

Maternal mind-mindedness: a cognitive-behavioural trait or a relational construct?

Gaby Illingworth (2014)

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# **Maternal mind-mindedness: A cognitive-behavioural trait or a relational construct?**

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This thesis is submitted in partial fulfilment of the requirements  
of the award of Doctor of Philosophy

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## Abstract

**Background:** Maternal mind-mindedness describes mothers' tendency to attribute internal states to their children (Meins, 1997) and has been shown to have clear links with positive developmental outcomes for children. However, the nature of the construct has not yet been fully explored. Maternal mind-mindedness has been described as both a cognitive-behavioural trait and as a relational construct but crucially designs have included only one child per mother so it has not been possible to investigate whether a mother's mind-mindedness is related with different children. This thesis aimed to examine the extent to which maternal mind-mindedness can be seen as a cognitive-behavioural trait or a relational construct, dependent on specific mother-child relationships.

**Method:** Thirty-two mothers with two children between 2½ and 10 years took part in two assessments, nine months apart. Mothers' relationships with more than one child were investigated concurrently and across time. Mothers' representational and interactional mind-mindedness were assessed as well as their tendency to use mental-state explanations (psychological mindedness). Child contributions to mind-mindedness were assessed through maternal report and observer ratings of child temperament and behaviour.

**Results:** Mothers' representational mind-mindedness was inconsistent across relationships with two children and a partner/friend. Conversely, mothers' interactional mind-mindedness was found to be highly consistent across relationships with two children. Mothers' representational and interactional mind-mindedness were not consistently related to their psychological mindedness or to child temperament and behaviour. Representational and interactional measures of mind-mindedness were unrelated.

**Conclusion:** Support was found for mothers' representational mind-mindedness as a relational construct and mothers' interactional mind-mindedness as a trait. However, neither was associated with child temperament and behaviour or reflected a general tendency in the mother to consider psychological factors. The results suggest that representational and interactional maternal mind-mindedness are discrete and should be viewed as different constructs. The theoretical, methodological and practical implications of these findings are discussed.

## Table of contents

	<b>Page</b>
List of tables	x
<b>Chapter 1: Introduction</b>	
1.1 Attachment theory: Internal working models and representations	1
1.2 Attachment theory: Interactions and observations	2
1.3 Mental representations: Mothers' mental state understanding	3
1.4 Maternal mind-mindedness	5
1.5 Structure of the thesis	9
1.6 Summary	10
<b>Chapter 2: Maternal mind-mindedness: Origins, operationalisation, and significance</b>	
2.1. Introduction	11
2.2 The origins of maternal mind-mindedness	11
2.2.1 Antecedents of attachment security	11
2.2.2 Maternal sensitivity	12
2.3 What is maternal mind-mindedness?	16
2.4 How is maternal mind-mindedness operationalised?	17
2.5 Do mind-mindedness measures examine an overarching construct?	20
2.6 Developmental outcomes of maternal mind-mindedness	22
2.6.1 Mind-mindedness and positive relations with secure attachment	22
2.6.2 Mind-mindedness and relations with the transmission gap	24
2.6.3 Mind-mindedness and relations with children's social and emotional development	25
2.7 Summary	25
<b>Chapter 3: Mind-mindedness: The nature of the construct</b>	
3.1 Introduction	27
3.2 The importance of understanding the nature of maternal mind-mindedness	27
3.3 A cognitive-behavioural trait	30
3.4 A relational construct	37
3.5 Mother-centred versus relationship-centred factors	41
3.6 Potential correlates with mother and child factors	44

3.6.1 Mother factors	44
3.6.2 Child factors	48
3.7 Summary	50
3.8 Research questions	51
<b>Chapter 4: Methodology and methods</b>	
4.1 Introduction	54
4.2 Methodology	54
4.2.1 Selection criteria of the sample	57
4.3 Methods	59
4.3.1 Recruitment	59
4.3.2 Participants	61
4.4 General procedure	65
4.5 Measures	66
4.6 Data collection procedure	68
4.7 Statistical analyses	70
4.8 Summary	71
<b>Chapter 5: Measures of mind-mindedness</b>	
5.1 Introduction	73
5.2 The emotional content of mothers' speech	73
5.3 The representational measure of mind-mindedness	75
5.3.1 Procedure	75
5.3.2 Coding	76
5.3.3 Enhanced coding of attributes	77
5.3.4 Indices of representational mind-mindedness	79
5.3.5 Reliability of coding	80
5.4 The interactional measure of mind-mindedness	80
5.4.1 Procedure	80
5.4.2 Coding	81
5.4.3 Adaptations to interactional measure coding	82
5.4.4 Indices of interactional mind-mindedness	90
5.4.5 Reliability of coding	90
5.5 The emotional valence measure of mind-mindedness	91
5.5.1 Coding	91
5.5.2 Indices of valence	92
5.5.3 Reliability of coding	92

5.6 Summary	93
<b>Chapter 6: The psychological mindedness measure</b>	
6.1 Introduction	94
6.2 Rationale for the psychological mindedness measure	94
6.3 Development of the psychological mindedness measure	96
6.3.1 Background to the measure	96
6.3.2 Procedure	98
6.3.3 Coding	99
6.3.4 Categories	100
6.3.5 Unit of analysis	104
6.3.6 Indices of psychological mindedness	106
6.3.7 Reliability of coding	107
6.4 Summary	107
<b>Chapter 7: Mind-mindedness and child temperament/behaviour</b>	
7.1 Introduction	108
7.2 Defining child temperament	108
7.3 Maternal mind-mindedness and temperament/behaviour: research to date	110
7.4 Methodological issues in the study of temperament	114
7.5 Selection of measures	115
7.6 Maternal report measures of child temperament and behaviour	116
7.7 The observational measure of temperament	119
7.7.1 Development of the measure	119
7.7.2 Procedure	121
7.7.3 Coding scheme	121
7.7.4 Indices of temperament assessed by observation	130
7.7.5 Reliability of coding	131
7.8 Summary	131
<b>Chapter 8: Maternal mind-mindedness and consistency across relationships</b>	
8.1 Introduction	133
8.2 Method	135
8.2.1 Participants	135
8.2.2 Measures	135
8.3 Results	136

8.3.1 Levels of mind-mindedness: Normality of distributions	136
8.3.2 Preliminary analyses for Time 1	137
8.3.3 Descriptive statistics for levels of mind-mindedness at Time 1	141
8.3.4 Consistency of relationships for levels of mind-mindedness at Time 1	144
8.3.5 Emotional content of mothers' mind-mindedness	147
8.3.6 Descriptives statistics for emotional content of mind-mindedness at Time 1	148
8.3.7 Consistency of relationships for emotional content of mind-mindedness at Time 1	151
8.3.8 Summary at Time 1	153
8.3.9 Preliminary analyses for Time 2	155
8.3.10 Descriptive statistics for levels of mind-mindedness at Time 2	158
8.3.11 Consistency of relationships for levels of mind-mindedness at Time 2	161
8.3.12 Descriptive statistics for emotional content of mind-mindedness at Time 2	163
8.3.13 Consistency of relationships for emotional content of mind-mindedness at Time 2	166
8.3.14 Summary at Time 2	168
8.4 Discussion	169
8.5 Conclusion	181

## **Chapter 9: Maternal mind-mindedness and relations with mother and child factors**

9.1 Introduction	183
9.2 Method	185
9.2.1 Participants	185
9.2.2 Measures	185
9.3 Results	186
9.3.1 Mothers' psychological mindedness	186
9.3.2 Relations between mother's levels of mind-mindedness and mothers' psychological mindedness	187
9.3.3 Is mothers' psychological mindedness stable over time?	191
9.3.4 Summary of relations between mind-mindedness and mothers' psychological mindedness	192
9.3.5 Child temperament and behaviour	192



9.3.6 Relations between mothers' mind-mindedness and child temperament and behaviour at Time 1	195
9.3.7 Relations between mothers' mind-mindedness and child temperament and behaviour at Time 2	198
9.3.8 Are temperament and behaviour in the younger siblings stable over time?	202
9.3.9 Summary of relations between mind-mindedness and child temperament and behaviour	203
9.4 Discussion	204
9.5 Conclusion	215

**Chapter 10: Maternal mind-mindedness as a construct: temporal stability and consistency across measures**

10.1 Introduction	216
10.2 Method	218
10.3 Results	218
10.3.1 Are levels of representational mind-mindedness stable across time?	218
10.3.2 Are levels of interactional mind-mindedness stable across time?	220
10.3.3 Is the emotional content of representational mind-mindedness stable across time?	221
10.3.4 Is the emotional content of interactional mind-mindedness stable across time?	221
10.3.5 Relations between levels of representational and interactional mind-mindedness measures	222
10.4 Discussion	227
10.5 Conclusion	235

**Chapter 11: General Discussion**

11.1 Introduction	237
11.2 Overall findings	237
11.3 Advances in our understanding of mind-mindedness	240
11.4 Theoretical and methodological implications	241
11.5 Practical implications	246
11.6 Limitations of the study	248
11.7 Suggestions for future research	249
11.8 Final conclusions	253

<b>References</b>	254
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## **Appendices**

Appendix A: UREC approval letter	276
Appendix B: List of mental and behavioural attributes	277
Appendix C: The play session toys	281
Appendix D: Psychological mindedness measure photographs	284

## List of tables

	<b>Page</b>
<b>Table 4.1.</b> Mother's highest educational qualification at Time 1	63
<b>Table 4.2.</b> Occupation by mother and partner at Time 1	64
<b>Table 4.3.</b> Highest household occupation at Time 1	65
<b>Table 4.4.</b> Measures: existing, adapted and developed	66
<b>Table 7.1.</b> SF-CBQ: Temperament factors and scales	118
<b>Table 7.2.</b> Observational measure: Temperament factors and scales	131
<b>Table 8.1.</b> Correlations between levels of representational mind-mindedness (mental attribute frequency and proportion) and demographic variables at Time 1	138
<b>Table 8.2.</b> Correlations between levels of interactional mind-mindedness (appropriate mind-related comment frequency and proportion) and demographic variables at Time 1	139
<b>Table 8.3.</b> Descriptive statistics for levels of representational mind-mindedness (mental attribute frequency and proportion) and interactional mind-mindedness (appropriate/non-attuned mind-related comment frequency and proportion) at Time 1	142
<b>Table 8.4.</b> Non-attuned mind related comments by percentage of mothers and frequency at Time 1	143
<b>Table 8.5.</b> Relations between mothers who did or did not make non-attuned mind-related comments with older and younger siblings at Time 1	144
<b>Table 8.6.</b> Correlations between levels of representational mind-mindedness (mental attribute frequency) with older sibling, younger sibling and partner/friend at Time 1	145
<b>Table 8.7.</b> Correlations between levels of representational mind-mindedness (mental attribute proportion) with older sibling, younger sibling and partner/friend at Time 1	146
<b>Table 8.8.</b> Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) with older sibling and younger sibling at Time 1	147

