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Abstract

Mothers with borderline personality disorder (BPD) have been theorized to have decreased mentalization ability, which is the capacity to perceive and interpret mental states. This could increase the risk for troubled relationships with their infants and therefore have adverse consequences for child social and emotional development. Mind-mindedness (MM), which codes the mother's references to her infant's mental states during an interaction, is one method of indexing mothers' mentalizing ability. However, research has yet to examine MM in mothers with BPD. Our objective was to assess the MM ability of 38 mothers during interactions with their 12-month-old infants, including 10 mothers with BPD and 28 mothers without a psychiatric diagnosis. Trained observers assessed maternal MM from two minutes of videotaped mother-infant free play. BPD was assessed with the Structured Clinical Interview for DSM-III-R- Personality Disorders (SCID-II). Mothers with and without BPD did not differ in the proportion of total comments referring to infant mental states. However, mothers in the BPD group proportionately made 3.6 times more misattuned mind-related comments than control mothers. Thus, mothers with and without BPD appear equally likely to envision mental states in their infants. However, mothers with BPD also appear more likely to misread their infants' mental states.

How do mothers with borderline personality disorder mentalize when interacting with their infants?

One prominent hypothesis regarding core difficulties in borderline personality disorder (BPD) is that individuals with BPD have decreased “mentalization ability,” the capacity to perceive and interpret their own and others’ mental states (Fonagy & Bateman, 2006). However, few empirical studies have assessed this hypothesis directly. Existing studies have examined the mentalizing capacities of individuals with BPD in scripted laboratory tasks and paradigms involving strangers, virtual partners, or pictures (Fertuck et al., 2009; Franzen et al., 2011; King-Casas et al., 2008) or have assessed references to others’ mental states in a structured interview (Schacht et al., 2013). Although important and innovative, the results of these studies may or may not reflect how individuals with BPD behave with other people in their daily lives. To our knowledge, no study has assessed whether individuals with BPD are less likely to represent others’ mental states during a natural social interaction with a familiar partner.

One potentially powerful context to assess the mentalizing ability of individuals with BPD is the parent-infant relationship. Within its clinical description, BPD includes many relational features such as intense and unstable relationships, labile anger toward others, and feelings of abandonment (American Psychiatric Association, 2013). In addition, individuals with borderline psychopathology are particularly susceptible to interpersonal rejection and to stressors in their current relationships (e.g., Stiglmayr et al., 2005). Despite the centrality of interpersonal problems in BPD, very little is known of the effects of this disorder on the crucial parent-child relationship, particularly in early life (Petfield, Startup, Droscher, & Cartwright-Hatton, 2015). It is well documented that the quality of parental behavior during parent-infant interaction is a robust predictor of positive child development (e.g., NICHD Early Child Care Research

Network, 2005), and difficulty in interpreting infant mental states impairs the quality of parental interactive behavior (Laranjo, Bernier, & Meins, 2008). Mothers with BPD have been found to engage in more problematic interactions with their infants (e.g., lower sensitivity, higher disrupted communication; Hobson et al., 2005; Hobson et al., 2009) and infants of mothers with BPD are more likely to exhibit disorganized attachment behavior (Hobson et al., 2005). These results are of concern given that research has consistently underscored the impressive long-term prediction from maternal insensitivity, disrupted communication, and attachment disorganization in infancy to poor developmental outcomes in childhood and adolescence (e.g., Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010; Lyons-Ruth, Bureau, Holmes, Easterbrooks, & Brooks, 2013; NICHD Early Child Care Research Network, 2005).

Given the parallel links between impaired maternal mentalization and both lower sensitivity (Laranjo et al., 2008) and disorganized attachment (Meins et al., 2012), impaired mentalization may be one cognitive substrate of the relational difficulties documented between mothers with BPD and their infants. Furthermore, as theorized by Fonagy and Bateman (2006), the development of the capacity for mentalization may depend on the extent to which a child's mental states were adequately reflected back to him or her by a trusted other, again suggesting a close interplay between BPD, parent-infant interaction, and mentalization. In summary, then, parent-infant interaction appears to be a particularly salient context for assessing the links between BPD and mentalizing difficulties. To our knowledge, however, whether mothers with BPD show impaired mentalization in interaction with their infants has not yet been tested. This was the central aim of this study.

