

COMMENTARY

Bridging the transmission gap: An end to an important mystery of attachment research?

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Abstract

The authors provide a context for this special section by arguing that the attachment relationships of infancy fulfil an evolutionary role in ensuring that the brain structures that come to subserve social cognition are appropriately organised and prepared to equip the individual for the collaborative existence with other people for which his or her brain was designed. Processes as fundamental as gene expression or changes in receptor densities can be seen as direct functions of the extent of understanding of mental states provided by the caregiving environment. If the attachment relationship is indeed a major organiser of brain development, it is even more important to understand the processes that underpin the transgenerational transmission of attachment patterns. The contributions of the papers in the special section to understanding the role of reflective function in the development of attachment and social cognition are reviewed, and the implications for the development of both theory and practice are explored.

Keywords: *Attachment, reflective function, mentalization, social cognition, neuroscience, transgenerational transmission*

Background

The collection of papers in this special section represents a significant advance in our understanding of the transgenerational transmission of attachment – an issue that itself lies at the heart of the question of the social inheritance of mental disorder and personality.

As our understanding of the interface of brain development and early psycho-social experience increases, we see the role of the attachment relationship as far more than being there to protect the human infant. It also fulfils an evolutionary role in ensuring that the brain structures that come to subserve social cognition are appropriately organized and prepared to equip the individual for the collaborative existence with conspecifics for which his or her brain was designed (Fonagy, 2003). Alan Sroufe (1996) and Myron Hofer (2004) were perhaps the key instigators in extending attachment theory from one primarily concerned with the developmental emergence of a complex set of social expectancies to a far

broader conception of attachment as an organizer of physiological and brain regulation. More recent work, such as that by Michael Meaney (Champagne et al., 2004; Champagne, Weaver, Diorio, Sharma, & Meaney, 2003; Plotsky et al., 2005; Zhang, Chretien, Meaney, & Gratton, 2005) and D. D. Francis (Francis, Szegda, Campbell, Martin, & Insel, 2003; Jaworski, Francis, Brommer, Morgan, & Kuhar, 2005), has illuminated the biological basis of intergenerational parenting in rodent models. Taken together, this body of work illustrates how processes as fundamental as gene expression or changes in receptor densities are direct functions of the caregiving environment. The brain is 'experience-expectant' (Siegel, 1999).

Taking a neuroscience perspective increases the importance of gaining an understanding of the processes that underpin the transgenerational transmission of attachment patterns. If the attachment relationship is indeed a major organizer of brain development, as many have accepted and suggested (e.g., Schore, 1997, 2003), then the determinants of attachment relationships are important far beyond the provision of a fundamental sense of safety or security (Bowlby, 1988). Indeed we have long known that intelligence remains related to early attachment security (Cicchetti, Rogosch, & Toth, 2000; Jacobsen, Edelstein, & Hofmann, 1994; Jacobsen & Hofmann, 1997; Jacobsen, Huss, Fendrich, Kruesi, & Ziegenhain, 1997; van Ijzendoorn & van Vliet-Visser, 1988). More recently, Jay Belsky and Pasco Fearon have drawn our attention to early attachment relationships as a possible organizer of attentional systems (Belsky & Fearon, 2002; Fearon & Belsky, 2004; Jacobsen et al., 1997). We also know that infant attachment is rare among behaviours in showing little heritability in twin studies (Bokhorst et al., 2003; O'Connor, Croft, Steele, 2000; O'Connor & Croft, 2001). This once again underscores the possible intent of evolution to leave early development maximally open to environmental influence and social heredity.

These considerations provide a background against which effort to explore the role of reflective function in the development of attachment and social cognition can be examined. Reflective function is mentalization measured in the context of attachment. It is likely to be part of a complex set of capacities which at their core involve interpretation, organisms making sense of each other in contexts where this matters biologically (Bogdan, 2001). Interpretation becomes uniquely human when this involves psychologically sharing experiences, information and affects. This requires the 'intentional stance', treating the object whose behaviour you want to predict as a rational agent with beliefs and desires (Dennett, 1987, p. 15). An understanding of society (our communities, our work groups, our families) relies upon our ability to see others as having minds, as motivated by thoughts, feelings, wishes, beliefs and desires. Further, a mentalized understanding of others is impossible if we cannot place our minds alongside those we wish to collaborate with and relate to. Understanding one's own actions and understanding those of others are abilities subserved by the same set of neural mechanisms (Frith & Frith, 2003; Gallagher & Frith, 2003).