<b>Table 8.9.</b> Descriptive statistics for emotional content of representational mind-mindedness (frequency and proportion of valence of mental attributes) at Time 1	149
<b>Table 8.10.</b> Descriptive statistics for emotional content of interactional mind-mindedness (frequency and proportion of valence of appropriate mind-related comments) at Time 1	150
<b>Table 8.11.</b> Relations between mothers who did or did not make positive mind-related comments with older and younger siblings at Time 1	153
<b>Table 8.12.</b> Correlations between levels of representational mind-mindedness (mental attribute frequency and proportion) and demographic variables at Time 2	155
<b>Table 8.13.</b> Correlations between levels of interactional mind-mindedness (appropriate mind-related comment frequency and proportion) and demographic variables at Time 2	156
<b>Table 8.14.</b> Descriptive statistics for levels of representational mind-mindedness (mental attribute frequency and proportion) and interactional mind-mindedness (appropriate/non-attuned mind-related comment frequency and proportion) at Time 2	159
<b>Table 8.15.</b> Non-attuned mind related comments by percentage of mothers and frequency at Time 2	160
<b>Table 8.16.</b> Relations between mothers who did or did not make non-attuned mind-related comments with older and younger siblings at Time 2	161
<b>Table 8.17.</b> Correlations between levels of representational mind-mindedness (mental attribute frequency) with older sibling, younger sibling and partner/friend at Time 2	161
<b>Table 8.18.</b> Correlations between levels of representational mind-mindedness (mental attribute proportion) with older sibling, younger sibling and partner/friend at Time 2	162
<b>Table 8.19.</b> Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) with older sibling and younger sibling at Time 2	163

<b>Table 8.20.</b> Descriptive statistics for emotional content of representational mind-mindedness (frequency and proportion of valence of mental attributes) at Time 2	164
<b>Table 8.21</b> Descriptive statistics for emotional content of interactional mind-mindedness (frequency and proportion of valence of appropriate mind-related comments) at Time 2	165
<b>Table 8.22.</b> Relations between mothers who did or did not make positive mind-related comments with older and younger siblings at Time 2	167
<b>Table 9.1.</b> Descriptive statistics for mothers' psychological mindedness (frequency and proportion of mental state comments) at Time 1 and Time 2	187
<b>Table 9.2.</b> Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and psychological mindedness (frequency and proportion of mental state comments) at Time 1	188
<b>Table 9.3.</b> Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and psychological mindedness (frequency and proportion of mental state comments) at Time 1	189
<b>Table 9.4.</b> Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and psychological mindedness (frequency and proportion of mental state comments) at Time 2	190
<b>Table 9.5.</b> Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and psychological mindedness (frequency and proportion of mental state comments) at Time 2	191
<b>Table 9.6.</b> Descriptive statistics for maternal report measures of child temperament and behaviour (SDQ and SF-CBQ) at Time 1 and Time 2	193
<b>Table 9.7.</b> Descriptive statistics for observational ratings of child temperament at Time 1 and Time 2	195
<b>Table 9.8.</b> Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 1	196

<b>Table 9.9.</b> Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 1	197
<b>Table 9.10.</b> Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 2	199
<b>Table 9.11.</b> Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 2	201
<b>Table 10.1.</b> Correlations between levels of representational mind-mindedness (mental attribute frequency) for older sibling, younger sibling and partner/friend across time	219
<b>Table 10.2.</b> Correlations between levels of representational mind-mindedness (mental attribute proportion) for older sibling, younger sibling and partner/friend across time	219
<b>Table 10.3.</b> Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) for older sibling and younger sibling across time	220
<b>Table 10.4.</b> Correlations between levels of representational and interactional mind-mindedness for older sibling and younger sibling at Time 1	223
<b>Table 10.5.</b> Correlations between levels of representational and interactional mind-mindedness for older sibling and younger sibling at Time 2	224
<b>Table 10.6.</b> Correlations between levels of representational mind-mindedness at Time 1 and interactional mind-mindedness at Time 2 for older sibling and younger sibling	225
<b>Table 10.7.</b> Correlations between levels of interactional mind-mindedness at Time 1 and representational mind-mindedness at Time 2 for older sibling and younger sibling	226

# 1

## Introduction

### 1.1 Attachment theory: Internal working models and representations

Bowlby proposed that much of our future well-being is determined in our first relationship, usually with our mother (Karen, 1998). As the father of attachment theory, Bowlby was highly influential regarding the impact of infant-caregiver relationships on healthy development. In his original theory (1958), using an ethological and evolutionary perspective, he described attachment as the relationship between an infant and a mother and elucidated how an infant behaved to indicate an attachment had been formed. The infant's attachment behaviours are usually taken as those which promote proximity or contact with the attachment figure.

Bowlby's attachment theory (1958, 1969) emphasised the function of representation in the role of interpersonal relationships. The concept of an "internal working model" (IWM) was devised by the cognitive psychologist, Craik (1943), in order to describe how people construct mental models of external reality to enable them to evaluate alternative courses of action and to adapt their behaviour to the environment. Bowlby incorporated IWMs into his revised version of the theory (1969) because the concept of an IWM permitted representations upon which an individual could mentally operate to enable them to make predictions about the world. This conception could apply to all representations but the working models of self and other in attachment relationships became the primary focus for Bowlby's work. He argued that mental representations would form on the basis of the quality of the interaction between the child and the attachment figure, and he saw these as becoming a template for future interactions with that person.

Two complementary models are formed, representing both sides of the relationship. Firstly, a working model of the attachment figure is constructed by the child from how they have experienced that person in the past. Secondly, a working model of the self is constructed by the child from "how acceptable or unacceptable he himself is in the eyes of his attachment figures" (Bowlby, 1973, p. 203). A working model of

parents as emotionally available and supportive would allow for the construction of a working model of self as valued and competent. On the other hand, a working model of a parent as rejecting or unresponsive to attachment behaviours, would lead to a working model of self as devalued and incompetent (Bretherton & Munholland, 1999). Following on from Bowlby's work, attachment theory and research has increasingly focused on cognitive processes in mental representations (Bretherton, 1985; Main, Kaplan, & Cassidy, 1985).

The development of the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985), focusing on measurement at the representational level, has enabled empirical explorations of adult IWMs and representations of attachment. This semi-structured interview assesses caregivers' state of mind with regard to attachment and provides an insight into caregivers' IWMs of their childhood attachment relationships. Instead of attempting to access an objective description of childhood experiences, it is how these experiences are currently represented which are of interest. Representational measures of attachment have also been developed for use with children including a pictorial separation anxiety test (Klagsbrun & Bowlby, 1976), later revised by Kaplan (1984) and doll-story completion tasks which have been validated against behavioural measures (Cassidy, 1988).

## **1.2 Attachment theory: Interactions and observations**

It was the pioneering work of Mary Ainsworth and colleagues which expanded the usefulness of attachment theory by devising observational methods to assess an infant's attachment to caregivers at the behavioural level. In capturing the intricacies of this dyadic interaction, Ainsworth identified the secure base phenomenon described by Bowlby. The Strange Situation (Ainsworth & Wittig, 1969) became Ainsworth's most well-known work and the prominent paradigm in assessing security of attachment. It involves a 20-minute observation of 12-month-old infant play during which the caregiver and an unfamiliar adult enter and leave an unfamiliar room. This allows for patterns of infant-mother interaction to be observed and Ainsworth claimed that an infant's responses to separations and reunions were very revealing about the quality of the attachment relationship. What a child does to restore a feeling of security when reunited with the attachment figure is based on their developing IWM of the attachment system. The procedure led to a classification system initially based on three patterns of infant behaviour (Ainsworth, Blehar, Waters, & Wall, 1978) which were later labelled secure, insecure-avoidant and insecure-resistant. A fourth pattern, insecure-disorganised, was subsequently



added following research by Main and Solomon (1990). The infant with a secure attachment to a caregiver was able to use their mother as a “secure base”, enabling them to explore the environment and when feeling threatened, turn to them for the protection and comfort needed.

The idea that a sensitive and responsive caregiver is of primary importance in determining whether a child will develop a secure or insecure attachment bond early on in life is at the very centre of Ainsworth’s extension of Bowlby’s theory of attachment. Ainsworth argued that a sensitive and responsive caregiver would relatively consistently understand the child’s attributes, accept their behavioural tendencies and in so doing was able to harmoniously interact with the infant (Belsky, 1999).

### **1.3 Mental representations: Mothers’ mental state understanding**

The importance of parental mental representations of the child stems in part from Bowlby’s emphasis on IWMs and is manifested in the prevalence of the AAI in attachment research. Indeed, according to de Rosnay and Hughes (2006), there is now a widespread acceptance that most mother-child interactions will be informed by a mother’s attitudes towards her child as an individual entity with their own thoughts and feelings or to put it another way, how they represent their child. Conceptualisations of this type of maternal attitude have included maternal sensitivity (Ainsworth, Bell, & Stayton, 1971), maternal reflective function (Fonagy & Target, 1997) and maternal mind-mindedness (Meins, Fernyhough, Fradley, & Tuckey, 2001). As well as having maternal attitude in common, all these concepts have been used to shed light upon the important relationship between adult and infant attachment and children’s developing understanding of other minds.

Even after decades of research, questions remained surrounding the possible role of maternal sensitivity as the most influential determinant of attachment security. Some of these questions are attributable to the way in which maternal sensitivity had come to be operationalised. Both reflective function and maternal mind-mindedness grew out of an attempt to pinpoint how maternal sensitivity could mould the infant-caregiver attachment relationship. Fonagy, Steele, Steele, Higgitt, and Target (1994) and Meins (1997) predicted that it was a mother’s sensitivity to an infant’s mental states, rather than how they responded to an infant’s needs, which would be more helpful than a rather generalised construct of maternal sensitivity. There are similarities in how these more recent concepts have been defined but

differences in the way they have been operationalised. Attachment security and links with maternal sensitivity and maternal mind-mindedness will be examined in Chapter 2. "

"

Mothers' proclivity to adopt the intentional stance in interactions with their children has been viewed as playing an important role in child development for many years (Bruner, 1975; Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Taking the intentional stance means that in predicting someone's behaviour, you treat them as a rational agent with mental states such as beliefs and desires, or in other words as someone who exhibits intentionality. This stems from Dennett's proposal (1987) that three stances are available to predict behaviour: the physical stance, the design stance and the intentional stance. The first of these, the physical stance, refers to how an individual may use knowledge of the physical constitution of a system and the laws of physics to predict the behaviour of a system. The second of these, the design stance, is used when an individual ignores the actual details of an object's physical constitution and instead, based on the assumption that it has a particular design, will predict that the object will behave as it is designed to behave. The third of these, the intentional stance, describes how an individual may make use of explanation in terms of beliefs and desires, or intentional states, which can then provide a means to predict a person's behaviour.

Allied to the intentional stance, Dennett (1987) wrote of "folk psychology", the perspective invoking "mentalistic concepts", for example: belief, desire, knowledge, expectation, understanding and imagination. Dennett proposed that folk psychology is used by people every day to make sense of the complexity of others and that this is achieved through adopting the intentional stance. This concept shows a similarity to an IWM of an attachment figure in that it is useful in predicting another's behaviour. Both reflective function and maternal mind-mindedness investigate the proclivity to adopt the intentional stance.

