of the study on an internet-based questionnaire form labeled only with their participant ID. Participants typed their responses into blank text boxes on the form and clicked to submit the questionnaire following completion of their final response.

After answering questions about basic demographic details, participants were asked to think of a person they regarded as a close friend and to write a description of this person in the blank text box. Those who were in a relationship were then asked to describe their partner. For each relationship, the instructions stated simply: *Please use the space below to tell us a little about this person. There are no right or wrong answers*.

The text from each participant's description of the friend and partner was divided into single words or phrases indicating discrete descriptions. Each description was assigned exclusively to one of the following categories according to the guidelines provided by Meins and Fernyhough (2015): (a) *Mind-minded* (references to the person's mental life, including emotions, intellect, or interests); (b) *Behavioral* (descriptions of the person's activities, interactions with others, and other characteristics that could be interpreted on a purely behavioral level); (c) *Physical* (references to physical attributes, including appearance and age); (d) *Self-referential* (comments focused on the participant's own thoughts, feelings, or behaviors, rather than those of the person being described); (e) *Relationship* (any references to the relationship between the participant and the person being described, such as length or quality); and (f) *General* (other comments not falling into one of the above categories, including name, where the person grew up, and non-specific value judgments about the person). Scores for mind-minded descriptions were expressed as a percentage of the total number of descriptions to control for the amount written.

Descriptions were coded by an experimenter who was blind to all other data, with a randomly selected 25% being coded by a second blind experimenter. Inter-rater reliability was $\kappa = .89$.

Unknown Mother–Infant Interaction Task (UMIIT). Participants were asked to watch 12 short video clips, each lasting less than 45 seconds, of four different mothers participating in unstructured play with their 8-month-olds in a research laboratory. The play clips were selected from a previous study where mothers had given permission for their filmed interactions to be used in future research. The clips were chosen to exemplify a range of maternal behaviors: (a) five

clips in which there was no internal state language, (b) three clips in which the mother commented appropriately on the infant's internal state (e.g., saying the child was excited when she squealed happily), and (c) four clips in which the mother misinterpreted the infant's internal state (e.g., saying the infant was crying because he was tired, when he had injured himself), or did not behave in accordance with the infant's internal state (e.g., saying that the infant liked a particular toy, but then took it away from the infant). Participants were asked to watch each clip twice, and were then given the following instructions: *Please tell us something about what's happening in the interaction. There are no right or wrong answers.* If participants asked the researcher for further guidance, they were told that they could write about whatever came to mind, or whatever struck them when they watched the clips.

A sample of 10 descriptions was used to establish whether the mind-mindedness coding scheme described above was suitable for coding descriptions of infant–mother interactions. A number of adaptations were made. First, some comments indicated that the participant believed the mother to have misinterpreted the child's internal state (e.g., "She says he's crying because he's tired, but I think he's upset that he hurt his head"). The adapted mental category (see next paragraph) thus included these disagreements about the mother's interpretation of her infant's internal states as well as attributions about the mother's or infant's internal states. Second, several participants made value judgements about the mother's behavior or the infant–mother relationship (e.g., "She's trying too hard", "They seem to have a close relationship"), and so a *Value* category replaced the *General* category in the original scheme.

The categories for the interactions were thus as follows: (a) *Mental* – any comment that focused on attributing or evaluating the mother's or infant's internal state, including their thoughts, feelings, beliefs, or intentions, or any suggestions that the mother had misinterpreted her infant's internal state; note that verbatim repetitions of the mother's own internal state language (e.g., "The baby screams and the mother says, 'You're getting all excited'", "The mother says the toy is the baby's favorite") were not coded as mental given that they did not require the participant to attribute or evaluate internal states; (b) *Behavioral* – descriptions of the mother's or child's behavior or play, including verbatim repetitions of the mother's own internal state language; (c) *Physical* – references to the mother's or child's physical attributes, including appearance or age; (d) *Value* – judgements that went beyond what was actually happening in the clip. Participants received a mean score for the number of mental references they made per clip for the three types of clip (non-internal state, appropriate internal state, misattributed internal state).

Transcripts were sectioned into individual comments prior to coding. All transcripts were coded by an experimenter who was blind to all other data and a second blind experimenter coded a randomly selected 25% of transcripts; inter-rater reliability was $\kappa = .79$.

