



## Attachment and preschool children's understanding of maternal versus non-maternal psychological states

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There is growing evidence that insecurely attached children are less advanced in their social understanding than their secure counterparts. However, attachment may also predict how individual children use their social understanding across different relationships. For instance, the insecure child's social-cognitive difficulties may be more pronounced when the psychological states of an attachment figure are being considered. In the current study, forty-eight 4- to 5-year-old children were asked about their mothers' emotions and false beliefs, as well as those of non-attachment figures. The Separation Anxiety Test (SAT) was administered to assess children's attachment representations. Children's SAT scores predicted their overall performance on the false belief and causes of emotion tasks, even after controlling for age and verbal ability. More interestingly, however, children with high scores on the Avoidance dimension of the SAT experienced greater difficulty understanding maternal false beliefs relative to those of an unfamiliar adult female. Thus, although attachment insecurity may hinder social-cognitive development in general, the findings suggest that there are more specific effects as well. Attachment representations that are characterized by high levels of avoidance appear to interfere with children's ability to fully engage their social-cognitive skills when reasoning about maternal mental states.

Evidence has been rapidly accumulating that individual differences in children's social understanding are related to their early social experiences, especially those occurring within the family. For instance, the number of siblings in a child's family (Jenkins & Astington, 1996); family conversations about feelings (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991) and desires (Bartsch & Wellman, 1995); and parental disciplinary style (Ruffman, Perner, & Parkin, 2000) have been linked to preschoolers' performance on social understanding tasks. The quality of the parent-child attachment

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relationship has also been implicated, with securely attached children demonstrating more advanced social understanding than those with insecure attachments (e.g. Fonagy, Redfern, & Charman, 1997). Despite this surge of interest in identifying the origins of inter-individual differences in children's social understanding, scant attention has been paid to intra-individual differences. Yet it has been proposed (e.g. Dunn, 1996; O'Connor & Hirsch, 1999) that the extent to which individual children use their social understanding may vary in complex ways across different social contexts. Thus, in the present study, both inter- and intra-individual differences will be considered. Specifically, this study explores whether attachment is related to inter-individual differences in two aspects of preschoolers' social understanding - their ability to identify the causes of emotions and their false-belief attributions. In addition, children's understanding of maternal versus non-maternal emotions and false beliefs will be explored to determine whether attachment predicts intra-individual variability in social understanding across different relationship contexts.

### **Attachment and emotion understanding**

In the first study of its kind, Fonagy *et al.* (1997) assessed 3- to 6-year-old children's attachment representations (using the Separation Anxiety Test; SAT) and their ability to predict another person's belief-based emotions (see Harris, Johnson, Hutton, Andrews, & Cooke, 1989 for task details). Secure children were more likely to pass this emotion task than those with insecure attachments, even after controlling for age, language and social maturity. Laible and Thompson (1998) likewise explored the link between 2½- to 6-year-old children's performance on Denham's (1986) emotion-prediction task and their attachment status (indexed by the Attachment Behavior Q-set; AQS). Securely attached children outperformed those with insecure attachments in their understanding of negative emotions. This was not the case, however, for positive emotions. Although these findings were recently replicated by Ontai and Thompson (2002) with a small sample of 5-year-old children, this was not the case at age 3. As noted by the authors, 3-year-old children have a somewhat limited conception of emotions; consequently, it may have been too early to find evidence for how attachment impacts their ability to predict another person's emotions. Finally, using different measures and age groups, DeRosnay and Harris (2002) and Greig and Howe (2001) both reported that, in addition to verbal mental age, attachment was a significant predictor of preschoolers' emotion understanding.

To date, only a few longitudinal investigations have been conducted, and these have likewise focused on children's ability to predict another person's emotions. Controlling for both age and language, Steele, Steele, Croft, and Fonagy (1999) found that 6-year-old children classified as securely attached at 12 months of age had a better grasp of mixed emotions than those with insecure infant attachments. Meins, Fernyhough, Russell, and Clark-Carter (1998) explored the relationship between infant attachment security and children's understanding of belief-based emotions at age 5. Although the mean number of correct responses was somewhat higher in the secure than the insecure group, this difference failed to reach significance. This is not surprising, however, given that many of these 5-year-old children, even those with secure attachments, did not yet fully understand that people's emotional responses to events are influenced by their beliefs. In summary, the bulk of the research findings, especially those based on concurrent measures, point to an association between attachment and preschoolers' ability to predict another person's emotional response.

### **Attachment and theory of mind**

There is some evidence that the association between attachment and social understanding is not restricted to the domain of emotions but may also extend to children's mental state understanding more generally (i.e. their theory of mind). This research has typically involved the false-belief task, considered to be the 'litmus' test for mental-state understanding during the preschool years. For instance, Symons and Clark (2000) reported that attachment security in 5- to 6-year-old children (assessed with the AQS) was related to their performance on a set of false-belief tasks involving the relocation of an object. No significant associations were evident between AQS scores and false belief tasks based on unexpected object identity or the relocation of a hypothetical caregiver. This is consistent, however, with the fact that no significant intercorrelations were obtained between the three types of false-belief tasks. Moreover, false-belief tasks in which animate entities (e.g. caregiver; animal) relocate themselves are not only more difficult than standard object-relocation tasks but are not reliably passed until some time after age 6 (see Symons, McLaughlin, Moore, & Morine, 1997, for a detailed discussion). Greig and Howe (2001) also explored the relation between attachment security (assessed with a story-completion task) and 40-month-old children's performance on a series of false-belief tasks. There was no significant difference between the secure and insecure groups. However, the performance of these young 3-year-olds was generally quite poor, so there may have been insufficient variability in the false-belief scores to yield an association with attachment.

Mixed findings have also been produced in longitudinal studies. Meins *et al.* (1998) reported that 83% of 4-year-old children who had been classified as securely attached in infancy passed a single false-belief task, compared with 33% of those with insecure attachments. However, in a subsequent study, Meins *et al.* (2002) conducted a more comprehensive assessment of children's theory of mind at age 45 and 47 months, with not only false-belief but also appearance-reality tasks in their test battery. In this study, no significant correlation was obtained between children's composite theory-of-mind score and their 12-month-old attachment status.