It is increasingly appreciated that the capacity for mentalization, along with many other social-cognitive capacities, evolves out of the experience of social interaction with a caregiver. Understanding of minds is hard without the experience of having been understood as a person with a mind. Some may claim that placing such a burden upon the caregiver–infant relationship is excessive. Would 'nature' have created a system fundamental to social cognition if it were so vulnerable to the vicissitudes of the relationship of the mother and her infant? Of course we must remember that it is only most recently that the social development of a human infant was in the hands of one adult rather than an average of four who were related to the child and who were therefore directly invested in his

survival (Hrdy, 2000). Allo-parenting is a characteristic of our species. Thus it may be quite reasonable to expect from an evolutionary perspective that each of us would have access to more than one adult with sufficient interest in the emergence of our mental capacities to treat us as potential minds and through a process of attuned and sensitive scaffolding promote in us the emergence of affect regulation, selective attention and mentalizing (Fonagy, Gergely, Jurist, & Target, 2002).

Key findings

Arietta Slade and her colleagues (in press a) report, for the first time, that the mother's capacity to mentalize about her own child relates both to adult attachment and infant attachment classifications. The sample is modest but the effect sizes are relatively large, and the mediational analysis is at least consistent with the assumption that mothers who are more reflective in terms of their appreciation of their child as an intentional being are mothers who are secure in relation to their own history, and presumably have high reflective function in their own adult attachment narratives. Previous findings in this area were somewhat limited since only the AAI RF measure was examined in relation to infant attachment (Fonagy, Steele, Moran, Steele, & Higgitt, 1991; Fonagy, Steele, Steele, Higgitt, & Target, 1994). Thus the parents' capacity to mentalize was measured in relation to their own childhood and their capacity to do likewise with their child had been assumed rather than observed.

Two studies, by Elizabeth Meins (Meins, Ferryhough, Fradley, & Tuckey, 2001) and David Oppenheim (Koren-Karie, Oppenheim, Dolev, Shery, & Etzion-Carasso, 2002; Oppenheim & Koren-Karie, 2002), had taken this forward to look at the interactional narratives between parents and children. In the Meins study mentalization was assessed on the basis of the mothers' verbalization to a 6 month old infant. In the Oppenheim studies, the mothers provided commentaries on their own previously recorded playful interaction with their child. Both studies found that high levels of mentalization of the child in the mothers' narratives were associated with secure infant–mother attachment. While both studies demonstrated that mentalization of the child in the context of the mother–child relationship, rather than global measures of sensitivity, was likely to predict the security of the attachment relationship, the studies assessed the quality of mentalization rather differently. The former measure aims to assess the quality of the parents' thinking about the child in 'real time' in the course of an interaction. The latter measure is pulling for a more reflective, 'off-line' mentalizing capacity. Both measures are however 'episodic', giving an indication of the parent's quality of mentalization of a particular moment of interaction. Neither is designed to measure the extent that mothers mentalize the nature of their relationship with their child (or rather their idea of their relationship with their idea of their child).

The Slade et al. study thus extends previous observations by using an AAI-like autobiographical memory focused measure, the Parent Development Interview (PDI), rather than an episode of observed interaction as an index of mentalizing capacity. In our view, a measure such as the PDI is to be preferred as an indicator of the quality of mentalization of the infant–parent relationship because it is likely to give a more stable, cross situational index of individual differences in mentalizing within the relevant context. It estimates mentalization as an aggregate across many episodes of interaction and what might be assumed to be a prototype is drawn from the mother's autobiographical memory (Conway, 1996). In a structural model of autobiographical memory, Conway (1992) proposed that two types of autobiographical memories exist within a hierarchical

autobiographical memory system: unique, specific events and repeated, general memories. The PDI gives access to these latter types of general autobiographical memories that are assumed to have a preferred level of entry to the autobiographical memory system (Addis, McIntosh, Moscovitch, Crawley, & McAndrews, 2004; Blagov & Singer, 2004; Conway & Holmes, 2004).