Results

Preliminary Analyses

Participant age showed a non-significant trend towards correlating positively with scores on the UMIIT clips featuring no internal state language, $r(96) = .20$, $p = .052$. Age was unrelated to all other UMIIT variables and to mind-minded descriptions of partner and friend (rs < .18, ps > .100).

Performance on the Unknown Mother–Infant Interaction Task (UMIIT)

Table 1 shows the descriptive data for performance on the UMIIT. There was good variance in internal state interpretations in all three types of clip (no internal state language, appropriate internal state language, and misattributed internal state language) included in the UMIIT. Paired samples t tests showed that participants used less internal state language when interpreting the appropriate internal state clips than (a) misattributed internal state clips, $t(95) = 7.21$, $p < .001$ and (b) no internal state clips, $t(95) = 7.30$, $p < .001$. More internal state language was used in relation to the non-attuned internal state clips than the clips with no internal state language, $t(95) = 2.53$, $p = .013$. However, there were robust positive correlations between the use of internal state interpretations across the three types of clip (see Table 2).

Relations between Mind-Mindedness and Unknown Mother–Infant Interaction Task (UMIIT) Performance

Table 2 shows the correlations between scores for mind-minded friend and partner descriptions and the UMIIT variables. As shown in Table 2, mind-mindedness in relation to partners was significantly positively correlated with mind-mindedness toward friends. Neither of the mind-mindedness measures correlated significantly with any of the UMIIT variables (see Table 2). These findings suggest that individuals' tendency to describe significant others using internal state language is not related to their general tendency to describe the behavior of unfamiliar others using internal state language.

Bayesian analysis was undertaken to verify the null findings, using the correlation framework to grade the decisiveness of the evidence in favor of the null hypothesis (Wagenmakers, Verhagen, & Ly, 2016). We used JASP for the analyses

(van Doorn et al., 2019); an annotated .jasp file is available from the corresponding author. The null hypothesis postulated that there would be no association between UMIIT performance and mind-mindedness in relation to (a) a partner, or (b) a friend. The alternative hypothesis was a default one-sided hypothesis of a positive correlation between performance on the UMIIT, and (a) mind-mindedness towards a partner, (b) mind-mindedness towards a friend. We set the Bayes factor to BF_{01} to indicate the strength of the evidence in favor of the null hypothesis. For mind-mindedness towards a partner, the Bayes factor was $BF_{0+} = 4.88$, which means the data are 4 times more likely to occur under the null hypothesis than the alternative hypothesis. This result indicates moderate evidence in favor of the null hypothesis. The Bayes factor also indicated evidence in favor of the null hypothesis for mind-mindedness towards a friend, specifically, $BF_{0+} = 14.04$, indicating that the data are 14 times more likely to occur under the null hypothesis than the alternative hypothesis. This result indicates strong evidence in favor of the null hypothesis.

Discussion

In Study 1, no relations were found between participants' mind-mindedness in relation to friends or partners and their internal state interpretations of the behavior of unknown individuals during the UMIIT. The fact that mind-mindedness was not associated with individuals' general tendency to use mental state language when interpreting others' behavior is in line with Meins et al.'s (2014) proposal that mind-mindedness is a relational construct rather than a trait-like quality.

The UMIIT was successful in eliciting good variance in internal state interpretations across the different types of clip, although certain clips elicited more internal state interpretations than others: internal state interpretations were more likely

to occur when the mother misread or behaved in a way that was inconsistent with the infant's internal state. The measure was therefore successful in engaging the intentional stance of the participant in relation to others' internal states.

Before drawing definitive conclusions about the relational nature of the construct of mind-mindedness from Study 1's findings, it is important to point out that the null findings for the relation between mind-mindedness and use of internal state language during the UMIIT may be due to the fact that these two assessments focused on very different types of close relationship: mind-mindedness in relation to adult friends and partners, and internal state interpretations of mothers and infants. The aim of Study 2 was thus to investigate whether internal state interpretations during the UMIIT related to mothers' mind-mindedness in relation to their infants. If Study 2 replicated the null finding for relations between UMIIT performance and mothers' mind-mindedness when interacting with their own infants, this would provide further corroboration of mind-mindedness being a quality of close relationships rather than an individual trait. Alternatively, a positive association between mind-mindedness and internal state interpretations during the UMIIT would suggest that the null findings of Study 1 were due to non-compatibility in the target relationships.