In reviewing the literature, it is apparent that attachment is more consistently related to individual differences in children's understanding of emotions than false-beliefs. It is worth noting, however, that those studies failing to report a link between attachment and false-belief performance have typically examined children who are less than 4 years of age. There is considerable variability among 4- to 5-year-olds in their ability to succeed on false-belief tasks. Some children can reliably pass these tasks as early as 4 years of age, and others will not do so until age 5 (Wellman, Cross, & Watson, 2001). Younger children, however, are more likely either to consistently fail the false-belief task or to perform at chance levels, and so researchers are less likely to find the predicted association with attachment at this age.

### **Explaining the association between attachment and social understanding**

Although no definitive statements can be made at this point in time about causal direction, it is possible that some of the caregiver qualities fostering security of attachment also facilitate the child's social understanding. Sensitive caregiving is considered crucial for the development of a secure attachment relationship (Ainsworth, Blehar, Waters, & Wall, 1978). In order to behave in this manner, however, Ainsworth and colleagues (Ainsworth, Bell, & Stayton, 1971; Ainsworth *et al.*, 1978) have noted that a mother must not only be attentive and responsive to her infant's overt signals but

also understand the child's internal experiences (e.g. intentions, desires, feelings). Thus, Fonagy and Target (1997) have speculated that secure mothers possess a well-developed ability to understand other people's behaviour in mental-state terms. Meins (1997) has taken this further by arguing that secure mothers display 'mind mindedness', that is, they appropriately interpret their children's behaviour by *verbally* referring to underlying mental states. Consistent with this proposal, Meins and colleagues (Meins, Fernyhough, Fradley, & Tuckey 2001; Meins *et al.*, 2002) recently reported that mothers' propensity to make appropriate comments about their 6-month-old infants' mental states predicts security of attachment at one year, even after taking into account maternal sensitivity. More importantly, however, maternal mind-mindedness predicted children's later performance on a battery of theory-of-mind tasks (Meins *et al.*, 2002). In summary, then, from a very early age, securely attached children may experience frequent exposure to maternal mental-state talk and interactions that focus attention on their own and other people's internal states, like thoughts, feelings, intentions and desires. This type of social environment may then promote their understanding of the connection between people's internal psychological states and their overt behaviour.

However, given the dearth of longitudinal studies, there are various alternative explanations that warrant consideration. One possibility is that attachment is a mediating, rather than a causal, variable (see Fonagy & Target, 1997, for a thorough discussion). For instance, because secure children are more able to establish close relationships with others (Howes, Hamilton, & Phillipson, 1998; Kerns, 1994), they may have a richer database from which to learn about mental states (e.g. peers, siblings, teachers). Along similar lines, there is some evidence that security of attachment facilitates language development (see van IJzendoorn, Dijkstra, & Bus, 1995, for a review). Consequently, securely attached children might be in a better position to discuss the causes of behaviour and talk about internal states with their social partners and/or be more able to reap the benefits of such conversations. Finally, Harris (1999) has suggested that although the caregiver's ability to engage in mental-state discourse might be related to attachment security, this parental behaviour facilitates social understanding independent of attachment. Thus, if the appropriate input is available from another source (e.g. father, an older sibling), the insecurely attached child may be able to acquire a level of social understanding comparable with that of secure children. Currently, however, there is insufficient empirical evidence available to differentiate between these alternative explanations.

### **Social understanding across different relationships**

To date, the research exploring attachment-related differences in social understanding has largely overlooked a key point raised by Dunn (1996). Dunn has argued that whether children fully engage their social understanding is dependent on the social context. In particular, it may depend on *whose* thoughts and feelings the child is trying to understand. For instance, children who are able to take into account their friend's internal states (e.g. goals, needs) during a conflict do not necessarily do so in disputes with siblings and/or their mother (Slomkowski & Dunn, 1992). Along similar lines, Brown, Donelan-McCall, and Dunn (1996) found no significant correlations between the amount of mental-state talk that individual children engaged in with their mother, an older sibling and a close friend. O'Connor and Hirsch (1999) have likewise suggested that social understanding differs as a function of the relationship under consideration. They examined the mentalizing ability (i.e. understanding of thoughts and feelings) of

pre-adolescent children using brief vignettes concerning their 'most liked' and 'least liked' teachers. Mentalizing scores were highly correlated across the two relationships. Thus, children who exhibited advanced mentalizing with one teacher were also more advanced with the other teacher. However, within individuals, the average mentalizing score for explaining teacher behaviour was significantly higher for 'most liked' compared with 'least liked' teacher. Taken together, these findings provide some support for the proposal that the extent to which children can read and reflect on another person's mental states is influenced by the nature of their relationship with that individual.

### ***The present investigation***

If children do use their social-cognitive skills differently across relationship contexts, this has important implications for how researchers conceptualize the link between attachment and social understanding. It is conceivable that children's performance on social-understanding tasks is influenced not only by the quality of the attachment relationship, but also by the 'attachment-relevance' of the tasks (see Humfress, O'Connor, Slaughter, Target, & Fonagy, 2002, for a similar point). For instance, it is possible that the insecure child's mind-reading deficit will be most pronounced in the context of the attachment relationship. With this in mind, the aim of the present study was to undertake a more detailed examination of the concurrent association between attachment (measured with the SAT) and social understanding in preschoolers. A subset of the social-understanding tasks included both an attachment (i.e. mother) and a non-attachment figure (i.e. an unfamiliar female adult). Consistent with previous research, it was expected that less securely attached children would obtain lower social-understanding scores in comparison with their more secure counterparts. As noted earlier, the degree of 'mind-mindedness' or some other characteristic of the caregiver that contributes to attachment insecurity may also interfere with children's social-cognitive development, resulting in a mind-reading deficit that is evident across all contexts, even neutral ones. However, although attachment insecurity may be associated with poor mind-reading in general, it was also expected that less secure children would experience greater difficulty understanding maternal psychological states in comparison with those of a female stranger. The maternal relationship is presumably a more negative context for these children than that associated with a non-attachment figure. Thus, following on from O'Connor and Hirsch's (1999) findings, the negative affective quality of the relationship may interfere specifically with children's ability (or motivation) to reason about their mothers' internal states. More securely attached children, however, should have no more difficulty understanding maternal than non-maternal states.