Reflective function has been defined as the "mental function which organises the experience of one's own and others' behaviour in terms of mental state constructs" (Fonagy, Target, Steele, & Steele, 1998, p. 5). Parental reflective function has been described as a "parent's capacity to reflect upon her own and her child's internal mental experience" (Slade, 2005, p. 269). Fonagy and Target (1997) root reflective function in Dennett's (1987) proposal that the intentional stance helps to predict a person's behaviour. The predisposition to understand one's own or another's

behaviour in mental state terms can be seen as an individual difference, with people varying in how much they explain their own or other's actions using beliefs and desires. Some caregivers may be very alert to the first signs of intentionality in their infants whereas others may need more obvious indications before perceiving an infant's mental state and adapting their behaviour in line with this.

"Mentalisation" refers both to a person's capacity to perceive and understand themselves and others, and to reason about their own and others' behaviour, in terms of mental states (Fonagy et al., 1998). This reflexive use of mental state understanding helps to make sense of emotional processes. It allows an individual to interpret others' behaviour in terms of intentional mental states such as desires, feelings, beliefs, and reasons (Fonagy, Luyten, Bateman, Gergely, Strathearn, Target, & Allison, 2010).

Maternal reflective functioning has been measured using the Reflective Functioning Scale (Fonagy, Target, Steele & Steele, 1998) with transcripts taken from interviews: the Parent Development Interview (PDI; Aber, Slade, Berger, Bresgi, & Kaplan, 1985) and the AAI. It is noteworthy that reflective function has been operationalised using a purely representational measure which does not take overt behaviour into account.

Maternal reflective functioning has been seen to play a role in children's developing understanding of other minds. Slade (2005) states that it is a mother's ability to represent her child as having feelings, desires and intentions which enables the child to discover their own internal world via their mother's representations. Reflective mothers are able to facilitate the early roots of mentalisation in their children because they are able to coherently and flexibly make sense of their own experiences as caregivers and their infants' mental states (Grienenberger, Kelly, & Slade, 2005). However, according to Meins, Fernyhough, de Rosnay, Arnott, Leekam, and Turner (2012) strong evidence is still to be found that a caregiver's reflection on internal states, when measured with instruments such as the AAI, will predict more sensitive caregiving.

#### **1.4 Maternal mind-mindedness**

This thesis will focus explicitly on maternal mind-mindedness (Meins, 1997), a concept which developed in the literature after maternal reflective function and mentalisation, but which shares an emphasis on the importance of maternal

representations and understanding of mental states in children's development. Reflective function focuses on how a parent perceives their own attachment experiences, whilst mind-mindedness focuses directly on how a parent perceives their child (Walker, Wheatcroft, & Camic, 2011). Meins and Fernyhough (2010) also make use of Dennett's ideas referring to mind-mindedness as an individual's tendency to adopt the intentional stance both in their representations of others and in their interactions with them. Meins (1997) argued that during a child's development, all mothers will at some stage begin to view their infant's behaviour as intentional and correspondingly will perceive their infant to be an intentional agent. However, there are individual differences in whether mothers then customarily treat their infants as mental agents or individuals with minds. When they do, the mother grants her child their own representations of the world and reality. As Meins stated, "Some mothers show a greater tendency to treat their children as "mental agents", taking into account their comments, actions and perspective" (Meins, 1997, p. 108). In this way, mind-mindedness involves treating "young children as individuals with minds of their own" (Meins, 2013, p. 530).

Maternal mind-mindedness has been shown to have clear links with positive developmental outcomes for children. It has been found to be associated with secure attachment relationships (Arnott & Meins, 2007; Lundy 2003; Meins et al., 2001) and high levels of maternal mind-mindedness have been found to be related to children's superior mentalising abilities in the preschool years (Meins, Fernyhough, Wainwright, Clark-Carter, Das Gupta, Fradley, & Tuckey, 2003; Meins, Fernyhough, Wainwright, Das Gupta, Fradley, & Tuckey, 2002). Empirical findings will be discussed in greater detail in Chapter 2. However, existing research has not definitively examined maternal mind-mindedness and understanding of the nature of the construct is less well developed than its potential outcomes. Meins, Fernyhough, Johnson, and Lidstone (2006) suggested it may be part of a mother's socio-cognitive style. Alternatively, Meins, Fernyhough, Arnott, Turner, and Leekam (2011) suggested it is best characterised as a facet of the specific caregiver-child relationship, while also being influenced by stable cognitive-behavioural traits in the mother.

Importantly, mind-mindedness can be viewed as a construct which relies on both representations and behaviour. It has been operationalised in two ways, using an interview measure and an interactional measure. The interview measure, where a mother describes her child, has been viewed as an offline and retrospective

measure whilst the interactional measure, where a mother is observed interacting with her child, has been viewed as an online and current measure of mind-mindedness. Both measures are representational in that they are a measure of the mother's representation of her infant's mental states but the interactional measure shows how these are used in real-life interactions. However, there is scant research evidence confirming that a mother's purely representational mind-mindedness assessed by interview is related to the interactional measure assessed by observational methods. This study addressed this shortcoming in the mind-mindedness literature, making use of both representational and interactional measures.

Questions remain surrounding the nature of the construct. Maternal-mind-mindedness could be viewed as dependent solely on a characteristic of the mother herself or alternatively as a facet of the mother-child relationship. The debate about its nature continues with the originator of the construct making a variety of arguments at different points in the history of research in this field. Maternal mind-mindedness has been put forward both as a cognitive-behavioural trait (Meins et al., 2011) and as a relational construct (Arnott & Meins, 2007; Meins et al., 2011, 2014) but evidence remains equivocal regarding its true nature. A comprehensive review of the relevant existing literature will be carried out in Chapter 3. Importantly, research designs do not easily facilitate a conclusive examination of the key aspects of both these alternatives.

If maternal mind-mindedness is a cognitive-behavioural trait, then it should be as other cognitive-behavioural traits are, stable across time. The investigation into temporal continuity has been limited so far firstly by looking at different mind-mindedness measures at different times (Arnott & Meins, 2008; Meins et al., 2003). A second limitation involving temporal continuity arises because although the same mind-mindedness measure has been used at different times, this has only been done with infants over a short time period (Meins et al., 2011). A stronger argument for continuity would be found if stability was observed over a longer time period. The research reported here used a longitudinal design including both mind-mindedness measures to enable the investigation of continuity by examining how concurrent measures of maternal mind-mindedness relate to each other and to later measures. Crucially, research designs have examined mother-infant dyads with a focus on the relationship with only one child, so it has not been possible to determine whether maternal mind-mindedness generalises across relationships within families. This

thesis addresses this limitation by including mothers with two children in the study to enable the appropriate comparisons to be made.

Factors within the mother could potentially contribute to levels of maternal mind-mindedness. Maternal mind-mindedness could be viewed as a general tendency in the mother, and if so could be described as a more pervasive inclination to consider others' internal states rather than being specific to mother-child relationships. This thesis looks at mothers' tendency to consider psychological factors, specifically whether they thought about people in psychological terms and used mental-state explanations in interpreting or explaining others' behaviour and motivations. After searching the literature, no suitable measure was found and so a new measure was developed to investigate whether mothers' non-child specific, psychological mindedness was related to maternal mind-mindedness.

There is also a need to explore potential child contributions to maternal mind-mindedness. A mother's mind-mindedness may be influenced by a variety of child characteristics in the same way that attachment theorists acknowledge that a child's attachment security is not merely the result of parental behaviour. If there were child contributions to maternal mind-mindedness, it would lend support to mind-mindedness as a relational construct. This thesis accordingly investigates children's temperament and behaviour, including both maternal reports and a newly developed observational measure, to see whether mind-mindedness was influenced by child temperament and behaviour. The use of both representational and interactional measures of temperament mirror the way in which maternal mind-mindedness has been operationalised. It was then possible to find out whether representational measures, mind-mindedness assessed by interview and child temperament assessed by maternal report, are more closely related to each other than those assessments which stem from observations of mother-child interactions. Similarly, it was possible to find out whether the interactional measures (taken from observations during a play session) of mind-mindedness and child temperament are more closely linked than those assessments which are purely representational.

The study design, through the inclusion of mothers with two children and its longitudinal component, enabled an examination of mothers' relationships with more than one child both concurrently and across time. The thesis aimed to shed light on the construct of maternal mind-mindedness by examining associations with measures carefully selected from the existing research literature as well as novel

measures. To date, research into mind-mindedness has concentrated on mothers' relationships with infants. This study extended the age group to preschool and primary school children to widen understanding of maternal mind-mindedness while remaining broadly within the age range in which existing research has demonstrated mind-mindedness to be influential.

### **1.5 Structure of the thesis**

The primary aim of the thesis was to investigate the extent to which maternal mind-mindedness could be seen as a general tendency related to mothers' psychological mindedness or a relational construct, dependent on specific mother-child relationships.

The following two chapters comprise a literature review providing the rationale for and the development of the exploratory research questions to be addressed in this thesis. Chapter 2 gives an overview of maternal mind-mindedness focusing on its origins, how it has been defined and operationalised and the important outcomes associated with the construct. Chapter 3 introduces questions concerning the nature of the construct and presents the arguments and current evidence supporting maternal mind-mindedness being either a cognitive-behavioural trait or a relational construct. Whilst an overview of the research questions to be addressed is provided, these are further developed in the relevant empirical chapters. Chapter 4 provides a methodological framework for the study, detailing the empirical nature of the thesis including the chosen method, recruitment and procedure and how the longitudinal design enables the research questions to be addressed.

The next three chapters introduce the measures that were used in this study and examine (a) existing measures used, (b) how existing measures have been adapted, and (c) new measures which have been developed for this thesis. Chapter 5 provides a comprehensive account of the mind-mindedness measures used, including a description of the more recently developed measure looking at the emotional content of mind-mindedness. The chapter presents the representational measure and the enhanced coding developed in this thesis, as well as the adapted coding for the interactional measure, again developed in this thesis, which takes into account the older age of the children.

Chapters 6 and 7 discuss potential mother factors (psychological mindedness) and child factors (children's temperament and behaviour) which may have a relationship

with maternal mind-mindedness. Chapter 6 presents the newly developed psychological mindedness measure and Chapter 7 presents the newly developed observational measure looking at children's temperament in a mother-child play session.

Chapters 8-10 constitute the major results and discussion chapters. Chapter 8 addresses whether maternal mind-mindedness should best be viewed as a maternal characteristic, looking at whether it is consistent across relationships. Chapter 9 produces findings on whether maternal mind-mindedness is related to mother and child factors and whether results best support maternal mind-mindedness as a trait or a relational construct. Chapter 10 then examines the longitudinal component of the thesis by looking at whether maternal mind-mindedness is stable over time. This chapter also investigates whether representational and interactional measures of mind-mindedness are related and measuring the same construct or whether there are differences between these two conceptions of the construct.

Finally, Chapter 11 brings together the findings from all the empirical chapters to develop overall conclusions and to address whether maternal mind-mindedness should best be considered a cognitive-behavioural trait or a relational construct. Conclusions are drawn for the theoretical and methodological implications for the construct of maternal mind-mindedness.