Study 2

Method

Participants

Participants were 56 women and their infants who were participating in a larger longitudinal study. Participants were recruited through local maternity services, community groups, social media, and word of mouth. All participants were living in

the north of the United Kingdom. The mean age of participants was 32.31 years (SD = 4.42, range 22–47). Infants' mean age was 27 weeks (SD = 2.92, range 21–37). Forty-seven of the mothers were primiparous, 8 had an older child, and one participant had two older children. All but one of the participants was White. Twenty had completed postgraduate study, 24 had completed undergraduate study, and the remaining 12 had not attended university. The study received ethical approval from the relevant University and NHS committees and participants gave informed consent to participate. Testing was carried out in accordance with APA and BPS guidelines. Participants received £20 for participation.

Materials and Methods

Tasks were completed in the University developmental laboratory as part of a 2-hour baseline visit for the larger longitudinal study. Participants were first observed in the free play interaction to assess mind-mindedness, and completed the UMIIT at the end of the testing session.

Maternal mind-mindedness. Mothers were filmed interacting with their infants for 10 minutes in the developmental laboratory, which was equipped with a range of age-appropriate toys. Mothers were instructed to play with their infants as they would do if they had free time together at home. The free play interactions were transcribed verbatim and coded according to the mind-mindedness coding scheme (Meins & Fernyhough, 2015). First, the transcripts were used to identify mind-related comments about the infant: (a) an explicit internal state term indicating what the infant was thinking, feeling, or experiencing; or (b) comments where the mother spoke in the first person as though she were the infant (e.g., "Oh Mummy, isn't this good?").

The coder then watched the entire interaction in conjunction with the transcript and coded each mind-related comment as either appropriate or non-attuned based on the following criteria. Appropriate mind-related comments were those for which either (a) the researcher agreed with the mother's reading of the infant's current internal state, (b) the internal state linked the infant's current activity with events in the past or future (e.g., "Do you remember the rings from grandma's house?" while the infant played with the ring-stacker), (c) the comment was used to re-engage the child after a lull in the interaction (e.g., "Do you want to play with the monkey?", "You'll like the ball"). Non-attuned mind-related comments were those in which (a) the researcher disagreed with the mother's reading of the internal state, (b) the internal state referred to a past or future event that was unrelated to the infant's current activity, (c) the mother asked the child what they wanted to do, or stated that the infant wanted or liked a different object or activity, while the infant was already engaged, (d) the caregiver appeared to be projecting their own mental state on the child, or (e) the referent of the caregiver's comment was not clear.

Mind-mindedness was coded by a trained researcher who was blind to all other measures, with a randomly selected 25% of interactions being coded by a second blind researcher; inter-rater reliability for coding mind-related comments as appropriate or non-attuned was $\kappa = .87$. Appropriate mind-related comments and non-attuned mind-related comments were expressed as a percentage of the total number of comments produced during the interaction in order to control for maternal verbosity (Meins & Fernyhough, 2015; Meins et al., 2001, 2012).

Unknown mother-infant interaction task (UMIIT). This task was identical to that used in Study 1. The UMIIT was presented on a desktop computer in a quiet

office. Participants' responses were coded into the Mental, Behavioral, Physical, and Value categories as described in Study 1.

Descriptions were coded by an experimenter who was blind to all other data, with a randomly selected 25% being coded by a second blind experimenter. Inter-rater reliability was $\kappa = .84$.

Results

Preliminary Analyses

Table 3 shows the descriptive statistics for performance on the UMIIT task. No relations were found between internal state language use on the UMIIT and mothers' age, education level, or infant age (rs <.16, ps >.116). Table 3 also shows the descriptive statistics for mothers' appropriate and non-attuned mind-related comments when interacting with their own infants. Mind-mindedness was unrelated to mothers' age, education level, and infants' age (rs <.17, ps >.217).

Replicating the findings of Study 1, there were robust positive correlations between the use of internal state interpretations across the three types of clip (see Table 4), and a paired samples t test showed that participants were more likely to use internal state language for clips containing appropriate internal states than (a) clips containing misattributed internal states, $t(55) = 5.20$, $p < .001$, and (b) clips with no internal state language, $t(55) = 3.76$, $p < .001$, while there was no significant difference between clips containing no internal state language and misattributed internal states, $t(55) = 1.09$, $p = .279$.

Relations between UMIIT and Maternal Mind-mindedness

Table 4 shows the correlations between UMIIT ratings and appropriate and non-attuned mind-related comments. As shown in Table 4, there were no significant

relations between the mind-mindedness and UMIIT variables. Mothers' mind-mindedness in relation to their own infants was thus unrelated to their internal state interpretations of the behavior of unfamiliar mother–infant dyads.