An additional aim of this study was to examine attachment in relation to children's understanding of false beliefs as well as their emotion understanding. Research by Dunn and colleagues (Cutting & Dunn, 1999; Dunn, 1995; Dunn *et al.*, 1991) indicates that, at least during the preschool years, these are relatively distinct components of social understanding. However, with one exception, the attachment research has either failed to treat false beliefs and emotions separately (e.g. have used the belief-based emotion task) or only assessed one of the two domains. Furthermore, whereas the findings have been mixed with regard to false-beliefs, the evidence is more compelling for a link between attachment and emotion understanding. Therefore, in the current study, separate false belief and emotion measures were employed to determine whether

attachment is indeed associated with both of these components of social understanding. Finally, in previous studies, emotion understanding has been measured in terms of children's ability to predict what another person will feel in a given situation. In order to explore whether attachment is related to other key aspects of emotion understanding, children's ability to identify the causes of emotions was assessed in the current study.

## Method

### *Participants*

The final sample consisted of 48 children (24 boys, 24 girls) aged between 48 and 61 months ( $M = 53.98$ ,  $SD = 3.51$ ). The children attended childcare facilities located in middle-class neighbourhoods of a large Australian city. The majority of the participants were Caucasian, and all children spoke English as a first language. Three additional children were excluded from the final sample because they did not complete the second testing session, and another three children refused to participate in either session. Children were excluded from the study if English was not the primary language spoken in the home, or their mothers did not identify themselves as the main caregiver. This latter criterion was used to maximize the chance that mothers would be the primary attachment figure. The participation rate across the childcare centres was about 65%.

### *Measures*

#### *Attachment*

The Seattle version (Slough & Greenberg, 1990) of the Separation Anxiety Test (Klagsbrun & Bowlby, 1976) was administered to assess children's attachment representations. The SAT is a quantitative, rather than categorical, measure of attachment and is thus highly suitable for small sample sizes. Previous research (e.g. Shouldice & Stevenson-Hinde, 1992; Slough & Greenberg, 1990) has demonstrated significant concurrent relationships between 4- to 5-year-old children's SAT responses and security ratings based on reunion behaviour after a short maternal separation. Main, Kaplan, and Cassidy (1985) have also reported moderately high correlations between 6-year-old children's SAT responses and their reunion behaviour at 12 months of age.

Six photographs, depicting separations between a child (same sex as the participant) and their parent(s), were individually presented. As each photo was presented, the scene was explained, and the child was asked 'How does the little girl/boy feel?', 'Why does she/he feel that way?' and 'What's the little girl/boy going to do?' After being questioned about the pictured child, children were asked how they themselves would feel and behave in this situation. Responses to questions about the 'self' and 'other child' were coded separately, using the procedures outlined by Slough, Goyette, and Greenberg (1988). Children's verbal responses to each picture were assigned to one of 21 categories, each of which yields a weighted subscore. These picture subscores were then combined to create three factors for 'self' and three for 'other child'. The Attachment dimension indexes children's ability to express their feelings of anxiety, sadness or anger about the more severe separations, whereas the Self-reliance dimension focuses on children's confidence in their ability to handle a mild separation.

Both of these dimensions have scores ranging from 3 to 12. The Avoidance dimension (scores ranging from 6 to 18) reflects the child's inability to discuss the separations in an open and appropriate manner. It is assumed that a secure child will obtain high scores on Attachment and Self reliance, but low scores on Avoidance.

Coders were not aware of children's age or their performance on the other tasks. One coder scored all of the SAT transcripts, and a second coder scored 25% ( $N = 12$ ) of the data set. Inter-rater reliabilities for SAT-self and SAT-other child dimensions were separately calculated on the basis of the initial category assignment for each picture. Cohen's kappa ranged from .86 to .97, and the percent agreement was likewise very high, ranging from 83 to 92%. The two coders resolved differences in category classifications by discussion, and the consensus categories were then used to create the summary scores.

#### *Understanding false beliefs*

Two modified false-belief tasks were administered (see Appendix for complete description and scripts). In the unexpected contents task (Bartsch & Wellman, 1989), children were presented with a 'Band-aids' box and a matching plain box. They were then shown that the Band-aids box was empty, whereas the plain box contained Band-aids. In the unexpected identity task (Flavell, Greene, & Flavell, 1986), children were presented with a candle that looked like a cup-cake. They were then allowed to handle the object while the researcher explained that the object was actually made of wax and that it was really a candle. In each task, children were required to predict both their mother's false beliefs and those of another adult female (Mrs Jones). A photo of an adult female was presented to each child and identified as Mrs Jones, a friendly neighbour of the researcher. Mrs Jones was employed, rather than a familiar person (e.g. day-care provider, preschool teacher), to ensure that the adult female character was not an attachment figure for any of the children. The order of the pairs of test questions (mother vs. Mrs Jones) was counterbalanced across the two tasks. Each task included a control question referring to the actual contents or identity of objects. This question had to be answered correctly before continuing the task. If the child failed the control question, the story was repeated.

Two standard false-belief tasks were also given, in which children were asked to recall their own false beliefs and to predict those of a toy bear (see Appendix). Once again, each task included a control question, and test-question order (self vs. bear) was counterbalanced across the two tasks. A 'Smarties' box, containing pencils, was employed in the unexpected contents task (Perner, Leekam, & Wimmer, 1987), and a peep-hole picture book was constructed for the unexpected identity task (Gopnik & Astington, 1988). Responses to each of the eight false-belief test questions scored 1 point if correct. Scores were summed for questions about each of the four characters, all with a possible range of 0–2. Coders were once again naive about participants' age and their performance on all other tasks. A second coder scored 25% of the sample, and there was perfect (100%) agreement.