The mind-mindedness (MM) assessment of Meins and Fernyhough (2006) is particularly relevant for evaluating mentalization among mothers with and without BPD during interaction

with their infants, as it focuses on how a caregiver's mentalizing tendency manifests itself through verbal comments on the infant's ongoing mental activity during parent-infant interaction. Maternal MM shows good predictive validity in relation to several child socio-emotional outcomes, including attachment security (Laranjo et al., 2008; Meins et al., 2012), theory of mind understanding (Laranjo, Bernier, Meins, Carlson, 2014; Meins, Fernyhough, Arnott, Leekam, & de Rosnay, 2013) and behavioral adjustment (Meins, Centifanti, Fernyhough, & Fishburn, 2013). MM is assessed by noting the frequency of a parent's verbal references to his or her infant's mental states during free play interaction, and each of those mind-related comments is further classified as either appropriate or non-attuned by a trained observer, taking account of the context of the interaction (Meins & Fernyhough, 2006). Comments can also be coded in terms of affective valence, noting the positive, negative or neutral quality of each. Adolescent mothers have been found to make fewer positive comments on their infants' mental states than their adult counterparts, and the use of negative comments by mothers while interacting with their infants was related to both decreased maternal sensitivity and lower child attachment security (Demers, Bernier, Tarabulsy, & Provost, 2010).

The aim of the current study was to evaluate whether mothers with BPD showed mentalizing difficulties (Fonagy & Bateman, 2006) in the context of interaction with their 12-month-old infants, using the MM assessment system. Our primary hypothesis was that mothers with BPD would exhibit a higher proportion of total comments that were *non-attuned* mind-related comments than would control mothers. Non-attuned comments would be the primary indicator that mothers with BPD were more often inaccurately interpreting mental states in their infants, which in turn might contribute to the interactional difficulties noted in previous literature. Consistent with the MM coding system, we also assessed total comments to the infant,

proportion of total comments that were appropriate mind-related comments, and proportion of total comments that were negative, neutral, or positive in valence. No specific hypotheses were advanced relative to these other aspects of mind-related comments.

Method

Participants

The 38 mother-infant dyads participating in this study were drawn from two studies of maternal interaction with 12-month-old infants in middle-class families. Mothers and their babies were recruited through screening at antenatal clinics and through advertisements placed in local publications. Hobson et al. (2005) had examined 30 English-speaking mother-infant dyads during free play (10 mothers with BPD, 20 controls). BPD diagnosis was made using the Structured Clinical Interview for DSM-III-R (SCID-II; see Hobson et al., 2005 for more details). Potential participants were first screened using a questionnaire version of the Structured Clinical Interview for *DSM-III-R* (SCID-NP; Spitzer, Williams, Gibbon, & First, 1990) as well as questionnaire versions of the SCID focusing on mood and psychotic disorders symptoms. In order to focus specifically on BPD, we excluded mothers who met criteria for other comorbid psychiatric disorders. Therefore, mothers who met criteria for BPD and no other diagnoses were invited for an interview using the SCID-II focusing on personality disorders, in addition to the interview version of the SCID focusing on mood and psychotic disorders symptoms.

Given that the study used the *DSM-III-R* for diagnosis (the current system at the time of data collection), we note that criteria for BPD were slightly more restrictive in the *DSM-III-R* than in the *DSM-IV* or *DSM-5*. *DSM-IV* and *DSM-5* include a 9th possible diagnostic feature for BPD, the presence of transient, stress-related paranoid ideation or severe dissociative symptoms,

and require 5 of 9 features for diagnosis. The DSM-III-R requires 5 of 8 criteria and includes only the first 8 criteria in the *DSM-IV* and *DSM-5*.

In order to maximize sample size and thus statistical power, we added to the control group eight English-speaking mother-infant dyads among a normative sample of mothers and their 12-month-old infants in Montreal, Canada (Laranjo et al., 2008). Our final sample thus included 10 dyads in which mothers were diagnosed with BPD (5 infant boys) and 28 dyads with mothers with no known psychiatric diagnosis (18 infant boys). Demographic data for the two groups (Hobson et al., 2005, and Laranjo et al., 2008) were similar: maternal age (32 vs. 33 years), infant's age (53 vs. 55 weeks), percentage of white ethnicity (63 vs. 70%) and percentage of married/cohabiting mothers (60 vs. 80%). All study procedures were reviewed by the Institutional Review Boards at the Cambridge Health Alliance, the Tavistock Clinic, and the University of Montreal, Canada.