As was the case in Study 1, we conducted Bayesian analyses to verify the null findings. The null hypothesis for Study 2 stated that there would be no correlation between UMIIT performance and (a) appropriate mind-related comments, or (b) non-attuned mind-related comments. The alternative hypothesis for (a) was a default, one-sided hypothesis of a positive correlation between appropriate comments and UMIIT performance. We set the Bayes factor to BF_{01} to indicate the strength of the evidence in favor of the null hypothesis. The Bayes factor indicated evidence in favor of the null hypothesis for appropriate mind-mindedness, with $BF_{0+} = 8.20$, which means the data are 8 times more likely to occur under the null hypothesis than the alternative hypothesis. This represents moderate evidence in favor of the null hypothesis. The alternative hypothesis for (b) was a default, one-sided hypothesis of a negative correlation between non-attuned comments and UMIIT performance. The Bayes factor again indicated moderate evidence in favor of the null hypothesis for non-attuned mind-mindedness, with $BF_{0-} = 8.29$, showing that the data are also 8 times more likely under the null hypothesis.

In summary, the Bayesian analyses showed moderate to strong evidence in favor of the null hypotheses, indicating that mind-mindedness towards close others is unlikely to be related to mentalizing about unfamiliar people.

General Discussion

The main aim of the two studies reported here was to explore the properties of the construct of mind-mindedness, evaluating Meins et al.'s (2014) proposal that it is

not trait-like, but a quality of close relationships. In both studies, mind-mindedness in relation to a significant other was unrelated to internal state interpretations of unknown individuals' behavior during the UMIIT: UMIIT performance was unrelated to mind-mindedness when describing a close friend or partner (Study 1), and to the indices of mind-mindedness for mothers interacting with their infants (Study 2). Bayesian analyses confirmed the null findings across both studies, indicating moderate to strong evidence in favor of the null hypothesis that mind-mindedness in relation to a significant other is unrelated to the tendency to invoke internal states when interpreting the behavior of unknown individuals. In contrast, significant associations emerged when mind-mindedness was assessed in relation to two known individuals, with Study 1 replicating the positive correlation in mind-mindedness in relation to a close friend and a partner (Meins et al., 2014). Taken together, the results of the two studies reported here suggest that mind-mindedness is not a general tendency to focus on thoughts, feelings, and intentions, but a specific application of this intentional stance towards individuals with whom one has a personal relationship.

Given that individuals' more general tendency to interpret others' behavior with reference to their internal states is not related to mind-mindedness, what other factors might underlie variability in mind-mindedness? One possibility is that there may be a motivational element to mind-mindedness, which encourages an individual to adopt the intentional stance towards people who are deemed to be significant. Hobson (2012) describes individual differences in the strength with which people identify with the perspectives of others, and thus experience them as their own. Variations in people's tendency to adopt others' perspectives can be seen on referential communication tasks, where participants use information about what

another person can see in order to provide an accurate instruction. By providing rewards for fast and accurate performance, participants become more likely to use cues on the other person's perspective in formulating their instruction than in conditions without a reward (e.g., Cane, Ferguson, & Apperly, 2017). Similarly, Hill and McMahon (2016) reported links between mind-mindedness and self-reported interest in others' mental states. Therefore, conscious or unconscious motivation to adopt another's perspective may be a factor underlying individual differences in mind-mindedness. Future research could investigate this possibility through manipulating people's motivation to read or adopt another's perspective.

With regard to maternal mind-mindedness specifically, while child characteristics such as infant temperament (Larkin, Oostenbroek, Lee, Hayward, & Meins, 2019; Meins, Fernyhough, Arnott, Leekam, & Turner, 2011) and the diagnosis of an autism spectrum disorder and other developmental disorders (Kirk & Sharma, 2017; Larkin et al., 2020) have not been found to relate to maternal mind-mindedness, associations with certain parent characteristics have been reported. For example, lower levels of mind-mindedness are associated with young motherhood (Demers et al., 2010), depressive symptoms (Bigelow et al., 2018), severe mental illness (Pawlby et al., 2010; Schacht et al., 2017), trauma-exposure (Easterbrooks, Crossman, Caruso, Rasking, & Miranda-Julian, 2018), parenting stress (McMahon & Meins, 2012; Walker, Wheatcroft, & Camic, 2012), and poorer executive functioning (Yatziv, Kessler, & Atzaba-Poria, 2018). Framing mind-mindedness as a relational construct prompts us to consider how these characteristics might influence the parent's perception of, or interaction with, their child. For example, Fishburn et al. (2017) found that adoptive parents and foster carers who focused on their child's placement

history when describing their children were less likely to describe their children in mind-minded ways. This suggests that representing the child in terms of their previous history may impede the ability to see the child as an individual with their own motivations, intentions, desires, and preferences.