#### *Understanding the causes of emotions*

A modified version of the 'causes of emotions' interview (Dunn & Hughes, 1998) was used to assess children's understanding of the situations that could elicit emotions in themselves, their mother and Mrs Jones. Four photos of a child's face (same sex as participant) were sequentially presented. Each photo depicted one of four emotional expressions, presented in the following order: happiness, sadness, anger and fear. After

correctly identifying the pictured emotion, children were asked 'What kinds of things make you feel X?' Participants who could not think of a response were given a standardized example and then probed for a different response. If children gave an answer which was similar to a previously given response or the researcher's example, they were asked 'What else makes you feel X?' Four photos of an adult female's facial expressions were employed in the remainder of the interview. Once again, after correctly identifying the pictured emotion, children were asked 'What kinds of things make your mum/Mrs Jones feel X?'

Responses that were appropriate to the emotion and different from any previously given response scored 2 points. One point was lost when a response was inappropriate to the emotion but appropriate to the valence of the emotion (i.e. positive or negative), and 1 point was deducted when the cause had been previously given. Totally inappropriate responses, repetition of the researcher's example, denial that the person ever experienced the emotion, 'don't know' and 'no response' were all given a 0. Scores were summed for questions about self (0-8), mother (0-8) and Mrs Jones (0-8). A second blind rater scored 25% ( $N = 12$ ) of the emotion understanding data. Inter-rater reliabilities were very high, with Cohen's kappa ranging from .85 to 1.00 across the different people and emotions.

#### *Understanding belief-based emotions*

Children were also given a task in which they were required to use false beliefs to predict how a story character would feel (see Harris *et al.*, 1989). This is a relatively complex emotion understanding task but was administered because it has been correlated with attachment in other studies (e.g. Fonagy *et al.*, 1997). Because the majority (81%) of the children failed this task, it is excluded from the analyses presented here.

#### *Verbal ability*

A language measure was included because there is evidence that language development is related to both attachment (van IJzendoorn *et al.*, 1995) and performance on social-understanding tasks (Astington & Jenkins, 1999). Children's verbal ability was estimated using the Peabody Picture Vocabulary Test - Revised (PPVT-R) (Dunn & Dunn, 1981). It was not possible to conduct a third testing session, and so children's expressive language ability was not assessed.

#### **Procedure**

Children were individually tested in their preschool or day-care centre, by the same female researcher. Each child participated in two testing sessions, conducted about 1 week apart. The first session lasted about 30 min and always began with the language measure. Children then completed the false-belief (FB) and causes-of-emotion (CE) tasks in an alternating order, to decrease the repetitive nature of the latter measure. A fixed order was used to ensure that differences between participants were not due to the order in which they received the tasks. The session always concluded with the belief-based emotion task. The second session lasted about 20 min, during which time the SAT was administered. Thus, the researcher was blind to each child's attachment scores when assessing their language and social understanding in Session 1. Children's responses to all of the tasks, including the SAT, were recorded on audiotape for later transcription and scoring by blind coders.



## Results

### Descriptive statistics

The maximum and minimum scores for each variable were examined using the Grubbs (1969) test, and this confirmed that there were no outliers in the data set. The PPVT-R raw scores were normally distributed with a mean of 47.63 ( $SD = 12.31$ ). There was a significant correlation between children's FB-mother and FB-Mrs Jones scores,  $r(46) = .84$ ,  $p < .001$ . All of the other false-belief inter-correlations were likewise significant ( $r_s = .43-.54$ ,  $p_s < .01$ ). The four FB subscores were therefore summed to produce an overall score for each child ( $M = 3.81$ ,  $SD = 2.75$ , range = 0-8). Cronbach's alpha for this measure was .83. Children's CE-mother score was highly correlated with their CE-Mrs Jones score,  $r(46) = .65$ ,  $p < .001$ . There were also significant correlations between each of these two scores and children's CE-self score ( $r_s = .59-.67$ ,  $p_s < .001$ ). An overall causes-of-emotions score was created for each child by summing these three subscores ( $M = 16.35$ ,  $SD = 5.15$ , range 4-23). Cronbach's alpha for this aggregate measure was .84.

For each SAT dimension, the summary scores for 'self' and 'other child' were significantly correlated ( $r_s = .61-.73$ , all  $p_s < .001$ ). However, the Attachment and Self-reliance scores were higher, and Avoidance scores were lower when participants discussed separations involving another child. There is some evidence (Slough & Greenberg, 1990; Wright, Binney, & Smith, 1995) that SAT-Self scores are a more reliable index of attachment than scores based on the 'other child'. Therefore, for ease of presentation, only the analyses with SAT-Self scores will be reported from here on. It should be noted, however, that analyses using the SAT-Other Child scores produced a very similar pattern of results for both measures of social understanding.

A series of  $t$  tests indicated that there were no significant gender differences in children's aggregate false-belief and causes-of-emotion scores (both  $p_s > .05$ ). Girls had somewhat higher scores than boys on the PPVT-R and the SAT-Attachment dimension, but these differences only approached significance (both  $p_s = .07$ ). About 71% of the children had at least one sibling, and 29% had one or more older siblings. Neither of these sibling variables was related to any of the other measures (all  $p_s > .05$ ). Consequently, child gender and siblings were not included as covariates in subsequent analyses.

### Bivariate correlations

Table 1 presents the bivariate correlations between age, language, the SAT dimensions and the social-understanding aggregates. Age was significantly and positively correlated with total false-belief score. Verbal ability was only correlated with total false-belief score and age. Overall performance on the causes of emotions task was related to both the Attachment and Avoidance dimensions of the SAT. Children's total false-belief scores were positively correlated with the Attachment dimension. The Avoidance dimension was highly correlated with both Attachment and Self-reliance, but the latter were not significantly correlated with each other. Because concerns have been raised about the reliability and validity of the Self-reliance dimension of the SAT (Wright *et al.*, 1995), these scores were not included in subsequent analyses. Finally, there was no significant correlation between the two social-understanding aggregates.