## **1.6 Summary**

Maternal mind-mindedness has grown out of the attachment literature and the important role which has been given in mother-child relationships to IWMs, mental representations and a mother's tendency to focus on her child's mental states. Research on maternal mind-mindedness has centred on outcomes associated with the construct. The nature of the construct is less well understood and this leads to an as yet unanswered question as to whether maternal mind-mindedness is a cognitive-behavioural trait or a relational construct. To contribute to our knowledge of maternal mind-mindedness, the longitudinal design of this thesis and the inclusion of mothers with two children, allows for investigation into whether maternal mind-mindedness generalises across relationships whilst also allowing for the stability of the construct to be addressed.



# 2

## **Maternal mind-mindedness: Origins, operationalisation, and significance**

### **2.1. Introduction**

This chapter reviews the origins of maternal mind-mindedness before clarifying how it has come to be defined and operationalised. It then continues with a review of the existing evidence concerning relations between representational and interactional measures of mind-mindedness and whether the two operationalisations are measuring the same overarching construct.

Mind-mindedness has been linked with secure attachment relationships and the emergence of an ability to consider others' minds at a younger age, both of which are beneficial for children's social and emotional development. Studies which provide evidence for the positive role of maternal mind-mindedness in attachment relationships and children's development are explored.

### **2.2 The origins of maternal mind-mindedness**

#### ***2.2.1 Antecedents of attachment security***

Bowlby contended in his seminal work (1969, 1973) that attachment security was transmitted from the caregiver to the child and this has been widely supported by research over many years (Main, Kaplan, & Cassidy, 1985; Steele, Steele, & Fonagy, 1996). Attachment in infancy has been seen to play an important part in children's socio-emotional development (Thompson, 1999) and subsequently much effort has gone into identifying the antecedents of attachment. The classic model posited that it was how the parent responded to the child's signals that was the important factor linking generations. Attachment researchers sought to identify precisely which mechanism accounted for the development of secure attachment relationships and which could be used to explain this link from one generation to the next. Van IJzendoorn used the term "transmission gap" in 1995 to describe the gap between mothers' representations of their own childhood attachment experiences and subsequent quality of attachment relationships with their children. Van IJzendoorn recommended that researchers should investigate the mechanisms

through which parental attachment representations affect children's attachment relationships and in doing so, establish the bridge between parents and children.

### **2.2.2 Maternal sensitivity**

Maternal sensitivity has been defined as "the ability to respond appropriately and promptly to the signals of the infant" (de Wolff & van IJzendoorn, 1997, p. 584). It has been the most widely investigated concept to be investigated as a precursor of infant attachment security. Seminal research was conducted by Ainsworth, Bell, and Stayton (1971, 1974) who found that maternal sensitivity in an infant's first year was a strong predictor of the security of the attachment relationship measured at 12 months in the strange situation. Ainsworth et al. (1974) noted that maternal sensitivity has four essential components: the mother has to be aware of the child's signals; interpret these signals accurately; and both appropriately and promptly respond to them. Ainsworth et al. argued that it was the quality of the mother's interaction with her infant which was probably the primary index of her sensitivity. The authors wrote that "it is essential that the mother's responses be ~~ad~~ ; [ ] ; ~~ae~~ to the situation and to the baby's communications" (p. 129). A mother who responds appropriately can accurately interpret their child's behaviour and see things from the child's point of view. In this way, for example, the sensitive mother will pick her child up when they appear to want this or will put them down when they appear to want to explore.

In order to assess correlates of attachment quality, Ainsworth et al. (1971, 1974) developed a measure looking at four dimensions of maternal behaviour: mothers' sensitivity-insensitivity, acceptance-rejection, co-operation-interference and accessibility-ignoring. The maternal sensitivity scale is a global measure looking at how sensitively a mother responds to her child's cues. This 9-point rating scale is anchored using the following five points: highly sensitive, sensitive, inconsistently sensitive, insensitive, and lastly, highly insensitive. Whilst measuring maternal sensitivity, an observer codes mother-child interactions looking at whether mothers are consistent and accurate in their interpretations of their child's behaviour and whether their responses to the child's signals are appropriate and prompt. When a mother displayed higher levels of maternal sensitivity, consistently being sensitively aware of a child's signals and responding to them promptly, this was found to be related to secure infant-mother attachment observed both in the strange situation and at home (Ainsworth et al., 1971, 1974; Ainsworth, Blehar, Waters, & Wall, 1978).

Maternal sensitivity has indeed been found to be a precursor of attachment security in much subsequent research, not just in similar American samples to Ainsworth et al's original research (e.g., Isabella, 1993) but also in high-risk populations (e.g., Egeland & Farber, 1984) and in Europe (e.g., Grossman, Grossman, Spangler, Seuss, & Unzner, 1985; Meins et al., 2001). It has been found that mothers who respond sensitively tend to have children who are securely attached whilst mothers who respond insensitively are more likely to have insecurely attached children. Isabella (1993) examined the interactional origins of secure, insecure-resistant and insecure-avoidant patterns of attachment in repeated naturalistic observations. Maternal sensitivity was measured using Ainsworth's maternal sensitivity scale (1978). Mothers of secure one-year-olds were observed to respond more sensitively at one and four months than mothers of insecure infants. Egeland and Farber (1984) assessed attachment relationships using the strange situation procedure (Ainsworth & Wittig, 1969) in high-risk mother-infant dyads at 12 and 18 months, and maternal sensitivity using Ainsworth's scale in a feeding and play situation at 6 months. Mothers of securely attached infants were reported to be consistently more sensitive than mothers of anxiously attached infants.

However, there have been challenges in a number of meta-analyses regarding the strength of the relation between maternal sensitivity and attachment security (de Wolff & van IJzendoorn, 1997; Goldsmith & Alansky, 1987; Lamb, Thompson, Gardner, & Charnov, 1985; van IJzendoorn, 1995). These meta-analyses have not provided consistent support for the primary role of maternal sensitivity with Goldsmith and Alansky (1987) concluding there was only a weak association between sensitivity and attachment and van IJzendoorn (1995) and de Wolff and van IJzendoorn (1997) concluding there was a modest effect size. The meta-analysis by van IJzendoorn (1995) which focused on the predictive validity of the AAI, suggested that the relation between maternal sensitivity and secure attachment was not as strong as that proposed in Ainsworth's original findings. It appeared that sensitive responsiveness insufficiently explained the strong association between parents' and children's attachment so consequently maternal sensitivity was not playing a true mediating role in the development of attachment.

In a meta-analysis on maternal responsiveness and children's attachment security, Goldsmith and Alansky (1987) concluded that the size of the predictive effect of maternal sensitivity was a great deal smaller than once thought and that this suggested there was only a weak relationship between attachment security and

parental sensitivity. Van IJzendoorn (1995) in commenting on the Goldsmith and Alansky meta-analysis, noted that a modest effect size was found for the studies which used the Ainsworth sensitive responsiveness scales and calculated that the influence of parental state of mind on children's attachment through mechanisms other than responsiveness would be  $Z = .36$ . Correspondingly, this meant that the greatest part of the influence would operate via mechanisms other than responsiveness measured through the Ainsworth scales.

Van IJzendoorn (1995) speculated that one of the reasons for this failure might be that measures looking at sensitive responsiveness might not capture all relevant facets of open communication and that another interactive mechanism might instead be the key to transmission of parents' mental representations of attachment to infant attachment. This failure of maternal sensitivity to sufficiently explain the strong association between parents' and children's attachment led to a recommendation that research should address this "transmission gap" (p 400) by exploring the mechanisms through which children's attachment relationships are affected by parental attachment relationships. Subsequently, de Wolff and van IJzendoorn (1997) conducted a meta-analysis on parental antecedents of infant attachment. In addressing the relationship of maternal sensitivity and attachment security, a predictor variable of sensitivity was identified by grouping all constructs which conformed to Ainsworth et al.'s original definition (1974) whilst also specifically analysing those studies which used Ainsworth et al.'s (1974) rating scale. A modest effect size of .24 was found for maternal sensitivity by combining the 21 studies which used the Strange Situation procedure in non-clinical samples. Adding further weight to the argument that another interactive mechanism might be at work, the authors found several domains of maternal interactive behaviour (for example, mutuality and synchrony) which showed similar effect sizes to maternal sensitivity for predicting attachment security. The authors concluded that maternal sensitivity could not be regarded as "the exclusive and most important factor in the development of attachment" (p. 585).

Meins et al. (2001) took the view that maternal sensitivity as a determinant of attachment security suffered from opacity for three possible reasons: firstly, the general, coarse-grained nature of Ainsworth et al.'s maternal sensitivity scale (1971); secondly, a lack of consensus about which behaviours constitute maternal sensitivity; and lastly, the failure to consider maternal behaviour in light of its interactional context. Meins et al. drew attention to the fact that there had not been a

cohesive approach to what actually constituted maternal sensitivity. It had become an umbrella concept for diverse behaviours including measures looking at interactional synchrony, harmony and contingency and that research investigating attunement with these measures had subsequently been viewed as studies into sensitive mothering.

Meins et al. (2001) proposed that research into maternal behavioural antecedents of attachment had not focused sufficiently on the distinction Ainsworth and colleagues had made between how a mother responded to an infant's emotional cues and whether these responses were in fact sensitive. In order to show maternal sensitivity, it was not sufficient for mothers to merely recognise an infant's needs and to respond promptly but crucially this response had to be appropriate to those needs. This essential component to maternal sensitivity had lost its central position during the many years of research in part because of the inclusive nature of the sensitivity scale provided by Ainsworth and colleagues (1971, 1974).

It was therefore suggested that the problem with maternal sensitivity was the way in which it had come to be operationalised rather than how it was originally defined by Ainsworth et al. in 1971. As Clarke-Stewart observed "the problem is probably with the measures not with the hypothesis about maternal sensitivity" (1988, p. 51).

Meins et al. (2001) proposed that Ainsworth et al.'s (1971) scale suffered from a lack of specificity in how it was originally operationalised and that this had resulted in differences in how it was interpreted. Meins et al. argued that compounding this problem was the global nature of the measure coupled with the rather loose framework due to there being no set time and structure for the observation in question. The measure is based on an observer's perception of a mother's sensitivity but this was also critiqued because observers do not have guidelines about exactly which behaviours should be coded or whether the frequency of the behaviour is important.

Pederson, Moran, Sitko, Campbell, Ghesquire, and Acton (1990) drew attention to other problems with the Ainsworth maternal sensitivity measure. One problem arose from the length of observations in more recent studies as opposed to the initial studies on which the measure was based. The descriptions of maternal sensitivity were based on over 60 hours of naturalistic observations for each dyad in the original studies by Ainsworth and colleagues (1971, 1974). This extensive contact has not been replicated in subsequent research and so the original researchers had

a much greater range of observations on which to base their findings. Consequently, it could be said that these early studies may have allowed a more accurate assessment of maternal sensitivity. Another problem arose because Ainsworth's descriptions of sensitivity demand that the observer has a considerable understanding both of the mother's psychological processes and the infant's needs and that the contexts in which these are observed need to be sufficient to allow behavioural subtleties to be fully observed. Again, this has not always been the case with brief sessions of laboratory-based free play not necessarily providing the optimal context for observing individual differences in maternal sensitivity. The lack of cohesion surrounding maternal sensitivity and its limitations in pinpointing the antecedents of attachment security in infants and in bridging the transmission gap led to the development of a new theoretical construct, "mind-mindedness" (Meins, 1997).