Other barriers may be at play in different contexts. In a recent intervention study reported by Zeegers et al. (2019), increases in parents' mindfulness and acceptance of distress were associated with improved mind-mindedness via reductions in non-attuned mind-related comments during mother–child interactions. The authors suggest that mindfulness may have lowered 'experiential avoidance' (Tiwari et al., 2008) in the parents, thereby allowing them to stay open to their child's internal states. Mind-mindedness is clearly sensitive to the complex transactional processes at play between parent and child, and further studies of how mind-mindedness can be enhanced are warranted in order to provide interventions to improve the parent–child relationship and infant and child mental health.

While the null relations with the established measures of mind-mindedness indicate that the UMIIT cannot be considered to assess mind-mindedness, this task did prove successful in measuring individuals' spontaneous tendency to invoke internal states when interpreting the behavior of unknown individuals; good variance in participants' internal state interpretations of others' behavior during the UMIIT was seen in both studies. It is important to note that internal state interpretations in the UMIIT involved the participants' own attributions and evaluations of the thoughts and feelings of the mothers and infants being observed; comments where participants simply reported verbatim internal state language used in the video clips were coded in the behavioral category. Internal state interpretations were highest in clips containing

internal state language in both studies, although the nature of the language differed; clips including non-attuned internal state language elicited the most internal state interpretations in Study 1, whereas such interpretations were most common for the appropriate internal state language clips in Study 2. The frequency scores for internal state language also differed between the two studies, with scores for all clips notably higher in Study 1 than in Study 2.

Without further research, it is difficult to interpret these differences across the two studies. One explanation is the fact that the samples in the studies were different: Study 1 primarily involved young adults who were not parents, whereas all of the participants in Study 2 were mothers with young infants. This may well explain the difference in frequency scores. Mothers in Study 2 completed the UMIIT as part of an observational study with their infants, and the infants were present while they completed the task. Although the instructions were the same as in Study 1, with no time limit, it may have been that the mothers were more concise in their descriptions of the UMIIT clips owing to their awareness that their infants were likely to need their attention before too long. Future research should administer the UMIIT to different samples of participants in order to establish whether specific types of clip are more likely than others to elicit internal state interpretations.

That said, it is important to point out that there was also good variance in participants' tendency to interpret behavior in terms of underlying thoughts and feelings in clips that did not include any internal state language, suggesting that the tendency to make internal state interpretations is not simply triggered by hearing others talk about thoughts and feelings. Moreover, in both studies, robust positive correlations were seen for use of internal state language across the three types of clip,

indicating a degree of consistency in the tendency to interpret people's behavior with reference to their underlying underlying thoughts and feelings. Caution should therefore be exercised in attempting to draw conclusions based on the divergent findings of Studies 1 and 2.

It is notable that correlations between UMIIT scores and mind-mindedness were negligible to small in terms of effect sizes. This magnitude of effect is in line with those reported by Meins et al. (2014) for relations between mind-minded descriptions of a significant other and those of famous figures or works of art. Individuals' general tendency to invoke internal states when describing unknown people thus appears to tell us little about their tendency to be mind-minded in relation to a significant other. Although Barreto et al. (2016) reported somewhat larger effects (r = .21) for correlations between mind-mindedness (using the describe-your-child interview) and parents' mentalizing ability (using the Visual Jokes task), these results in no way suggest that mind-mindedness and more general mentalizing abilities are equivalent. It would be interesting for future research to explore how use of internal state language in the UMIIT relates to measures of adults' theory of mind and mentalizing abilities. Although our findings indicate that the UMIIT cannot be considered a measure of mind-mindedness, one would expect internal state language during the UMIIT to correlate positively with tasks assessing adult mentalizing abilities.