**Table 1.** Bivariate Pearson correlations between age, language, SAT dimensions and social-understanding aggregates ( $N = 48$ )

Variable	1	2	3	4	5	6
1. Age (months)	–					
2. PPVT (raw scores)	.48**	–				
3. Total False Belief	.34*	.42**	–			
4. Total Causes of Emotions	.17	.24	.05	–		
5. Attachment	.28 <sup>+</sup>	.26 <sup>+</sup>	.41**	.31*	–	
6. Self-reliance	.28 <sup>+</sup>	.01	–.02	.25 <sup>+</sup>	.23	–
7. Avoidance	–.23	–.16	–.27 <sup>+</sup>	–.34*	–.74***	–.64***

<sup>+</sup> $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

### **Exploring the significant associations between the SAT and social understanding**

Two separate hierarchical regression analyses were conducted to assess the relative contribution of the Attachment dimension to children's overall performance on the false-belief and causes-of-emotions tasks. Although there were no significant differences between boys and girls in their mean scores on the SAT, it was possible that the associations between security of attachment and social understanding might vary as a function of child sex. Therefore, the Sex by SAT-Attachment interaction was initially included in these analyses. Age was always entered on the first step and language on the second. The interaction term was entered next, but if it was not significant, it was then dropped to limit the number of variables in the final model. The Attachment scores were always entered on the last step. As illustrated in Table 2, age and language each accounted for significant proportions of the variance in children's total false-belief score. The Sex by Attachment interaction was not significant. When the Attachment score was entered on the third step, this significantly increased the explained variance. About 8% of the variance in false-belief performance was attributable to this SAT dimension. The overall model was significant, and the Beta weights indicated that the Attachment dimension was the best predictor of children's total false-belief score,  $t(46) = 2.28, p < .05$ .

As illustrated in Table 2, neither age nor language accounted for a significant proportion of the variance in the total causes of emotions score. In addition, the Sex by Attachment interaction term was not significant. There was an increase in  $R^2$  when the Attachment score was entered on the third step, but this change was not significant. The overall model was likewise not significant. The bivariate correlations indicated that the Avoidance dimension was also related to children's emotion understanding, so this was explored in a separate regression analysis (see Table 2). The Sex by Avoidance interaction was not significant. When the Avoidance score was entered on the final step in Model 2, this significantly increased the explained variance. About 9% of the variance in children's performance on the causes of emotions task was attributable to this SAT dimension. The overall model was marginally significant, and the Beta weights indicated that Avoidance was the only significant predictor,  $t(46) = 2.18, p < .05$ .

### **Attachment and children's understanding of different people's false beliefs**

The false belief subscores for each of the four characters (i.e. self, bear, mum, Mrs Jones) are presented in Table 3. A repeated-measures ANOVA revealed a significant

**Table 2.** Hierarchical regression analyses for social understanding aggregates ( $N = 48$ )

Variable	$\Delta R^2$	$F_{\text{change}}$	$\beta$ weights overall model
Total false-belief score			
Step 1			
Age	.11	5.89*	.12
Step 2			
Language	.09	4.90*	.28 <sup>+</sup>
Step 3			
SAT-Attachment	.08	5.20*	.31*
Adj. $R^2 = .24$ , $F(3,44) = 5.85$ , $p < .01$			
Total causes-of-emotions score			
Model 1			
Step 1			
Age	.03	1.33	.02
Step 2			
Language	.03	1.60	.16
Step 3			
SAT-Attachment	.06	3.07 <sup>+</sup>	.26 <sup>+</sup>
Adj. $R^2 = .06$ , $F(3,44) = 2.05$ , $p > .10$			
Model 2			
Step 1			
Age	.03	1.33	.01
Step 2			
Language	.03	1.60	.19
Step 3			
SAT-Avoidance	.09	4.74*	-.31*
Adj. $R^2 = .095$ , $F(3,44) = 2.64$ , $p = .06$			

<sup>+</sup> $p < .10$ , \* $p < .05$ .

effect of person identity,  $F(3,141) = 8.42$ ,  $p < .001$ . Follow-up  $t$  tests, using Fisher's Least Significant Difference procedure, indicated that children had more difficulty reasoning about the false beliefs of the toy bear relative to the other three characters (all  $p$ s  $< .01$ ). There were no other differences between the subscores. It is important to note that these analyses identify whether, for the sample as a whole, there are differences in children's social-understanding scores as a function of person identity. They do not, however, test the hypothesis that less securely attached children will experience more difficulty reasoning about maternal states than those of Mrs Jones

Discrepancy scores were computed as a preliminary test of the prediction that attachment security would be related to intra-individual differences in children's understanding of maternal versus non-maternal false beliefs. A discrepancy score was created for each child by subtracting the FB-mother from the FB-Jones subscore. Mrs Jones was used here because she was a neutral adult female, and the questions about her false beliefs were identical to the maternal questions. This discrepancy score had a potential range of  $-2$  through to  $+2$ . A positive score indicated that the child was less able to understand maternal false beliefs relative to those of Mrs Jones. A negative score indicated the reverse. Thus, the discrepancy score indicates the extent and direction of the difference between a child's understanding of their mother's false beliefs and those

**Table 3.** Mean social understanding scores across different people (N=48)

Measure	M	(SD)	Range
False belief-Self	.98	(.89)	0–2
False belief-Bear	.60	(.82)	0–2
False belief-Mother	1.15	(.89)	0–2
False belief-Mrs Jones	1.08	(.85)	0–2
Causes of Emotions-Self	6.63	(1.90)	2–8
Causes of Emotions-Mother	5.48	(1.88)	1–8
Causes of Emotions-Mrs Jones	4.25	(2.14)	0–8

**Table 4.** Partial correlations between SAT dimensions and social understanding discrepancy scores, controlling for age and verbal ability (N = 48)

Type of discrepancy	Attachment	Avoidance
<i>False beliefs</i>		
1. Mrs Jones-Mother	-.22	.33*
2. Bear-Self	-.16	.21
<i>Causes of emotions</i>		
1. Mrs Jones-Mother	.12	-.14
2. Self-Mother	-.09	-.02

\* $p < .05$ .

of Mrs Jones.<sup>1</sup> The partial correlation between the discrepancy score and each SAT dimension was then calculated, controlling for age and language (see Table 4). False-belief discrepancy scores were significantly correlated with the Avoidance dimension.