Procedure and measures

Maternal mind-mindedness was assessed during a videotaped two-minute period of free play that took place before the beginning of the Strange Situation (SS) procedure, in a room with age-appropriate toys. Each mother was asked to play normally with her child for the two-minute period before the start of the SS. Verbal content for the two-minute period was transcribed from videotape and coded using Meins and Fernyhough's (2006) guidelines. There were five different categories of mind-related comments: (a) desires and preferences; (b) cognitions (knowledge, decisions, etc.); (c) emotions; (d) epistemic states (playing games, joking); (e) talking on the infant's behalf. Total number of mind-related comments was counted, and each was then classified as appropriate or non-attuned.

Following Meins and Fernyhough's (2006) guidelines, a comment is considered appropriate when it fits at least one of three criteria: the coder agrees with the mother's comment

on her infant's state of mind, the comment clarifies how to proceed after a lull in the interaction, or the comment is linked with a past, future or current activity (e.g., "Do you want to take the train to visit grandma tomorrow?") would be appropriate if said while the child is playing with a toy train. In contrast, the same statement made while the infant is obviously interested in something else than a train or visiting grandma would be rated as non-attuned). Affective valence, which refers to the positive, negative or neutral quality of maternal comments on the infant's activity, was also coded for each mind-related comment (e.g., a mother's comments on emotions like happiness or enjoyment of an activity would be rated as positive, whereas a comment about remembering playing with a similar toy elsewhere would be rated as neutral).

All types of mind-related comments were expressed as proportions of the number of *total comments*, not as a proportion of mind-related comments only, to control for differences in mothers' verbosity. Note that expressing each type of mind-related comment as a proportion of total comments, rather than of mind-related comments, makes each proportion independent of the other proportions. That is, relative to other mothers, a given mother could have a high proportion of total comments that were appropriate, as well as a high proportion of total comments that were non-attuned. Similarly, a given mother could have a higher proportion of total comments to her infant that were negative in valence relative to other mothers, as well as a higher proportion of total comments to her infant that were positive in valence relative to other mothers.

All interactions were coded by a rater who was blind to diagnostic status and who was trained to code for mind-mindedness by an experienced trainer. The rater first achieved reliability with the trainer on a different sample, and then achieved reliability with a second coder on interactions from the current sample. Interrater reliability between the two coders on a

randomly selected 25% of the interactions was excellent for total mind-related comments, appropriate mind-related comments, non-attuned mind-related comments, and the positive, negative, or neutral valence of mind-related comments, with all ICC's $> .79$. Disagreements between the two coders were resolved by consensus discussion.

Statistical analyses

We tested hypotheses with the UNIANOVA procedure using Type III sums-of-squares in SPSS® 21 because it is more robust to unbalanced designs (IBM Corp, 2012). One outlier value for the variable representing % of non-attuned comments was noted and moved into the distribution for statistical purposes, being coded at one percentage point above the next highest value in the distribution, following Tabachnick and Fidell's (2013) recommendations for winsorizing. Specifically, 16% of this mother's total comments consisted of non-attuned mind-related comments, whereas this proportion varied between 0% and 7% for other mothers. Consequently, this mother's score was transformed to a value of 8% for statistical analysis.

Results

Descriptive statistics and ANOVA results are shown in Table 1. Consistent with the central hypothesis, mothers with BPD made significantly more mind-related comments that were non-attuned, with group accounting for 13% of the variability in such comments. Mothers with BPD proportionately made 3.6 times more non-attuned mind-related comments than control mothers, who made such comments very rarely. However, mothers with BPD did not differ from controls in the percentage of total comments to their infants that were mind-related. In addition, mothers with BPD did not differ from controls in the percentage of total comments to their infants that were appropriate mind-related comments. There were also no differences in the percentage of total comments that were negatively valenced, positively valenced, or neutral

mind-related comments. Given the small sample size, we aimed to cross-validate the results with a non-parametric test. We used the non-parametric equivalent to ANOVA, namely the Kruskal-Wallis one-way analysis of variance by ranks (Siegel & Castellan, 1988). The results were very similar to those presented in Table 1, and thus are not described in more detail.