The findings reported here indicate that the general tendency to understand others' internal states is necessary but not sufficient for mind-mindedness, and again highlight the potential role of motivation to engage with internal states as a key component of mind-mindedness. This proposal is consistent with evidence that mind-

mindedness is associated with self-reported interest in mental states (Hill & McMahon, 2016), and with evidence from neuropsychology that increased motivation (either intrinsically through individuals having high pro-social values, or extrinsically through rewards) is associated with increased mentalizing and cognitive effort (Halko, Hlushchuk, Hari, & Schurmann, 2009; Telzer et al., 2012). It would be interesting to investigate how UMIIT performance would vary if motivation to engage with characters' mental states were manipulated. Future research could also investigate whether UMIIT performance differs if the observed interaction involves the caregiver and their own infant, similar to studies where early years practitioners comment on their filmed interactions with particular infants (e.g., Degotardi, 2010). Under such circumstances, stronger relations with mind-mindedness might be observed.

It should also be noted that we did not investigate relations between UMIIT performance and the two different assessments of mind-mindedness (descriptions of adult partners and friends versus appropriate and non-attuned mind-related comments during infant–caregiver interaction) in the same sample of participants. Future research on the UMIIT should therefore explore relations with the different measures of mind-mindedness in the same sample of participants. That said, the fact that we found relations of almost identical magnitude between mind-mindedness and UMIIT performance across the two studies suggests a degree of generalizability in our results.

In summary, the two studies reported here have provided initial validation of a new measure for assessing individual differences in adults' tendency to interpret others' behavior with reference to their internal states. The null findings for relations between internal state interpretations of unknown individuals' behavior and mind-mindedness when assessed from (a) descriptions of friends and partners (Study 1),

and (b) mothers' mind-related comments when interacting with their infants (Study 2) are consistent with the proposal that mind-mindedness is distinct from the general ability to mentalize, which may indicate that it is relationship-dependent.

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Table 1

Descriptive Statistics for Internal State Comments on the Unknown Mother–Infant Interaction Task (UMIIT) and Mind-Minded Descriptions in Study 1

	M (*SD)*	Range
Type of Clip		
No ISL clips	7.83 (4.77)	0–24
Appropriate ISL clips	5.28 (3.15)	0–16
Non-attuned ISL clips	9.28 (6.25)	0–52
Frequency of ISL across all clip types	22.44 (11.97)	2–62
Partner mind-minded descriptions (%)	43.38 (27.83)	0–100
Friend mind-minded descriptions (%)	43.46 (30.23)	0-100

Note: ISL = internal state language.

Table 2

Correlations between Mind-Minded Descriptions of Partners and Friends and Internal State Comments on the Unknown Mother–Infant Interaction Task (UMIIT) in Study 1

	1	2	3	4	5	6
1. Partner mind-mindedness	--	.32*	-.00	.11	.02	.04
2. Friend mind-mindedness		--	-.11	.08	-.14	-.10
3. No ISL			--	.70*	.51*	.85*
4. Appropriate ISL				--	.51*	.80*
5. Non-attuned ISL					--	.86*
6. All clips						--

Note: ISL = internal state language.

* = $p < .001$

Table 3

Descriptive Statistics for Internal State Comments on the Unknown Mother–Infant Interaction Task (UMIIT) and Appropriate and Non-attuned Mind-Related Comments for Maternal Mind-mindedness for Study 2

	M (*SD*)	Range
UMIIT Type of Clip		
No ISL clips	2.52 (2.09)	0–8
Appropriate ISL clips	3.59 (2.18)	0–10
Non-attuned ISL clips	2.25 (2.39)	0–13
Frequency of ISL across all clip types	8.36 (5.73)	1–29
Mind-Mindedness		
Total number of comments	170.09 (48.13)	72–285
Appropriate mind-related comments (%)	3.77 (2.45)	0–10.20
Non-attuned mind-related comments (%)	2.47 (1.98)	0–8.42

Table 4

Correlations between Maternal Mind-mindedness and Internal State Comments on the Unknown Mother–Infant Interaction Task (UMIIT)

	1	2	3	4	5	6
1. % Appropriate MM	--	.24	.02	-.08	-.09	-.06
2. % Non-attuned MM		--	.08	.02	.06	.06
3. UMIIT No ISL			--	.50**	.67**	.84**
4. UMIIT Appropriate ISL				--	.65**	.83**
5. UMIIT Non-attuned ISL					--	.91**
6. UMIIT All clips						--

Note: UMIIT = Unknown Mother-infant Interaction Task. MM = Mind-mindedness. ISL = internal state language.

** p <.01