### **2.3 What is maternal mind-mindedness?**

Maternal mind-mindedness was intended to capture the distinction between sensitive and insensitive mothering. In developing the construct of maternal mind-mindedness, Meins sought to redress the limitation in how maternal sensitivity had come to be measured in order to adhere more closely to Ainsworth's distinction between sensitive and insensitive mothering, arguing that a mother's willingness to engage with her infant at a mental level should be distinguished from how she responded to her child's needs. Mind-mindedness should therefore be viewed as complementary to the construct of maternal sensitivity.

Meins (1997) wanted to find out exactly which aspects of maternal sensitivity might be most important in establishing security-related differences and thus proposed the new construct, describing maternal mind-mindedness as "the propensity to treat one's infant as an individual with a mind" (p. 136). This followed a study exploring maternal teaching strategies in a box construction task with 3-year-old children, representing the four attachment groups. It was found that mothers of securely attached children interacted with them within the Zone of Proximal Development (ZPD; Vygotsky, 1978) and were sensitive as tutors to the children's changing needs within the task. Meins argued that these mothers, being responsive to their children's comments and perspectives on the task, demonstrated an ability labelled "mind-mindedness" in their greater tendency to treat their children as "mental agents".

Mind-mindedness was defined by Meins et al. (2001, p. 638) as a parent's proclivity "to treat her infant as an individual with a mind rather than merely as a creature with needs that must be satisfied". Meins (1997) proposed that greater mind-mindedness was one of the most important factors in mothers' ability to sensitively interact with their children. Even though the construct had not previously been labelled mind-mindedness, it appeared that some studies already suggested that mothers of securely attached children showed this tendency. Ainsworth et al. (1971) wrote that the mother of a securely attached child was "capable of perceiving things from [the child's] point of view" (p. 43). If mind-mindedness described mothers' "proclivity to treat their infants as individuals with minds" (Meins, 1997, p. 139), then the mother of a securely attached child according to Ainsworth would also treat her child as a "separate person" (1971, p. 43).

#### **2.4 How is maternal mind-mindedness operationalised?**

The original studies into mind-mindedness operationalised the construct using a purely representational measure (Meins, Fernyhough, Russell, & Clark-Carter, 1998); an interview question which accesses a mother's representation of her child's mental states. Meins & Fernyhough (1999) also included two other measures of maternal mind-mindedness, as well as the interview measure taken from the earlier study (Meins et al., 1998). These measures looked at how mothers interpreted their infants' early language. Firstly, mothers' reports of non-standard words in their children's vocabularies and secondly mothers' meaningful interpretations of their children's early vocalisations were taken to be indices of maternal mind-mindedness. However, these two measures were not used in subsequent research or included in the battery of measures described in Meins and Fernyhough's *Maternal Mind-Mindedness* (2006; 2010).

When asked to describe her children, the interview measure focuses on a mother's tendency to refer to her child's mental attributes rather than behavioural, physical or general attributes. Mental attributes are any comments which refer to the child's mental life, for example those relating to a child's will, mind, interests, imagination, knowledge and memory. Mothers' level of mind-mindedness can be expressed through a frequency measure, the total number of mental attributes produced by the mother, and through a proportional measure which controls for verbosity, whereby the score for mental attributes is calculated as a proportion of the total number of attributes. In Meins and Fernyhough's *Maternal Mind-Mindedness* (2010) this measure is described as for use with caregivers with preschool and older children.

Mind-mindedness can thus be seen as a mother's representation of her child, specifically her tendency to view her child as an individual with an autonomous mental life.

The interactional measure was designed to assess mind-mindedness by looking at the relationship between a mother and her child in the first year of life and a mother's tendency to refer to a child's mental states when interacting with them. Meins et al. (2001) sought to rethink the construct of maternal sensitivity by focusing on mothers' ability to accurately read their infants' mental states. In doing so, the authors aimed to determine maternal behaviours which demonstrated that a mother was treating her infant as a mental agent. This interactional measure was developed using detailed observations of videotaped interactions from a 20-minute play session with 71 mothers and their 6-month-old infants. An initial coding scheme was developed for this measure which identified five potential measures of mind-mindedness based on different ways in which a mother could be seen to attribute attention to her infant: (a) maternal responsiveness to change in infant's direction of gaze; (b) maternal responsiveness to infant's object-directed action; (c) imitation; (d) encouragement of autonomy; and (e) appropriate mind-related comments.

The first four categories in the initial coding scheme were behaviour-based indices and took into account how mothers responded to their infants' behaviour or whether they elicited certain infant behaviours. The last category, appropriate mind-related comments, stemmed from analysis of maternal speech, focusing on comments made by the mothers which seemed to relate to their infants' minds. Mind-related comments were coded dichotomously into appropriate or inappropriate comments. Coders viewed comments as "appropriate" when, for example, they agreed with the mother's reading of the infant's internal state or as "inappropriate" when mothers were viewed as misinterpreting their infants' internal state. The term "inappropriate" was later changed to "non-attuned" in Meins and Fernyhough's *T ħ āĒ ħ ā^ā} ^••Á ÔĴ āā \*Ā ā ~ āĀ* (2010) and accordingly the more recent term shall be used in this thesis. Of the five mind-mindedness variables, notably only appropriate mind-related comments were found to significantly predict attachment security.

Crucially for the development of the construct, although appropriate mind-related comments and maternal sensitivity were positively correlated, findings suggested that they were not equivalent partly because appropriate mind-related comments only accounted for 16% of the variance in sensitivity. A regression analysis



investigating the relative strength of maternal mind-mindedness and maternal sensitivity as predictors of attachment security showed that appropriate mind-related comments accounted for 12.7% of the variance and that maternal sensitivity accounted for 6.5% of the variance. This suggested that appropriate mind-related comments could be viewed both as an independent and as a better predictor of infant-mother attachment security than maternal sensitivity.

Consequently, Meins and Fernyhough (2010) described mind-mindedness in this measure as a “caregiver’s tendency to comment appropriately or in a non-attuned manner on the infant’s putative internal states during on-line interactions” (p. 3). Being mind-minded depends on the mother’s willingness to represent the infant’s internal states in an interactional play context. The measure of appropriate mind-related comments was described as an index of the mother’s capacity to accurately represent both mental and emotional states of her infant (Meins et al., 2001). Meins et al. argued that this capacity relates to the processes involved in forming and operating IWMs of attachment. An IWM of attachment is representational and enables an individual to predict how an attachment figure will behave in future interactions, having been shaped by previous experiences with that person. In a similar way, a mother’s mind-mindedness, or her tendency to frame interactions in line with her infant’s desires, beliefs and emotions could provide a naturalistic measure of the mother’s IWM of “self with child”. Meins et al. contrasted this representational component of mind-mindedness and its theoretical links with IWMs with maternal sensitivity, arguing that the latter was instead an index of behaviour without a representational component.

A unique feature of mind-mindedness operationalised in this way is that it defines an aspect of parent-child interaction that is at the interface of representation and behaviour (Arnott & Meins, 2007). Meins et al. (2012) also described it as a “construct at the interface between behavioral and representational operationalizations of the caregiver-child relationship” (p. 394). Unlike purely representational measures of the caregiver-child relationship, it draws on both representational and behavioural facets of the caregiver’s relationship with the child. If caregivers are to be considered as mind-minded, they “must first form a representation of the infant’s internal state and then use this representation to inform their behavioral engagement with the child” (Meins et al., 2012, p. 394). The measure has also been described as “online” (Arnott & Meins, 2007; Lundy, 2013; Meins et al., 2003) because it is current and allows mind-mindedness to be

demonstrated in real-life interactions. It focuses on a mother's tendency to represent and reflect on her child's mind and then to use this representation to talk to her child in line with their thoughts and feelings.

Mind-mindedness, assessed using the interactional measure, differs from caregivers' general internal state language (e.g., Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Taumoepeau & Ruffman, 2008) because it distinguishes between comments which appropriately reflect the child's internal states and those comments which could be viewed as not attuned to the child's mind. Mothers' scores for appropriate and non-attuned mind-related comments have been found to be unrelated in studies with infants (Arnott & Meins, 2007; Meins et al., 2002, 2011, 2012) with appropriate mind-related comments occurring approximately four to five times more frequently (Meins et al., 2003, 2011). The contribution of interactional mind-mindedness to infant-mother attachment, specifically the roles played by the two types of mind-related comment, was investigated by Meins et al. (2012). The authors found that mothers in the secure-group obtained higher scores for appropriate mind-related comments and lower scores for non-attuned mind-related comments than those in the insecure-avoidant, insecure-resistant and insecure-disorganised groups. Overall, the authors interpreted the study findings as illustrating how appropriate and non-attuned mind-related comments independently contributed to attachment, suggesting that mind-mindedness was best viewed as a "multidimensional construct" (p. 408). This study accordingly measured both appropriate and non-attuned mind-related comments.

### **2.5 Do mind-mindedness measures examine an overarching construct?**

An aim of the current study was to establish the relationship between levels of mind-mindedness found in the two measures and to examine concurrent correlations and possible directions of influence. If both operationalisations of maternal mind-mindedness are examining the same overarching construct, the representational and interactional measures should be related.

Although both stemming from maternal representations, there are fundamental differences between the two operationalisations. Crucially, both measures involve the mother thinking of her child as a mental agent, but only the interactional measure can assess whether the mother then goes on to treat her child as someone with internal states. Only the interactional measure is able to provide observational evidence regarding mothers' behaviour. This measure originates from

the supposition that representations are grounded in interactions which means that mothers' representations should then be translated into behaviour.

In contrast to the interactional measure, the representational measure is retrospective and reflective. A criticism of the reflective quality inherent in the measure is that this method of measurement may be more likely to induce "canned responses" from mothers about their children rather than being a true reflection of how the mother represents her child. Another important difference between the measures is that the interactional measure allows an assessment of accuracy of representations, by focusing on the attunement of the mother's language in interactions, but investigating accuracy of representations is not possible in the representational measure.

There is scant research evidence confirming that the two measures are related; studies tending to use only one of the measures. However, three studies have used a representational and an interactional measure (Arnott & Meins, 2008; Lundy, 2013; Meins et al., 2003). Both measures of mind-mindedness were used in a longitudinal study by Meins et al. (2003). Here, mothers' early interactional mind-mindedness was found to positively relate to later representational mind-mindedness. However, the measures were used over two time points which could be viewed as a limitation in establishing their convergent validity because it is not possible to say whether mothers' mind-mindedness changed over time and that this change accounted for the relationship between the measures. In a study by Arnott and Meins (2008), the total number of comments rather than mental attributes produced by mothers in their antenatal descriptions of what their unborn child might be like in the future, were found to positively relate to appropriate mind-related comments in interactions. As the standard index of representational mind-mindedness, that of mental attributes, was not related to interactional mind-mindedness, the measures were not shown to be unequivocally related.