As commentary on the events remembered is part of the content scrutinized for level of mentalization, the PDI measure probably also incorporates an indication of the mother's 'off-line' reflective mentalizing capacity. Thus, it is to be hoped, the measure picks up the mother's predominant stance towards the child as more or less an intentional being, perhaps reflecting many hundreds of interactions and thus providing greater accuracy of prediction. The PDI mentalizing measure may be more robust to situational biases than a specific laboratory based observation. The latter could distort or unduly enhance or inhibit mentalization, thus making such observation a poor index of a generic mentalizing capacity. The PDI pulls for commonly experienced feelings and gives a general sense of the nature of the parent-child relationship. In this way it is able to index more than simple 'mind-mindedness' (Meins et al., 2001), the complexity of mental state terms and concepts used. High scorers on the PDI-RF scale have awareness of the characteristics of mental functioning in their infants and grasp the complex interplay between their own mental states and the child's inner experience. Thus establishing the association takes us a step forward in filling the transmission gap.

But does it take us far enough? There are 10 infants with disorganized attachment classification, whose mothers' RF scores are a standard deviation below those who are secure. What is it that low RF parents do which might disorganize the infant's attachment classification? In the Grienberger et al. paper, we find the possibility of an answer. This includes the rating of the Strange Situation on Karlen Lyons-Ruth and colleagues' AMBIANCE (Atypical Maternal Behaviour Instrument for Assessment and Classification; Bronfman, Parsons, & Lyons-Ruth, 1999) coding system. As the authors point out, the notion of mentalization is built into the AMBIANCE measure. If the PDI-RF measure was indeed an indicator of the mother's propensity to focus on the child's unique subjectivity, carefully separated from her own wishes, needs, beliefs and desires, then behavioural observations should show her to be more responsive to the intentions conveyed in the infant's communication and less likely to show atypical behaviours that suggest gross failures to grasp the intentionality of the infant.

This indeed turns out to be the case. It is clear that AMBIANCE is particularly sensitive to behaviours associated with the disorganization of infant-mother attachment. Parents of disorganized infants are almost a standard deviation higher on this measure than parents of secure ones. There is a substantial correlation between AMBIANCE codings and RF - again, an effect size greater than 1. The size of the effect is somewhat surprising given the disparity of the domains of measurement; the AMBIANCE is a behavioural measure based on a single interaction and the RF is coded from a narrative. There appears to be a strong relationship between the observed frequency of behaviours (such as demanding a show of affection from the infant), fearful behaviour or intrusive or negative behaviours (such as mocking or criticizing) and narratives that - for example - show little appreciation that the infant's mind cannot be directly read, or depict her as having no feelings, thoughts or wishes. The strong correlation suggests that the same control mechanism may be responsible for the inhibitory regulation of certain aspects of the mother's behaviour with the infant, and her organization of narratives about her. Frith and Frith (2003) made a strong case for mentalizing as a distinct neurocognitive system probably located in the paracingulate (Gallagher & Frith, 2003). It is conceivable that the correlation is accounted for by the

common neural basis that might underpin both tasks. The mentalizing system might provide input for the organization of both social interaction and person-centred autobiographical narrative.

This suggests that possibly Slade and her colleagues have closed the transmission gap originally identified a decade ago by Marinus van Ijzendoorn (1995). A somewhat simplistic restatement of the findings might go like this. Secure attachment history of the mother permits and enhances her capacity to explore her own mind and liberates and promotes a similar enquiring stance towards the mental state of the new human being who has just joined her social world. This stance of open, respectful enquiry makes use of her awareness of her own mental state to understand her infant, but not to a point where her understanding would obscure a genuine awareness of her child as an independent being. The awareness of the infant in turn reduces the frequency of behaviours that would undermine the infant's natural progression towards evolving its own sense of mental self through the dialectic of her interactions with the mother. In this context, then, disorganization of attachment is implicitly seen by Arietta Slade and her group as the consequence of an undermining of a mental self, or the disorganization of the self.

This brings us to Daniel Schechter's intriguing findings from the unique Columbia Trauma Study (Schechter, 2003). In this severely traumatized, predominantly Hispanic group of women, most of whom have suffered or are currently suffering from PTSD, the severity of interpersonal violent trauma did not directly predict either negativity or distortion of maternal attributions concerning the infant. However, maternal reflective functioning, an operationalization of the capacity to mentalize in an attachment context, did predict these. Those with higher reflective functioning show somewhat more balance in their attributions. In this study the Slade et al. (1994) RF coding was applied not to the PDI but to the Working Model of the Child Interview (Zeanah & Benoit, 1995). The WMCI differentiates distorted and disengaged types of non-balanced (insecure) maternal representations. Notably, it was distorted representation that correlated with PTSD. It was disengaged mothers rather than those with distorted perceptions of their children who received particularly low WMCI-RF codings. There was no significant correlation between maternal reflective functioning and the severity of maternal PTSD.