Although this finding is consistent with the general research hypothesis, it does not address the more specific prediction that less secure children would experience more difficulty reasoning about maternal than non-maternal false beliefs. For instance, a significant correlation between the false-belief discrepancy score and the Avoidance dimension could also be obtained if (a) children with lower Avoidance scores were better at understanding their mum's false beliefs than those of Mrs Jones *and* (b) more Avoidant children were similar across these two individuals. In order to identify the source of the correlation, children were divided into three groups on the basis of whether they performed more poorly on the maternal than Mrs Jones task; better on the maternal than Mrs Jones task; or equally well across the two. An analysis of covariance revealed that, after controlling for age and language, there was no significant difference in the Avoidance scores of children who performed equally well across the two question types ( $M = 10.36$ ,  $SD = .60$ ) and those who were better on the maternal questions ( $M = 8.56$ ,  $SD = 1.40$ ). However, children who were less proficient at understanding maternal false beliefs had significantly higher Avoidance scores ( $M = 14.16$ ,  $SD = 1.82$ ) than the other two groups,  $F(3,44) = 4.61$ ,  $p < .05$ . Taken

<sup>1</sup> Thus, no distinction is made, for example, between a score of +1 resulting from FB-mother = 0 and FB-Jones = 1 and that resulting from FB-mother = 1 and FB-Jones = 2.

together, these findings suggest that the more Avoidant children experienced greater difficulty with maternal false beliefs relative to those of an unfamiliar adult.

The possibility remains, however, that children with high Avoidance scores experienced difficulty attributing false beliefs to real and familiar individuals, rather than an attachment figure per se. A second discrepancy score was therefore created, by subtracting FB-self from FB-bear. In this instance, both characters were non-attachment figures, but only one was familiar and real (i.e. the self). The bear subscore was employed, rather than Mrs Jones, because it was based on the same false-belief tasks as the self subscore. A positive score indicated that the child was less proficient on the self than the bear questions. This discrepancy score was not significantly correlated with either of the SAT dimensions (both  $ps > .05$ ), either before or after controlling for age and language (see Table 4). It is worth noting, however, that the correlation with the Avoidance dimension is in the same direction as that found for the other false-belief discrepancy score and that these two correlations are not significantly different from one another.

#### **Attachment and children's understanding of different people's emotions**

The subscores for children's understanding of the causes of their own, their mother's and Mrs Jones' emotions are presented in Table 3. A repeated-measures ANOVA revealed a significant main effect of person identity,  $F(2,94) = 47.30$ ,  $p < .001$ . Follow-up paired  $t$  tests indicated that children were better at explaining the causes of their own emotions relative to those of their mother and least competent at explaining the causes of Mrs Jones' emotions ( $ps < .001$ ).

A discrepancy score was created by subtracting CE-mother from CE-Jones to test the hypothesis that children's SAT scores would be related to their understanding of maternal vs. non-maternal emotions. This score had a potential range of  $-8$  to  $+8$ . A positive score indicated that the child was less able to identify the causes of their mother's emotions relative to those of Mrs Jones. None of the partial correlations between this discrepancy score and the SAT were significant (both  $ps > .05$ ; see Table 4). An additional discrepancy score (CE-self minus CE-mother) was created to further test the hypothesis that maternal emotions might be especially challenging for less secure children. These correlational analyses also failed to reveal any significant associations with the SAT scores (both  $ps > .05$ ; see Table 4).<sup>2</sup>

## **Discussion**

The results of this study are significant for a number of different reasons. First, until now, the possibility that attachment might be related to the way in which children use their social understanding across relationship contexts has not been examined. Although children with less secure attachment representations performed more poorly on the social understanding tasks in comparison to those with more secure attachments, the present study suggests that this is an over simplification. The social-cognitive difficulties associated with less secure attachment tend to be more pronounced when children are dealing with the mental states of an attachment than a non-attachment figure. Second, little research has addressed the question of whether

<sup>2</sup> Because of the small sample size, these analyses were not conducted separately for boys and girls.

attachment is related to some aspects of social understanding but not others. This study is the first to directly demonstrate that, at least in older preschoolers, attachment is related to their understanding of false beliefs as well as their ability to identify the causes of emotions. The findings are especially compelling in light of the small sample size and the inclusion of all children, rather than just those with extreme scores on the SAT. Moreover, because the quality of children's attachment with their mother may differ from that with their father (Fox, Kimmerly, & Schafer, 1991; van Ijzendoorn & De Wolff, 1997) and the SAT combines the two, the results may in fact be somewhat conservative estimates of the strength of the association between social understanding and attachment. Finally, the findings also support the proposal that social understanding is not a unitary construct but is best viewed as comprising distinct domains during the preschool years (Cutting & Dunn, 1999).

The most important and novel finding in this study was that children with higher Avoidance scores experienced more difficulty reasoning about maternal false beliefs in comparison with those of a female stranger. Although children with poor SAT scores were less proficient in their overall understanding of false beliefs than their more secure age-mates, this ability was further disrupted when maternal beliefs were at issue.<sup>3</sup> It is conceivable that when the more Avoidant children were asked to reflect on their mother's false beliefs, this activated their attachment system and related defensive processes. Indeed, relationship issues may already have been salient, given that children were tested in the context of a maternal separation. Bowlby's (1969) notion of internal working models of attachment provides a useful way of conceptualizing these findings. As a result of early caregiver-infant interactions, children construct mental representations of self and parent in the attachment relationship. These internal working models (IWMs) provide the basis for predicting the caregiver's behaviour and for planning the child's own responses (Bowlby, 1969). Moreover, as noted by Bretherton (1990), these IWMs are affective-cognitive filters which bias not only the child's expectations about how others will behave in the context of close relationships but also the child's interpretation of their social partner's behaviour. It could be argued, then, that distortions or biases in the less secure children's IWM prevented them from accurately reasoning about their mother's false beliefs. Regardless of the mechanism, when children experience specific difficulties reading their mother's mental states, this might well contribute to and/or maintain the insecure quality of the mother-child attachment relationship.