Discussion

This study presents the first empirical suggestion of a difficulty in accurate mentalization among mothers with BPD during interaction with their infants. Mothers with and without BPD were quite similar in how often they referred to mental states in their infants. Thus the deficit in mentalization shown by mothers with BPD does not appear to be a general incapacity to conceive of mental states in their infants. Instead, we found that these mothers were more likely to misinterpret cues as to their infant's mental states. Specifically, they were 3.6 times more likely than control mothers to make non-attuned comments pertaining to their infant's ongoing mental activity.

In contrast, mothers with and without BPD did not differ in the proportion of total comments that were appropriate mind-related comments, as judged based on the context and the infant's activity. Mothers with and without BPD were also quite similar in the proportions of total comments that were positive, negative, or neutral mind-related comments. This lack of differences was not due to low statistical power to detect differences, which is a concern with a small sample size. The differences and their corresponding effect sizes were quite small (1 to 2% of the variance accounted for by group; Table 1) and would not reach significance even with a much larger sample. Only the effect size for a lower proportion of appropriate mind-related comments was of a magnitude (6% of variance) that might reach significance in a large sample, so that result requires replication. More highly powered studies might find that mothers with

BPD are less inclined than their healthy counterparts to make appropriate mind-related comments while interacting with their infant, but this is speculative and needs empirical examination with larger samples.

Thus, the overall picture that emerges is that mothers with BPD are as oriented to commenting on their infants' intentions and mental states as control mothers and often make positive and appropriate mind-related comments when interacting with their infants. However, they also mix positive and appropriate comments with *misinterpretations* of their infants' mental states. For instance, they would be more likely to say, "Oh, you are tired of playing with this truck; let's try the puzzle then", when the infant appeared to the observer to be happily engaged with the truck. Thus, mothers with BPD appear to be quite aware that their infants have mental activity, but were inconsistent in the accuracy of their interpretations of their infants mental states.

The current results, albeit based on a small sample, converge with evidence that mothers of infants with disorganized attachments do not differ from other mothers in the proportion of mind-related comments, but do make more non-attuned comments and fewer appropriate comments (Meins et al., 2012). Thus, the elevated rate of non-attuned attributions of mental states observed here may be one mechanism through which maternal BPD places infants at risk for disorganized attachment and further developmental difficulties. Also, others have compared MM in mothers with schizophrenia, depression, and mania to controls (Pawlby et al., 2010) and found no group differences in MM during mother-infant interaction, raising the possibility that non-attuned mind-related comments are particularly characteristic of BPD. Unfortunately, we were unable to test this hypothesis, given the absence of a psychiatric non-BPD comparison group.

While the proportions in Table 1 indicate that mothers with BPD have a significantly elevated rate of non-attuned mind-minded comments compared to controls, the numbers also indicate that non-attuned comments are still relatively rare, even for mothers with BPD. Interestingly, this relatively low rate of non-attuned comments is consistent with previous research. Meins et al. (2012) observed that mothers made only 3.53 non-attuned comments on their infant's activity on average throughout a much longer free-play sequence (20 minutes, whereas ours lasted 2 minutes). Yet, they did observe that mothers of infants in disorganized attachment relationships made significantly more such comments than other mothers. Strikingly, in fact, the rate of non-attuned comments that they found among mothers of disorganized infants was almost identical (2.54% of total comments) to the rate that we found here among mothers with BPD (2.5%). Hence, we suggest that even relatively infrequent non-attuned mind-related comments may index meaningful relational difficulties, as they are more likely to be observed in mothers with BPD (this study) and in disorganized attachment relationships (Meins et al., 2012). Given the current study's small sample size, though, along with the short duration of interaction (2 minutes) that was observed, we wish to reiterate that great care is needed in interpreting the current results, and that replication using more comprehensive observations on larger samples is critical before these promising results can be considered robust and generalizable.

However, our results differ from those of Schacht et al. (2013) who investigated MM in mothers with BPD using a brief one-question interview asking mothers to describe their preschool-aged child. Mothers with BPD were less likely to ascribe mental attributes of any kind to their children during the interview. However, mother-child interactions were not observed. The current findings suggest that when mothers with BPD are confronted with their child's behavior, they make a similar proportion of mind-oriented attributions concerning the child's

thoughts and feelings as control mothers. However, the misattuned nature of some of those comments may differentiate them, in a manner similar to how it differentiates mothers of infants with disorganized attachment.