We would have expected more intensive trauma to be associated with lower reflectiveness. Interpersonal trauma, at least clinically, appears able to inhibit mentalization (e.g., Fonagy, 1991) and there is some evidence that this is reflected in AAI based RF measures (e.g., Fonagy et al., 1996). In the Schechter et al. study, it was the disengaged mothers who had less severe PTSD and lower RF ratings, while the mothers with high levels of PTSD were more likely to be classified as having distorted mental representations of their children. The results imply that the severity of interpersonal violent trauma does not predict the way a mother will perceive her child as measured by the WMCI. However, the mother's capacity to see the child in a balanced (secure) way is related to the extent to which she depicts her child as intentional. While the findings may at first sight appear counterintuitive, perhaps they are related to the same interview narrative, the WMCI, being used to derive both the RF and the distortion-disengagement measures. The association of low RF scores of mothers with a disengaged classification may be, in part at least, an artefact of the brief narratives which disengaged mothers tend to offer about their child. These might preclude a demonstration of reflectiveness.

The absence of a correlation between the severity of PTSD and the likelihood of a balanced perception of one's child may also sound surprising. The specific association with distorted (rather than disengaged) WMCI has, as the authors point out, valuable clinical implications. Disengagement may be a relatively more adaptive strategy in the face of

overwhelming traumatic events. However, as the entire sample was quite severely traumatized, the finding does not preclude the possibility that the experience of trauma reduces the likelihood of a balanced picture of one's child. The relatively low number of balanced classifications overall (17%) suggests that trauma might have undermined the ability to depict for the interviewer a balanced working model of the child in many of the participants. A matched, non-traumatized sample drawn from the same population would help test this assumption.

The finding of the lowest RF scores amongst the mothers coded as disengaged is an important pointer but is consistent with a range of possibilities. First, it could suggest a measurement problem. This could be a simple one indicating a need to ensure that RF coding is not susceptible to the length or detail of narratives. Alternatively it might imply a more complex measurement issue. For example, it is possible that what we have called 'pseudomentelization' in the context of personal histories recounted in AAI narratives and psychotherapy interviews (Fonagy et al., 2002) is harder to code in relation to narratives about one's child, and what was coded as mentalization on the WMCI-RF scale was mentalization in terms of content but insufficiently linked to reality for it to be considered functionally mentalizing. Second, it is possible that narratives concerning one's child do not reflect limitations of mentalization, even if these are significant. Notably, a recent study found a strong negative relationship between the presence of past trauma and current ability accurately to identify mental states in others using a non-narrative based measure of mentalization. The relationship between the Reading the Mind in the Eyes Test (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) and the experience of childhood and adolescent trauma as measured by the Childhood Experience of Care and Abuse interview (Bifulco, Brown, & Harris, 1994; Bifulco, Brown, Lillie, & Jarvis, 1997) was observed to be quite strong and, as predicted, negative (Fonagy et al., submitted). Thus it could be that the impact of trauma on mentalization is more modality specific than we have previously assumed. Third, the lack of an association of RF and PTSD in the Schechter et al. study may point to an important positive observation. It may suggest that while trauma generally depletes mentalizing capacity as measured in the AAI (e.g., Fonagy et al., 1996) or using the Eyes Test, this does not necessarily extend to mentalizing a new relationship with a child. There may be a reduction in reflective capacity in the context of mother–infant relationship, but this is not correlated with trauma severity because the parent may be able to protect a specific relationship with the child from the more general impingement of traumatic experience upon her mentalizing capacity. Thus even though no direct evidence for a trauma related failure of maternal mentalization of the child was demonstrated in this study, there could be an implication of the openness to change or modification implied by the specificity of the mentalizing capacity in relation to the infant.

Key ideas

Where to from here? The reports contain important suggestions for the development of both theory and practice. In the discussion of their findings, Slade et al. advance a new formulation of adult attachment linking adult attachment classification and parental reflective functioning about the child into a single model (see Slade et al., this volume, Figure 2). They place the RF construct along a dimension from organized–secure to disorganized–unresolved attachment with dismissing and preoccupied attachment placed towards the lower end of reflectiveness but orthogonally to the security-reflectiveness dimension. The formulation suggests that strategies associated with enmeshed and detached attachment behaviours become relevant to sustaining relationships mainly when reflective capacities are already

moderate to low. Disorganization occurs at the lowest level of reflectiveness. This seems to us a productive reformulation of the classical attachment model, with numerous clinical implications that certainly deserve further empirical exploration.