Lundy (2013), in the only study to use both measures concurrently, investigated whether interactional attunement played a mediating role in parents' mind-mindedness and preschoolers' theory of mind. In doing so, they used a representational measure of mind-mindedness and a 5-minute, laboratory-based parent-child interaction on a puzzle construction task with 4-year-olds. Interactional attunement in this task was used as an index of online mind-mindedness and was viewed by the author as a proxy for the standard interactional measure. It was

predicted that parents who produced a higher proportion of mental descriptions on the representational measure would demonstrate greater attunement to their child's mental processes in the online measure. The task was assessed first of all for effectiveness of parental scaffolding with parental interventions being coded in terms of level of specificity of instruction and the child's success following an intervention. Secondly, sensitivity to feedback in the interaction was then scored, using criteria set by Meins (1997), which investigated a parent's ability to modify their assistance based on their child's performance. The assumption was that parents who were able to use their children's performance on the task to gauge their thought processes would be better at intervening at an appropriate level. The number of times a parent appropriately modified their level of instruction was scored as a proportion of the total number of interventions. This was taken to be the index of online mind-mindedness.

Mothers' mind-mindedness on the representational measure was found to positively correlate with the online measure ( $r = .41$ ). Higher levels of mind-mindedness in the representational measure also predicted higher interactional attunement in the online measure. However, there are limitations in this study's ability to provide evidence that representational and interactional mind-mindedness are related. The online measure used in the study was a measure of an appropriate level of intervention rather than a measure of appropriate mind-related comments in interactions. It could then be said that this is not measuring mind-mindedness but indexing a different type of interactional attunement to that specified by Meins and Fernyhough (2010). It also took place within the confines of a structured task and involved parental scaffolding rather than taking place in the context of free play and involving general mother-child conversation. Based on the findings of these three studies, it is not possible to state unequivocally that the two measures are convergent.

## **2.6 Developmental outcomes of maternal mind-mindedness**

### ***2.6.1 Mind-mindedness and positive relations with secure attachment***

The formation of secure attachments has been associated with a variety of positive developmental outcomes. For example, Bohlin, Hagekull, and Rydell (2000) reported that children who had been assessed as securely attached as infants were found to have improved social functioning at school, being more socially active, popular and reporting less social anxiety than those who had been insecurely attached as infants. Secure attachment also appears to be a protective factor and

has been found to be associated with better psychological health including lower anxiety (Collins & Read, 1990) and an increased ability to regulate affect through interpersonal relatedness (Simpson, Rholes, & Nelligan, 1992).

Supporting the rationale for its development, mind-mindedness has been linked to secure attachment relationships (Arnott & Meins, 2007; Lundy, 2003; Meins et al., 1998, 2001). Meins et al. (1998) found that mothers of securely attached children showed a greater likelihood to describe their children with mental characteristics when interviewed, in other words, to be more mind-minded. However, attachment was measured when the infants were 12 months old and the mind-mindedness measure was carried out when they were 3 years old and so it was not known whether a tendency to be mind-minded was present when the children were infants. It could then be said that mind-mindedness was associated with secure attachment but not that it was a precursor of secure attachment.

Meins et al. (2001) went a step further when they found that mind-mindedness, specifically whether mothers made appropriate mind-related comments in a play session with their infants at 6 months, was a significant predictor of attachment security assessed using the Strange Situation procedure at 12 months. Mothers who demonstrated higher levels of mind-mindedness by producing a greater proportion of comments appropriate to their child's internal states were more likely to have securely attached infants than those who produced a smaller proportion of appropriate comments. Lundy (2003) also explored maternal mind-mindedness during interactions at 6 months but subsequently assessed infant attachment security at approximately 13 months using a different measure to Meins et al., the Attachment Q-set (AQS; Waters, 1987). The frequency of mind-related comments was found to positively correlate with increased levels of attachment scores. One category of appropriate mind-related comments, those related to infants' general thought processes, knowledge or desires, was found to predict infant-mother attachment scores accounting for 33% of the variance, further supporting the link between mind-mindedness and attachment security. The authors also found that the frequency of interactional synchrony, defined as the "extent to which interaction appeared to be reciprocal and mutually rewarding" (Isabella, Belsky, & von Eye, 1989, p. 13), mediated the relationship between mothers' mind-related comments and attachment security. This linguistic element of mind-mindedness is in line with Bowlby's belief that parents, by engaging in verbal dialogue, could become

psychological secure bases for their children with a secure relationship being characterised by open communication.

### **2.6.2 Mind-mindedness and relations with the transmission gap**

Arnott and Meins (2007) provided preliminary support for the possibility that mind-mindedness may mediate the relation between mothers' attachment representations and mother-infant attachment security. The study explored possible relations with both mothers and fathers and included 25 couples and three solo mothers. Regarding the mothers, it investigated how mothers' antenatal attachment representations assessed using the AAI during the last trimester of pregnancy related to their maternal mind-mindedness in infant-mother interaction when the infants were 6 months old and to infant-mother attachment security assessed using the strange situation procedure at 12 months old. The small sample meant that it was not possible to test predictors of infant-mother attachment and mediational pathways using the optimal statistical analysis. However, 100% of infants were securely attached if their mothers were autonomous and high in maternal mind-mindedness and 80% of infants were insecurely attached if their mothers were nonautonomous and low in maternal mind-mindedness.

There is a possibility that links between mothers' attachment representations and mind-mindedness may not explain the mechanism through which mind-mindedness predicts attachment security. Laranjo, Bernier, and Meins (2008) found that maternal sensitivity rated using the Maternal Behavior Q-Sort (Pederson, Moran, Sitko, Campbell, Ghesquire, & Acton, 1990) mediated the relation between mind-mindedness and infant attachment. This supported Meins' (1997) suggestion that mind-mindedness is a prerequisite for maternal sensitivity. This is in contrast to the later study by Meins et al. (2001), which found that sensitivity and mind-mindedness were independent predictors of security. However, Laranjo and colleagues focused on subtypes of appropriate mind-related comments and did not include non-attuned comments in the analyses. Another explanation for this difference is that different methodologies were employed. Attachment security was measured by Laranjo et al. using the Attachment Q-Sort (Waters, 1987) which does not allow specific attachment categories to be explored whereas Meins et al. used the Strange Situation coding procedure (Ainsworth & Wittig, 1969). Whether mind-mindedness is viewed as an independent predictor of infant-mother attachment security or as being mediated by maternal sensitivity, its importance as a construct in attachment literature is now well-established.

### ***2.6.3 Mind-mindedness and relations with children's social and emotional development***

Meins (1997) proposed that higher levels of maternal mind-mindedness, as well as resulting in greater sensitivity to an infant's desire and intentions, may also encourage children to understand themselves and others as mental agents.

Research has subsequently found links between mind-mindedness and children's social and emotional development (Laranjo, Bernier, Meins, & Carlson, 2010; Meins et al., 1998, 2002, 2003).

Meins et al. (1998) argued that levels of maternal mind-mindedness would have an effect on children's mentalising abilities. Support for this hypothesis was found in mothers' proclivity to describe their 3-year-old children in mentalistic terms being related to how well these children performed at 4 years on a version of Wimmer and Perner's (1983) unexpected transfer task which requires the child to represent the mental states of another person in order for them to be able to predict that person's subsequent behaviour. Also, mothers' descriptions of their children in mentalistic terms were related to how well the children performed on a more advanced mentalising task when tested again at 5 years.

Further support for this important role of maternal mind-mindedness was found by Meins et al. (2002) when mind-mindedness, specifically mothers' appropriate mind-related comments in a play session with 6-month-old infants, was found not only to positively correlate with children's performance on a battery of theory of mind tasks at 45 and 48 months but also to independently predict overall theory of mind performance. Meins et al. (2003) argued that exposure to mind-minded discourse would present children with the opportunity to reflect on their own and other's ongoing ideation. This was supported when mothers' appropriate mind-related comments with 6-month old infants was positively associated with children's stream of consciousness understanding at 55 months.

## **2.7 Summary**

Much research has focused on finding out the mechanism which may account for the development of secure attachment relationships and the transmission of attachment security between generations. Maternal sensitivity, possibly due to the way it came to be operationalised, has proved to have limitations as an antecedent of attachment security. Meins (1997) proposed a new construct, maternal mind-mindedness, to adhere more closely to Ainsworth's distinction between sensitive

and insensitive mothering. This focuses on a mother's willingness to think of and treat her child as a mental agent and came to be operationalised in two ways, using a representational measure and an interactional measure. Both stem from mothers' representations but only one of these, the interactional measure, is online and allows you to see how representations are used in real-life behaviour.

Subsequently, maternal mind-mindedness has been found to be linked to variables with positive developmental outcomes such as secure attachment relationships and children's superior mentalising abilities. Maternal mind-mindedness has been found not only to relate to these outcomes concurrently but more importantly to predict them. It appears that mothers with higher levels of mind-mindedness are more likely, later on, to have securely attached infants and children who perform better on mentalising tasks than mothers who demonstrate lower levels of mind-mindedness. These links demonstrate the importance of maternal mind-mindedness but do little to clarify the nature of the construct.



# 3

## **Mind-mindedness: The nature of the construct**

### **3.1 Introduction**

While there is a burgeoning literature on the beneficial impact of maternal mind-mindedness on children's development and its links with secure attachment relationships, understanding of the nature of the construct is less well developed. This chapter reviews research which has, in part, addressed the nature of mind-mindedness. Research proposing support for mind-mindedness as a cognitive-behavioural trait, a relational construct alone, or a relational construct which is influenced by cognitive-behavioural traits in the mother, will be examined as well as potential contributory mother and child factors. A review of these studies and those detailed in the preceding chapter will lead to an elaboration of the research questions to be addressed in this thesis.

### **3.2 The importance of understanding the nature of maternal mind-mindedness**

Maternal mind-mindedness has been put forward as appearing to be a cognitive-behavioural trait, a relational construct and indeed as one influenced by the other. In establishing the importance of maternal mind-mindedness as instrumental in children's positive developmental outcomes, it is necessary to determine whether mind-mindedness should be viewed as a stable trait or whether it should be viewed as a relational construct. If viewed as a trait, one could predict that mind-mindedness is likely to remain relatively consistent across time, but if viewed as a relational construct, one could predict that mind-mindedness is less likely to remain consistent as the relationship between mother and child changes over time.

The necessity to investigate the nature of the construct becomes clearer when we consider the area of applied psychology. Maternal mind-mindedness could be viewed as a promising focus for future interventions due to the positive associations found between high levels of maternal mind-mindedness and favourable child development. If findings about the positive outcomes of maternal mind-mindedness are to be of greater benefit to mother-child relationships, it is essential to find out more about its characteristics as this might have implications for the focus of

interventions. Disentangling findings in psychological research is difficult with the concomitant risk that poorly understood causal influences may hamper our ability to use research findings appropriately. The more that is understood about the correlates and limits of maternal mind-mindedness, the more likely it is that our knowledge of mind-mindedness can be put to use to ameliorate mother-child relationships and possibly improve child outcomes.