The main limitation of this study is the small sample size, which limits both statistical power and generalizability. Replication is therefore required. The recruitment procedure also excluded BPD participants with comorbidity on Axis I or II, such as mood, anxiety or substance use disorders (Hobson et al., 2005), limiting conclusions to BPD mothers without comorbidities. Because such comorbidities with BPD are common, replication with a sample of mothers with BPD as well as other diagnoses is therefore important. Furthermore, we cannot address the specificity of these findings to BPD compared to other mental health or personality disorders, other than referring to the Pawlby et al. (2010) findings. Finally, MM is often assessed based on longer observation periods (e.g., 10 minutes; Laranjo et al., 2008; 20 minutes; Meins et al., 2012). It is impossible to determine whether the observed group differences in the use of non-attuned comments would have been magnified or attenuated with a longer observation period.

Nonetheless, these study results raise important questions for future work. Mothers with BPD were found here to attribute mental states to their infants proportionally as often as other mothers and to be capable of making a similar proportion of accurate and positive attributions. Thus, the question arises as to when and why this mentalizing capacity breaks down for mothers with BPD. As noted earlier, individuals with BPD are known to be particularly sensitive to rejection and to have profound fears of abandonment (e.g., American Psychiatric Association, 2013; Stiglmayr et al., 2005), and they show higher rates of Unresolved and Hostile-Helpless attachment states of mind (Lyons-Ruth, Melnick, Patrick, & Hobson, 2007; Patrick, Hobson, Castle, Howard, & Maughan, 1994), which are associated with anomalous parenting (Lyons-

Ruth, Yellin, Melnick, & Atwood, 2005; Main & Hesse, 1990). In addition, childhood maltreatment is more prevalent among mothers with BPD (Zanarini et al., 1997). Thus the intimate engagement with one's own infant may be a potent context for activating fears related to rejection and abuse and precipitating emotional dysregulation and associated interactional difficulties. Indeed, the well-validated coding systems for anomalous maternal behaviors associated with infant disorganization (Lyons-Ruth et al., 2005; Main & Hesse, 1990) specifically include codes for maternal fearful behavior toward the infant. Future studies might incorporate ways to examine the specific contexts associated with an increase in non-attuned comments in mothers with BPD, for example, comparing interactions when infants are distressed versus non-distressed. In addition, incorporating a joint viewing component with mothers after the interaction to elicit the mother's thoughts about her interactions with the infant might shed more light on what triggers such misinterpretations.

Another important question raised by the results is what consequences ensue for infants of mothers with BPD who misinterpret their mental states? Cross-sectional studies need to be supplemented by longitudinal studies following cohorts of mothers with BPD and their infants into toddlerhood and schoolage, to examine potential developmental deviations associated with early maternal misinterpretation.

There is no validated parenting treatment for mothers with BPD (Stepp et al., 2011), despite their demonstrated parenting difficulties (Hobson et al., 2005; 2009; Petfield et al., 2015). The current results suggest that treatment components that build on a mother's ability to make appropriate and positive mind-minded comments, while also helping her to understand better what precipitates misattuned comments and to refashion those comments, should be tested, perhaps modeled on parenting interventions that have focused on enhancing mentalizing abilities

(Sadler et al., 2013). Well-designed intervention studies can be one potent methodology for both further understanding and for preventing the transmission of mental health problems to the next generation.

References

- American Psychiatric Association.(2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Demers, I., Bernier, A., Tarabulsy, G. M., & Provost, M. A. (2010). Mind-mindedness in adult and adolescent mothers: Relations to maternal sensitivity and infant attachment. *International Journal of Behavioral Development, 34*(6), 529-537. doi: 10.1177/0165025410365802
- Fearon, R. P., Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., Lapsley, A.-M., & Roisman, G. I. (2010). The significance of insecure attachment and disorganization in the development of children's externalizing behavior: A meta-analytic study. *Child Development, 81*(2), 435-456. doi: <http://dx.doi.org/10.1111/j.1467-8624.2009.01405.x>
- Fertuck, E.A., Jekal, A., Song, I., Wyman, B., Morris, M. C., Wilson, S. T., ... Stanley, B. (2009). Enhanced 'Reading the Mind in the Eyes' in borderline personality disorder compared to healthy controls. *Psychological Medicine, 39* (12), 1979-1988. doi: 10.1017/S003329170900600X
- Franzen N., Hagenhoff, M., Baer, N., Schmidt, A., Mier, D., Sammer, G., ... Lis, S. (2011). Superior 'theory of mind' in borderline personality disorder: An analysis of interaction behavior in a virtual trust game., *Psychiatry Research, 187*, 224-233. doi: 10.1016/j.psychres.2010.11.012
- Fonagy, P. & Bateman, A. (2006). Progress in the treatment of borderline personality disorder. *British Journal of Psychiatry, 188*, 1-2. doi: 10.1192/bjp.bp.105.012088
- Hobson, R.P., Patrick, M., Crandell, L., Garcia-Perez, R. & Lee, A. (2005). Personal relatedness and attachment in infants of mothers with borderline personality disorder. *Development and Psychopathology, 17*(2), 329-47. doi: 10.10170S0954579405050169