Extending the model of caregiver attachment, Grienberger et al. (this volume) suggest that mentalization serves as a buffer against breakdowns in affect regulation during times of stress. They suggest that mothers with high reflective function possess greater capacity to regulate the baby's fear, interacting with her without frightening or otherwise disorganizing the baby. This links mentalization conceptually to Bion's (1962) containment concept. At a more pragmatic level, the findings create a profound opportunity for early intervention. Given the discoveries reported in these papers, the testable suggestion is that infant security may be most effectively ensured by enhancing the inhibition on frightening or otherwise disruptive caregiving behaviour through a focused intervention aimed at improving the mother's mentalization of her child. Obviously the paper reported correlations and, as Michael Rutter (2000) eloquently pointed out, treatment trials are ultimately always the best tests of models of developmental psychopathology. Slade, Grienberger and their colleagues have created a remarkable opportunity for an attachment based preventive intervention (Grienberger et al., 2004; Slade et al., in press b; Slade et al., 2005) which shares features that are seen in relational prevention projects such as that of David Olds and colleagues (D. L. Olds et al., 1998), Cristoph Heinicke and colleagues (Heinicke et al., 1999; Heinicke et al., 2000; Heinicke & Ponce, 1999), the Circle of Security project (Marvin, Cooper, Hoffman, & Powell, 2002) and others. Unlike these other projects, Slade and colleagues are able to design their intervention on a well-specified model of psychopathology capable of delineating the mechanisms of change, as is increasingly demanded by evaluation researchers (Kazdin & Nock, 2003).

A second psychoanalytic figure to emerge from these papers is that of Donald Winnicott. Slade et al. link the finding that RF can serve as a model for the regulation and modulation of experience to Winnicott's (1960) concept of good enough mothering. What is implied here is that mentalization comes to serve a modulating function once the mother–infant relationship has been dysregulated. To put it perhaps too simplistically, 'the relationship needs to be bad (in trouble) for the mother to be able to show that she is good'. It is at these moments that the mother is called upon to give voice to the child's inner experience, to make these experiences real for the child through a mirroring process and thereby make a dysregulated constitutional bodily state manageable. The key conceptual implication is that coherence of the infant's internal working model is achieved through the integration of disruption. This model not only links the findings to the work of Winnicott (1960) and Stern (1985) but perhaps more relevant for clinicians (Safran & Muran, 2000a) to the modern literature on effective processes in psychological therapy. The burgeoning literature on the therapeutic benefits of overcoming or healing ruptures in the therapeutic alliance is given by these findings a developmental analogue. In particular Jeremy Safran's work finds echoes in the ideas proposed by Slade and her colleagues (Safran & Muran, 1996, 2000a, 2000b; Samstag, Batchelder, Muran, Safran, & Winston, 1998).

Finally, the study by Schechter et al. (this volume) brought a number of clinical suggestions of great importance. For example, they point out that their findings suggest an additive clinical model for dealing with survivors of trauma, where neither PTSD symptom-oriented treatment nor attachment-informed parent–infant therapy on its own is likely to ensure the creation of balanced mental representation of the child in the mother's mind. The most efficacious interventions are likely to require both tackling stress responses and addressing the emotional determinants of parent–infant relating. It is not often that developmental research yields such tangible clinical recommendations.

Conclusion

A new measure was introduced in this special issue and, somewhat unusually for attachment measures, it was immediately validated in three independent investigations. The value of the measure, a relatively simple instrument offering an index of the quality of a mother's conception of her relationship with the child based on mental states, is clearly illustrated by the intriguing early findings reported above. An aspect of attachment research, the process of transgenerational transmission of secure attachment, which has puzzled us all, may be on the way to being resolved in combining the PDI-RF and the AMBIANCE measures. The relationship between a balanced (secure) mental representation of the child and the parent's capacity to mentalize has also been established. The value of the instrument is further indicated by the quality of the theoretical ideas and clinical implications that emerge from discussions of the findings. It seems to us that the measure is of great importance to the field. Ultimately, its worth will not be judged on the basis of commentaries such as the present one but rather on the value it turns out to have for researchers and clinicians working in this important and fascinating field.

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