Research with community samples has suggested that a focus on mind-mindedness in child and family social services might have a beneficial effect for families in promoting secure child attachment relationships (Arnott & Meins, 2007; Bernier & Dozier, 2003). Adults' attachment state of mind, an antecedent of infant attachment security, has been found to be resistant to interventions (Korfmacher, Adam, Ogawa, & Egeland, 1997). Bernier and Dozier (2003) suggested that focusing on a more malleable construct than attachment representations might be another way to promote secure attachment relationships. They proposed that an educational approach targeted at improving parents' understanding of their child as an autonomous person could prove favourable.

In a preliminary study, Arnott and Meins (2007) found that if a parent was rated as nonautonomous (dismissing, preoccupied, unresolved) using the AAI, the chance of the child forming a secure attachment relationship was increased if the parent was rated as high in interactional mind-mindedness rather than low in mind-mindedness. Following on from this finding, it could be argued that if Arnott and Meins' findings are replicated in a larger sample, an intervention might do well to concentrate on increasing nonautonomous parents' levels of mind-mindedness to improve the likelihood of their infants developing a secure attachment relationship.

Whilst the majority of research into mind-mindedness has focused on community samples, it has begun to include at risk groups such as mothers with severe mental illness (Pawlby, Fernyhough, Meins, Pariante, Seneviratne, & Bentall, 2010), borderline personality disorder (BPD) (Schacht, Hammond, Marks, Wood, & Conroy, 2013), and with children referred to clinical services (Walker et al., 2011).

Schacht and colleagues (2013) investigated relations between mind-mindedness in mothers with and without BPD and their children's mental state understanding. Maternal BPD was found to be associated with fewer maternal references to their children's mental states, assessed using the representational mind-mindedness

measure, and to lower levels of mental state understanding in their 3- to 5-year-old children. A positive relationship was found between the proportion of mental attributes used in mothers' descriptions and children's performance on theory of mind tasks ( $r = .27$ ). These findings lend support to the proposal that BPD is linked to a reduced mentalising capacity, or in other words an ability to make sense of yourself and others in terms of mental states and processes (Fonagy & Bateman, 2008). The concurrent nature of the study is a limitation because it is only possible to speculate about the causal role of mind-mindedness in children's mental state understanding. However, the associations found do point towards mind-mindedness being a promising area for future investigation in mothers with BPD.

There is also the possibility of pre-birth preventive work, stemming from the positive relationship found by Arnott and Meins (2008) between antenatal mind-mindedness, assessed by a modified representational measure, and postpartum mind-mindedness, assessed by the interactional measure. Mothers' representations of their unborn child in a community sample were found to be related to their levels of mind-mindedness in interactions with their 6-month-old children. This study and its measures will be discussed in greater detail later in this chapter but the authors suggested that mind-mindedness may originate in parents' antenatal representations of their infants as distinct beings and that this ability might continue in the parents' tendency to think about their child's internal states after birth. Consequently, this raises the potential of antenatal interventions with at risk mothers. An intervention aimed at increasing the mother's ability to think about her future child as a separate entity might be beneficial in future mother-child interactions.

The nature of mind-mindedness – specifically whether it is a cognitive-behavioural trait or a relational construct – has consequences for potential interventions. Difficult mother-child relationships could be targeted by interventions aimed at increasing the mother's tendency to think of her child's internal states and to make appropriate responses in her interactions with that child. If maternal mind-mindedness is a cognitive-behavioural trait, this implies that an intervention would do well to focus on the mother alone (possibly a simpler intervention). This is because mind-mindedness as a trait would be something which exists within the mother herself rather than being a product of the relationship. Not only that but if showing the stability inherent in the trait concept, the mother's mind-mindedness would be likely to remain at relatively the same level and hence without an intervention difficulties

might well remain in the future. The very concept of a trait implies that mother's mind-mindedness would be relatively consistent, therefore it could well generalise across relationships with problematic relationships occurring with more than one child. On the other hand, if maternal mind-mindedness is a relational construct, then it could be argued that an intervention should focus on the relationship with that particular child rather than predominantly concentrating on the mother herself. The uncertainty surrounding maternal mind-mindedness, with the attendant consequences for focused interventions, highlights a vital question regarding the nature of the construct which is yet to be conclusively answered.

### **3.3 A cognitive-behavioural trait**

Mothers have been seen to vary greatly in their levels of maternal mind-mindedness as measured both by the representational measure and the interactional measure. Studies have found considerable variability in whether mothers describe their children with reference to their mental attributes (Bernier & Dozier, 2003; Meins et al., 1998, 2003; Meins & Fernyhough, 1999) or whether they use appropriate mind-related comments when interacting with their children (Laranjo et al., 2008; Meins et al., 2001, 2002, 2011). The first explanation to be addressed in this thesis as to why mothers differ from each other in their tendency to refer to mental attributes or to make appropriate mind-related comments is that maternal mind-mindedness could be a cognitive-behavioural trait.

Traits are used to describe inter-individual differences in behaviour that show relative stability over time and across situations. Traits refer to "consistent patterns in the way individuals behave, feel, and think" (Pervin, Cervone, & John, 2005, p. 223) and are "essentially a relatively stable tendency or feature characteristic of an individual" (Kreitler & Krietler, 1990, p. 4). The trait approach alludes to the consistency of an individual's responses to different situations, importantly allowing you to predict how a person will behave in the future. For example, when you meet a person and they are friendly, you would anticipate when you meet them next that they would still be friendly. This encompasses the view that a trait is a lasting internal characteristic, suggesting that the explanation for an individual's behaviour will be found within the person rather than the situation. As Pervin noted, "Probably most would agree that *dear* represents a disposition to behave expressing itself in consistent patterns of functioning across a range of situations" (1994, p. 108).

Traits are deemed to be relatively stable across time and refer to “patterns of behaviour presumed to transcend time and specific situations” (Funder, 1991, p. 31). In line with the preceding definition, traits are assumed to be relationship-unspecific (Asendorpf & Aken, 1994). An example of this lack of specificity across relationships is the assumption that a sociable individual would be sociable with many different people, rather than behaving in this way with only a few. Most theorists have suggested that the trait model is supported by the evidence found for longitudinal stability of traits (Funder, 1991; McRae & Costa, 2003). However, there is general acknowledgement that change is possible without compromising the validity of the trait concept. As Buss stated, “Traits change over time, but for most traits and for most individuals, the changes are unlikely to be large enough to deny stability” (1988, p. 40).

The trait approach has a long history, especially in the field of personality psychology. Prominent trait researchers in this area have included the pioneering Cattell, who identified 16 primary traits (1965), and Eysenck, who identified the three broad personality factors of neuroticism, extraversion-introversion and psychoticism (1967, 1978). There is now a good deal of consensus for the existence of five personality traits (Costa & McRae, 1985; Digman, 1990; Goldberg, 1990) which were named the “Big Five” dimensions by Goldberg in 1981 (p. 159). These are generally known by the terms neuroticism, extraversion, openness, agreeableness and conscientiousness.

Regarding the stability of the Big Five, trait researchers agree that this is quite high during adulthood (Caspi & Roberts, 1999; Costa & McCrae, 1988) though small age effects have been found (e.g., Costa & McCrae, 1994). Costa and McCrae (1988) carried out a six-year study of trait stability, based on the Baltimore Longitudinal Study of Aging panel. Results based on the NEO-PI instrument supported trait stability across time, with high retest correlations and only very slight changes in mean levels being found. Genetic evidence has been used by some theorists to argue in favour of the strong heritability of most psychological traits (Plomin & Caspi, 1999; Plomin, Chipuer, & Leohlin, 1990). This view was supported by the findings of the Minnesota Study of Twins raised apart (MISTRA) which began in 1979. However, theorists acknowledge that the environment is important and that environment accounts for at least half the variance in personality traits (Pervin, 1994).

Maternal mind-mindedness, if a cognitive-behavioural trait, would be expected to be reasonably stable across time if conforming to this definition. In this way, when a mother's mind-mindedness is investigated longitudinally using the representational measure, and she describes her child on different occasions, she should talk about her child with a consistent level of mind-mindedness by producing a similar amount or proportion of mental attributes about the child across time. Likewise, when a mother's mind-mindedness is investigated longitudinally using the interactional measure, and she and the child play together on different occasions, she should show a consistent level of mind-mindedness by producing a similar amount or proportion of mind-related comments when talking to the child across time.

Evidence for temporal continuity so far has been limited by methodology. In longitudinal studies, different mind-mindedness measures have been used at different data collection times (Arnott & Meins, 2008; Meins et al.; 2003; Meins & Fernyhough, 1999). Meins and Fernyhough (1999) took two measures representing mind-mindedness with 20-month infants, mothers' reports of non-standard words in their children's vocabularies and mothers' meaningful interpretations of their children's early vocalisations. Mind-mindedness was then measured again at 3 years with the same children using the standard representational measure (Meins et al., 1998). Higher levels of mind-mindedness, assessed using mothers' descriptions of their 3-year-old children in terms of mental attributes, had previously been found to be related to children's performance on mentalising tasks by Meins and colleagues (1998). Meins and Fernyhough aimed to extend these findings to establish whether mind-mindedness at an earlier stage in the child's life was related to children's subsequent understanding of other minds at age 5 and to investigate the consistency of mind-mindedness over time. Mothers who were more likely to view their infant's early vocalisations as mindful also had a greater tendency to focus on their 3-year-old children's mental attributes. However, it is important to note a couple of caveats regarding this finding. The first concerns the earlier measures of mind-mindedness. Although Meins et al. (2013) stated that mind-mindedness may be operationalised in terms of caregivers' tendency to "attribute meaning to their infants' early non-word utterances" (p. 544), the measures used by Meins and Fernyhough did not become part of the battery of mind-mindedness measures included in Meins and Fernyhough's (2006; 2010) coding manual and were not included in subsequent research. The second concerns the fact that the indices taken at the two time points are quite different to each other so it is not certain that they arise from the same construct, with the earlier one constituting an

assessment of the child's vocabulary and the later one coming from a description of the child. This suggests that evidence taken from this study in support of the stability of mind-mindedness should not be interpreted as conclusive.

In a key longitudinal study, Meins et al. (2003) investigated the convergent validity of maternal mind-mindedness by looking at the relationship between early and later measures of mind-mindedness. It was reported that mothers' mind-mindedness when interacting with their 6-month-olds, indexed by observed appropriate mind-related comments, was positively related to their tendency to describe their children with reference to mental attributes at 4-years-old. This is in contrast to the negative relationship found between non-attuned mind-related comments, where mothers misread the infants' internal state and fail to respond appropriately, and mental attributes given. Due to the lack of transparency in infants' mental states, mothers have to infer their infants' thoughts and feelings and only those inferences coded as accurate and attuned by the observer were found to positively relate to later mind-mindedness. There was, therefore, a higher likelihood that mothers would describe their children in mentalistic terms if they had shown a greater tendency to comment appropriately, and to hold back from making non-attuned comments, on their infants' mental states in interactions. This suggests that it is the quality of the mind-related inferences, specifically the appropriateness of the comments, which underlies the stability of mind-mindedness in the context of interactional and representational measures across time.