- Hobson, R.P., Patrick, M.P., Hobson, J.A., Crandell, L., Bronfman, E. & Lyons-Ruth K. (2009). How mothers with borderline personality disorder relate to their year-old infants. *British Journal of Psychiatry*, 195(4), 325-30. doi: 10.1192/bjp.bp.108.060624
- IBM Corp. (2012). *IBM SPSS Statistics for Windows, Version 21.0*. Armonk, NY: IBM Corp.
- King-Casas B., Sharp C., Lomax-Bream L., Lohrenz T., Fonagy P. & Read, P. M. (2008). The rupture and repair of cooperation in borderline personality disorder. *Science*, 321(5890), 806-810. doi: 10.1126/science.1156902
- Laranjo, J., Bernier, A. & Meins, E. (2008). Associations between maternal mind-mindedness and infant attachment security: investigating the mediating role of maternal sensitivity. *Infant Behavior and Development*, 31(4), 688-95. doi: 10.1016/j.jecp.2014.02.005
- Laranjo, J., Bernier, A., Meins, E. & Carlson, S.M. (2014). The roles of maternal mind-mindedness and infant security of attachment in preschoolers' understanding of visual perspectives and false belief. *Journal of Experimental Child Psychology*, 125, 48–62. doi: 10.1016/j.jecp.2014.02.005
- Lyons-Ruth, K., Bureau, J. -F., Holmes, B., Easterbrooks, M., & Brooks, N. H. (2013). Borderline symptoms and suicidality/self-injury in late adolescence: Prospectively observed relationship correlates in infancy and childhood. *Psychiatry Research*, 206, 273-281. doi: 10.1016/j.psychres.2012.09.030
- Lyons-Ruth, K., Melnick, S., Patrick, M., & Hobson, R. B. (2007). A controlled study of hostile-helpless states of mind among borderline and dysthymic women. *Attachment and Human Development*, 9(1), 1-16. doi:10.1016/j.psychres.2012.09.030

- Lyons-Ruth, K., Yellin, C., Melnick, S., & Atwood, G. (2005). Expanding the concept of unresolved mental states: Hostile/Helpless states of mind on the Adult Attachment Interview are associated with disrupted mother-infant communication and infant disorganization. *Development and Psychopathology, 17*(1), 1-23.
- Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightened and/or frightening parental behavior the linking mechanism? In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 161-182). Chicago: University of Chicago Press.
- Meins, E., Centifanti, L. M., Fernyhough, C., & Fishburn, S. (2013). Maternal mind-mindedness and children's behavioral difficulties: Mitigating the impact of low socioeconomic status. *Journal of Abnormal Child Psychology, 41*, 543-553. doi: 10.1007/s10802-012-9699-3
- Meins, E. & Fernyhough, C. (2006). Mind-mindedness coding manual, version 1.0. Durham University. Unpublished manuscript.
- Meins, E., Fernyhough, C., Arnott, B., Leekam, S. R., & de Rosnay, M. (2013). Mind-mindedness and theory of mind: Mediating roles of language and perspectival symbolic play. *Child Development, 84*, 1777-1790. doi : 10.1111/cdev.12061
- Meins, E., Fernyhough, C., de Rosnay, M., Arnott, B., Leekam, S. R., & Turner, M. (2012). Mind-mindedness as a multidimensional construct: Appropriate and non-attuned mind-related comments independently predict infant-mother attachment in a socially diverse sample. *Infancy, 17*, 393-415. doi : 10.1111/j.1532-7078.2011.00087.x

NICHD Early Child Care Research Network (2005). *Child care and child development: Results from the NICHD study of early child care and youth development*. New York, NY: Guilford Press.