It has been argued (e.g. Thompson & Lamb, 1983) that these IWMs generalize to unfamiliar social partners and thus influence the child's interactions with, and understanding of, people in general, rather than just those with whom they share a close relationship. The fact that relationship-specific effects were identified in the present study does not conflict with this proposal. Although the less secure children were especially disadvantaged in their ability to reason about maternal false beliefs relative to those of an unfamiliar adult, the significant intercorrelations across all four types of false-belief tasks indicate a high degree of consistency in their social understanding. In other words, less secure children performed poorly not only on questions about maternal false beliefs, but also on those concerning the false beliefs of a toy bear, Mrs Jones and the self. Thus, security of attachment was related to children's more general ability to attribute false beliefs, as well as their reasoning about the false

<sup>3</sup> Although the correlation was not significant, it is noteworthy that children with higher Avoidance scores also tended to experience more difficulty understanding their own false beliefs relative to those of a toy bear. Thus, similar processes might interfere with the Avoidant child's ability to reason about the mental states of attachment figures and the self.

beliefs of specific individuals, albeit for potentially different reasons. For instance, as they were growing up, these less secure children may have experienced fewer opportunities to discuss mental states, thereby interfering with the development of their mental-state reasoning. Then, when asked to reason about their mother's false beliefs, their mind-reading difficulties may have been exacerbated by defensive processes or other cognitive biases associated with this particular relationship context.

O'Connor and Hirsch (1999) have hypothesized that individuals are more able and/or motivated to understand the mind of someone with whom they share a close, positive relationship. However, the current findings do not support this hypothesis. Although children who were better at understanding maternal than non-maternal false beliefs had the lowest Avoidance scores, these were not significantly different from the scores of children who were equally adept across the two types of tasks. Thus, the results obtained here are best construed as evidence that negative relationship contexts (e.g. an insecure attachment with mother) inhibit or disrupt children's mental-state reasoning. In the case of the less Avoidant (or more secure) children, neither Mrs Jones nor their mother constituted a negative socio-emotional context. Thus, future studies need to include a variety of negative relationships (e.g. a disliked peer) to clarify whether person identity influences the more secure child's understanding of false beliefs. It is possible, for instance, that the performance of more securely attached children is less susceptible to these contextual effects than that of their less secure counterparts.

In contrast with the false-belief findings, less secure children did not experience greater difficulty understanding the causes of maternal emotions in comparison with those of an unfamiliar adult.<sup>4</sup> Instead, significant intra-individual differences were evident in the sample as a whole. For instance, regardless of their SAT scores, children were more able to explain the causes of their mother's emotions than those of another adult. Because Mrs Jones was a stranger, we assumed that children would provide prototypical causes (e.g. 'she's scared of spiders') or examples based on their own/their mother's past experiences. However, there were more 'don't know' responses for the Mrs Jones questions, suggesting that some children thought it was impossible to know what would cause a stranger to feel a particular emotion. In addition, some children repeated previous Self and Mother responses, presumably because they had exhausted their list of emotion causes by the time they were asked about Mrs Jones.<sup>5</sup> Consistent with previous research (e.g. Dunn & Hughes, 1998), the majority of the children received higher scores on the self than the mother questions. However, the self questions were always administered first, so order effects cannot be ruled out here. Further research, using a task that can readily incorporate attachment and non-attachment figures, is required to determine more clearly whether insecure children have particular difficulty understanding the causes of maternal emotions.

An additional aim of this study was to explore whether security of attachment is associated with social understanding in general, or whether it is related to some components and not others. In contrast to Greig and Howe's (2001) recent report, security of attachment was correlated with children's understanding of false beliefs as

<sup>4</sup> It should be noted that the significant association between the SAT and the FB discrepancy score but not the CE discrepancy score can not be explained by a higher correlation between mother and Mrs Jones in the causes of emotion task. In fact, this correlation was somewhat smaller than that obtained between mother and Mrs Jones in the false-belief task.

<sup>5</sup> When children's responses to the Mrs Jones questions were re-scored, without penalty for repetition of self or mother examples, there was no longer a significant difference between CE-Jones and CE-mother scores. However, the SAT was still unrelated to whether individual children experienced more difficulty understanding the causes of maternal emotions than those of either Mrs Jones or the self.

well as emotions. Indeed, after controlling for age and language, the SAT accounted for a small but significant proportion of the variance in each social-cognitive domain. As mentioned earlier, Greig and Howe's (2001) sample of children were at an age when very few would be expected to reliably pass a false-belief task. Thus, range restriction in the false-belief scores may account for their failure to find a significant correlation with attachment. Not only does the present study demonstrate that attachment is related to both affective and cognitive components of social understanding, but the findings also suggest that the link with emotion understanding may be quite pervasive. As noted earlier, previous research has focused on children's ability to predict other people's emotional responses, but emotion understanding is a complex and multi-faceted domain. By employing a very different type of task, the present study found evidence that attachment is also associated with preschooler's ability to identify the causes of other people's emotions. Thus, attachment may have a wide-ranging impact on children's understanding of emotions.

Wellman and Banerjee (1991) have stated that '... understanding the nature and causes of emotions is part and parcel of acquiring a theory of mind, and understanding internal states of mind is part and parcel of acquiring an understanding of emotion' (p. 191). Despite being conceptually linked, the empirical evidence regarding the existence and nature of such a relationship has been limited and yielded mixed findings. Consistent with the findings of Dunn and colleagues (Cutting & Dunn, 1999; Dunn, 1995; Dunn *et al.*, 1991), scores on the theory of mind and emotion understanding tasks were not significantly related in the present study. At first glance, this may seem puzzling. After all, children frequently use their understanding of mind and emotion in the same context (e.g. 'mummy was angry with me because she thought I hurt my brother, but I didn't'). However, given the nature of the two social-understanding tasks employed here, this finding is not so surprising. In order to pass the false-belief task, children had to put aside their own (true) belief about a situation and recognize that another individual holds a very different (false) belief. However, a child could generate correct responses in the causes-of-emotions task without necessarily taking into account the unique perspective of the other person. For example, a child might know some of the prototypical triggers of fear and simply cite a different example for self ('scared of monsters'), mother ('gets scared when she hears strange noises at night'), and Mrs Jones ('scared of barking dogs'). Or, in some instances, these responses might be egocentric, with the child simply reporting three of their own fears. Thus, genuine affective perspective-taking (i.e. understanding that another person can have an emotional response to a situation that differs from your own response) may have been lacking in many of the children's answers. Not only was there no significant correlation between the two social-cognitive measures, but they were also associated with different dimensions of the SAT. Children's overall false-belief scores were specifically related to the Attachment dimension, whereas the Avoidance dimension was the best predictor of emotion understanding. One implication of these findings is that different aspects of the parent-child attachment relationship may influence the development of these two social-cognitive domains. For example, maternal emotional expressiveness has been linked to preschoolers' emotion understanding (Denham, Zoller, & Couchoud, 1994), whereas participation in pretend play with the child, another characteristic of the secure caregiver (Slade, 1987), may be a more important contributor to children's understanding of false beliefs. In summary, these data further highlight the importance of treating theory-of-mind and emotion understanding as relatively distinct domains of social understanding during the preschool years.