Patrick, M., Hobson, R. P., Castle, D., Howard, R. & Maughan, B. (1994). Personality disorder and the mental representation of early social experience. *Development and Psychopathology*, 6, 375-388. doi: <http://dx.doi.org/10.1017/S0954579400004648>

Pawlby, S., Fernyhough, C., Meins, E., Pariante, C.M., Seneviratne, G. & Bentall, R.P. (2010). Mind-mindedness and maternal responsiveness in infant-mother interactions in mothers with severe mental illness. *Psychological Medicine*, 40(11), 1861-9.
doi:10.1017/S0033291709992340

Petfield, L., Startup, H., Droscher, H., & Cartwright-Hatton, S. (2015). Parenting in mothers with borderline personality disorder and impact on child outcomes. *Evidence Based Mental Health*, 18(3), 67-75. doi: 10.1136/eb-2015-102163

Sadler, L., Slade, A., Close, N., Webb, D., Simpson, T., Fennie, K., & Mayes, L. (2013). Minding the baby: Enhancing reflectiveness to improve early health and relationship outcomes in an interdisciplinary home-visiting program. *Infant Mental Health Journal*, 34(5), 391-405. doi: 10.1002/imhj.21406

Schacht, R., Hammond, L., Marks, M., Wood, B. & Conroy, S. (2013). The relation between mind-mindedness in mothers with borderline personality disorder and mental state understanding in their children. *Infant and Child Development*, 22(1), 68-84. doi: 10.1002/icd.1766

Siegel, S. & Castellan, N.J. Jr. (1988). *Nonparametric statistics for the behavioral sciences* (2nd ed.). New York: McGraw-Hill.

- Spitzer, R. L., Williams, J. B. W., Gibbon, M., & First, M. B. (1990). *Structured clinical interview for DSM- III-R-Personality disorders (SCID-II Version 1.0)*; and *non-patient edition (SCID-NP, Version 1.0)*. Washington, DC: American Psychiatric Association.
- Stepp, S.D., Whalen, D.J., Pilkonis, P.A., Hipwell, A.E. & Levine, M.D. (2011). Children of mothers with borderline personality disorder: Identifying parenting behaviors as potential targets for intervention. *Personality Disorders*, 3(1), 76-91. doi: 10.1037/a0023081
- Stiglmayr, C. E., Grathwoll, T., Linehan, M. M., Ihorst, G., Fahrenberg, J., & Bohus, M. (2005). Aversive tension in patients with borderline personality disorder: A computer-based controlled field study. *Acta Psychiatrica Scandinavica*, 3, 372-379.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6 ed.). Boston: Pearson Education.
- Zanarini, M. C., Williams, A. A., Lewis, R. E., Reich, R. B., Vera, S. C., Marino, M. F., & ... Frankenburg, F. R. (1997). Reported pathological childhood experiences associated with the development of borderline personality disorder. *The American Journal of Psychiatry*, 154(8), 1101-1106.

Table 1

Total maternal comments and percentages of total comments that were mind-related by appropriateness and affective valence among mothers with and without BPD.

	BPD (n = 10)		Controls (n = 28)		ANOVA		
	<i>M</i> (SD)	Range	<i>M</i> (SD)	Range	<i>F</i> _(1,36)	<i>p</i>	η^2
Total number of maternal comments	47.2 (23.5)	12-77	41.4 (19.4)	3-86	0.58	0.45	0.02
Mind-related comments (%)	14.7 (9.3)	0-32	17.3 (9.8)	0-36	0.49	0.48	0.02
Appropriate mind-related comments (%)	11.4 (7.3)	0-33	16.3 (9.4)	0-25	2.19	0.15	0.06
Non-attuned mind-related comments (%)	2.5 (3.2)	0-8	0.7 (1.7)	0-7	5.16	0.03	0.13
Positive mind-related comments (%)	1.9 (3.3)	0-9	1.1 (2.5)	0-10	0.65	0.43	0.01
Negative mind-related comments (%)	0.8 (1.8)	0-5	0.5 (1.2)	0-4	0.48	0.50	0.01
Neutral mind-related comments (%)	12.5 (8.3)	0-26	15.6 (10.0)	0-33	0.82	0.37	0.02

Note. All percentages indicate percent of total comments. η^2 (eta square) statistic indexes effect size, in percent variance accounted for by group membership.