### **Potential limitations**

One concern about the findings presented here is that social understanding was related to attachment simply because the SAT requires some degree of perspective-taking and/or emotion understanding. If this were the case, then the social-understanding tasks should have been related to both of the SAT dimensions. However, after controlling for age and language, children's overall performance on the false-belief tasks was *only* related to a subset of their SAT responses, that is, the three separations that contribute to the Attachment dimension. In addition, measurement overlap by itself cannot account for why children with high Avoidance scores were less adept at reading maternal thoughts relative to those of an unfamiliar person. Given that the SAT includes questions about the emotional responses of a pictured child, more caution is needed when interpreting the significant association with emotion understanding. Children's overall causes of emotions score were most clearly related to the Avoidance dimension, which is based on responses to all six separations. This finding suggests that there was more measurement overlap between the SAT and this particular social understanding task, than the false-belief task. However, the degree of overlap may still be quite minimal, given the qualitative nature of the SAT scoring procedure. Despite predicting identical emotions, children's SAT scores could differ substantially, depending on their justifications and their way of coping with the separation. For instance, a child who reports that he would 'feel sad because he will miss his parents and that he would cry', would be given a higher Attachment dimension score than one who 'feels sad because he has no one to play with and would do some drawing'.

Finally, because the sample size was small, a continuous rather than categorical measure of attachment was employed. There are no established cut-off scores for the SAT, so it cannot be determined whether the children with high Avoidance or low Attachment dimension scores in the present sample were in fact 'insecure'. More importantly, however, because only one marker of insecurity was measured, we do not know whether the findings are characteristic of insecure children in general or whether it is Avoidance that is most closely connected to this particular mind-reading difficulty. Clearly, a more systematic investigation needs to be undertaken to determine whether there are distinctive social-cognitive problems associated with different types of attachment insecurity.

### **Conclusions**

Despite the limitations outlined, this study provides evidence for the usefulness and importance of exploring relationship contexts when studying individual differences in social understanding. Specifically, the data suggest that the link between security of attachment and early social understanding is more complex than previously thought. Not only were less secure children less skilled at understanding false beliefs and emotions than their more secure counterparts, but they experienced particular difficulty understanding maternal false beliefs. The more negative relationship that these children have experienced with their mother appears to influence the degree to which they can use their available social-cognitive skills to reason about her mental states. More research will be required, however, to determine whether this inhibitory effect extends to any individual with whom these children experience a negative relationship (e.g. a disliked peer).

Finally, it is not yet known whether the social-cognitive difficulties identified in this study continue beyond the preschool period and, if so, what form they might take. It is

extremely unlikely that the less secure children in this sample had been exposed to extreme forms of caregiving (e.g. abuse), so their poor task performance presumably reflects a subtle delay in social-cognitive development rather than a deficit per se. Moreover, these early attachment-related differences may diminish or disappear entirely once the child is interacting with peers, teachers and other adults on a more regular basis. However, even when a basic understanding of false beliefs and emotions has been acquired, differences may continue to exist between the secure and insecure child, albeit in terms of the quality, style or content of their thinking about other people's psychological states. What is most apparent from the results presented here is that researchers need to focus not only on differences between children in their social understanding but also take into account the differences within individual children in their ability to use such knowledge across relationships and other contexts.

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## Appendix: False-belief task descriptions and scripts

### **False beliefs: Mother and Mrs Jones**

(1) Unexpected contents task (based on Bartsch & Wellman, 1989). Children were shown two boxes of identical size and shape. One box was plain, and the other was a 'Band-aids' box with its trademark pictures/logos. Children were asked to point to the box containing Band-aids. They were then shown that the unmarked box contained Band-aids and that the marked box was empty. The researcher closed the boxes and asked 'Which box has Band-aids in it?' (control question); 'When I show these boxes to your mum, which one will she think has Band-aids in it?' and 'When I show these boxes to Mrs Jones, which one will she think has Band-aids in it?'

(2) Unexpected identity task (based on Flavell *et al.*, 1986). Children were shown a candle that looked like a cup-cake, but were not initially given an opportunity to touch it. When asked to identify the object, all of the children claimed that it was a cake. They were then allowed to handle the object. The researcher explained that the object was made of wax and that it was really a candle. Children were subsequently asked 'What is it really?' On passing the control question, they were then asked 'If we showed this to Mrs Jones, but didn't let her touch it, what would she think it was?' and 'If we showed this to your mum, but we didn't let her touch it, what would she think it was?'

### **False beliefs: Self and bear**

(1) In the unexpected contents task (based on Perner *et al.*, 1987), children were shown a 'Smarties' box and asked what was inside. They were then told to open the box. After showing children the contents (pencils), the researcher closed the box and asked 'What's really inside this box?' (control question); 'When you first saw this box, what did you think was inside?'; and 'If we showed this box to Mr Teddy Bear, but we didn't let him look inside, what would he think was inside the box?'

(2) A peep-hole picture book was constructed for the unexpected identity task (based on Gopnik & Astington, 1988). On the first page of the book, children could see the ears of a bear through a rectangular peep-hole. The complete picture of the bear was then revealed on the subsequent page. The next peep-hole showed a cat's ears, with the following page revealing the whole cat. The final peep-hole showed what appeared to be the ears of a rabbit. Children were asked 'What do you think this is?' The page was then turned to reveal the petals of a sun-flower. Turning back to the previous page, children were asked 'What is it really?' (control question); 'If we showed this to Mr Teddy Bear, but we didn't let him turn the page, what would he think it was?'; and 'When I first showed you this, before I turned the page, what did you think it was?'