A forward regression analysis, with the interactional mind-mindedness indices at 6-months comprising the independent variables, demonstrated that appropriate and non-attuned mind-related comments accounted for 17% and 19% respectively (though with opposite directions of effect) of the variance in mothers' mentalistic descriptions at 4-years. Meins et al. (2003) argued that this was evidence of strong temporal continuity between these measures of early and later mind-mindedness. However, because different measures were used longitudinally, this fails to take into account that continuity in a pure sense would be established through the use of the same measure across time. Whilst these measures may be associated, they are not strictly equivalent. One of the key factors differentiating the measures is that the representational measure of mind-mindedness does not distinguish between appropriate and non-attuned mentalistic attributions and so it is not possible to conclusively state on this evidence that there is continuity in mind-mindedness over time. As Asendorpf stated, "A construct is continuous between two points in time if

the construct can be operationalized by the same behaviors at both time points” (1992, p. 54).

Other research from Meins and colleagues has assessed continuity of mind-mindedness across what could be seen as a significant period in mothers’ representational tendencies. Arnott and Meins (2008) carried out a study investigating continuity in parents’ mind-mindedness from pregnancy to their infants’ first year. Antenatal mind-mindedness was assessed in the last trimester of pregnancy and postpartum mind-mindedness was subsequently assessed at 6 months using the standard interactional measure. The authors argued that it was possible to investigate mind-mindedness during pregnancy, unlike other assessments of early infant-caregiver interaction such as maternal sensitivity, because mind-mindedness depends on a willingness to represent an infant’s internal states and so a mother can begin to represent her child before they are born.

Antenatal mind-mindedness was assessed using an adaptation of the representational measure with parents being asked to talk about what their unborn child might be like when they were 6-months-old. Due to the novelty of asking parents to conjecture about an unborn child and the possibly difficult nature of the task, the index of mind-mindedness was reframed so that mind-mindedness was viewed as a “willingness or ability to imagine the unborn child as a future person” (Arnott & Meins, 2008, p. 648) rather than focusing solely on the future child’s mental characteristics. It was conjectured that if parents were more willing to represent the foetus as a separate being, there might be a greater tendency for these parents to think that their child was able to act independently of the mother. Thus, the process of interpreting their child’s behaviour with reference to intentions could begin before birth. This could then mean that these parents would be more equipped to give a fuller and more comprehensive prediction about the child. Conversely, if parents were not thinking of their foetus as an individual, they could be less likely to predict what the child might be like in the future.

The authors found that the total number of antenatal “describe your child” comments was positively related to postpartum mind-mindedness indexed by appropriate mind-related comments but there was no relationship with non-attuned mind-related comments. Based on these findings, it could be said that mothers who had been more willing or able to imagine their unborn child had a greater tendency to



comment appropriately on their infants' internal states during a mother-child interaction. However, when focusing on the standard representational index of mind-mindedness, which requires mothers to produce mental attributes to demonstrate mind-mindedness, the measures are no longer related. This finding needs to be treated with some caution because it was the volume of mothers' speech, indexed by the number of "describe your child" comments, rather than the content of speech, indexed by mental attributes given, which predicted postpartum mind-mindedness. Out of 28 mothers who gave descriptions of their predicted child, 15 included no mentalistic characteristics and so this category was dichotomised into those who did and those who did not produce mentalistic characteristics. No difference was found between these two groups in mothers' postpartum tendency to make appropriate or non-attuned mind-related comments.

Arnott and Meins (2008) proposed two alternative reasons for finding a relation only between parents' general descriptions of their unborn child and post-partum mind-mindedness. Firstly, they suggested that the principal marker of antenatal mind-mindedness may be parents' ability to think about their future child in general terms rather than the child's internal states in particular. Secondly, they proposed that asking mothers to describe their child antenatally may have failed to access mothers' tendencies to postulate the mental characteristics of children who had not yet been born. However, using the standard index of representational mind-mindedness, convincing evidence of stability in mind-mindedness was not found; only the number of comments made about the unborn child rather than their content predicted postpartum mind-mindedness. If the mentalistic aspect of mind-mindedness is to be fully recognised and preserved, it cannot be concluded that mind-mindedness has shown stability across time using these different measures.

One study has partly addressed this limitation of different mind-mindedness measures being used over time by focusing solely on one measure. To explore whether the indices of maternal mind-mindedness, specifically appropriate and non-attuned mind-related comments in an interaction, reflect a cognitive-behavioural trait and remain stable over time, Meins et al. (2011) conducted a study with a sample of 41 infant-mother dyads. Mind-mindedness was assessed in two age-appropriate assessments with a 5-minute interaction taking place when the infants were aged 3-months and a 20-minute interaction taking place when they were aged 7-months. Temporal stability in mothers' tendency to comment both appropriately and in a non-attuned manner was found between 3 and 7 months with positive correlations

showing a large effect size for proportion of appropriate mind-related comments (.53) and a medium effect size for proportion of non-attuned comments (.37) according to the requirements set out by Cohen (1988). In investigating temporal stability, despite the advantage over earlier studies (Arnott & Meins, 2008; Meins et al., 2003) of using the same mind-mindedness measures, rather than representational and interactional measures at different times, a shorter time period was employed between data collection points. This involved a gap of four months compared with, for example, approximately seven months in the Arnott and Meins study.

Meins et al. (2011) considered that as infants age, they develop greater motor skills and more purposeful behaviour, which could result in greater stability in mothers' appropriate mind-related comments than in their non-attuned mind-related comments. Younger infants' behaviour might be more difficult to read, thereby increasing the likelihood of non-attuned mind-related comments being made. The authors consequently explored whether appropriate and non-attuned mind-related comments showed different levels of stability over time by being more or less common as the child aged. This was not found to be the case though as when looking at whether mothers were more likely to comment appropriately on or to misinterpret their infants' internal states at the younger age, scores for both indices were significantly higher at age 7 months than at 3 months. This implied that mothers were not more likely to misinterpret internal states with younger infants because if so, more non-attuned mind-related comments would have been found with this age than with the infants four months later. According to the definition of what constitutes a trait, a construct has to demonstrate relative stability across time and consistency across situations. Meins et al. argued that the study's findings were congruent with mind-mindedness being a cognitive-behavioural trait in the mother due to the correlations showing both indices as stable across mother-child interactions at 3 and 7 months. Results showed a degree of stability but importantly this was only over a 4-month period which could be viewed as representing a short time period in investigating a trait construct. Importantly, the issue of consistency across situations was not truly addressed because a mother's mind-mindedness was only investigated with one child.

A key feature of trait approaches is that traits are conceptualised as relationship-unspecific (Asendorpf & van Aken, 1994). In this way, if a mother showed high levels of mind-mindedness with one child, it would be assumed that she would show

similar levels of mind-mindedness with her other children. The key issue is that the relationship between a mother and any of her children could be expected to be of a similar closeness. Consequently, variability in a mother's level of knowledge about the children should not become a possible confound resulting in differences in a mother's ability to reflect on children's mental attributes or to accurately respond to their internal states. Supporting evidence for a conceptualisation of mind-mindedness as a cognitive-behavioural trait would be provided if it were found to generalise across relationships. Crucially, research designs have examined mother-infant dyads looking at the relationship with only one child per mother, and there is no evidence about the extent to which maternal mind-mindedness generalises across relationships within families or whether it is specific to the relationship with that particular child.

### **3.4 A relational construct**

If traits are one extreme of the relationship-specificity continuum, then individual attributes which are wholly relationship-specific, theoretically showing no consistency across interactions with different people, are at the other end (Asendorpf & van Aken, 1994). According to Asendorpf and van Aken, an entirely relationship-specific attribute may not be easy to find in the way people behave but substantial relationship specificity has been shown to feature in developmental research. The authors highlighted children's inhibition and their social competence in a very familiar group of peers as moderately relationship-specific attributes. Asendorpf (1990) provided evidence that inhibition in peer groups becomes relationship-specific to some degree during group socialisation.

Relationship specificity can be seen as central to the concept of attachment relationships. At the core of attachment theory is the primacy of the caregiver-infant relationship. Bowlby (1969) proposed that an infant has a strong tendency to prefer a principal attachment figure for security and comfort. As well as this, most infants have multiple attachment figures but the existence of an "attachment hierarchy" means it should not be assumed that they treat all attachment figures as equivalent or that they are interchangeable (Cassidy, 1999). Attachment research has gone some way to demonstrating this hierarchy (Ainsworth, 1967, 1982; Colin, 1996). Ainsworth (1982) described how the combination of several attachment figures would not compensate for the loss of the principal attachment figure and how children could tolerate major separation from subsidiary figures with less distress than from the principal attachment figure.

Attachment theory can be conceptualised as relational in its claims that the attachment bond reflects the quality of the specific infant-caregiver relationship (Ainsworth et al., 1978). This was demonstrated by Ainsworth et al. (1974) through the association found between mother-infant interactions observed at home during the first year of life and Strange Situation classifications. An example of relationship-specificity can also be seen when an infant's attachment relationship with their mother is not the same as their attachment relationship with their father. Fox, Kimmerly, and Schafer (1991) noted that out of 11 samples which examined the concordance of infant attachment classifications to mother and father, only in three of these samples was classification to one parent found to be dependent on classification to the other parent (Goossens & van IJzendoorn, 1990; Lamb, 1978; Owen & Chase-Lansdale, 1982). This suggested that it was not only possible but probable that a child would be securely attached to one parent and insecurely attached to the other. This was called into question by Fox et al. after carrying out a meta-analysis on these 11 studies, when they concluded that security of attachment to one parent was dependent upon security to the other parent and that type of insecurity (avoidant/resistant) to one parent was dependent upon type of insecurity to the other. However, the concordance found in classifications does not preclude attachment being relational. One explanation proposed by the authors was that parents may be concordant in their caregiving behaviour; both interacting in a similarly responsive and sensitive way to their infant. However, it was noted that there were few studies supporting similar parenting in couples. Another explanation given was that infant temperament might lead infants to behave similarly during the strange situation regardless of whether the mother or father was taking part. This consistent behaviour would lead to an infant being given a similar attachment classification to both parents.

Maternal mind-mindedness, with its evolution out of attachment theory, has been put forward as a relational construct. This is the second conceptualisation to be addressed in this thesis to explain the variability found in mothers' levels of mind-mindedness. This perception of mind-mindedness emerges from the view of attachment as "an affectional tie that one person or animal forms between himself and another specific one – a tie that binds them together in space and endures over time" (Ainsworth & Bell, 1970, p. 50). Correspondingly, if maternal mind-mindedness is viewed as a relationship-specific construct, it implies there is a uniqueness to each relationship with maternal mind-mindedness being governed by the

relationship between a mother and child in the same way that attachment is a bond between one person and another specific individual.

One explanation for the failure to find a correlation between levels of mothers' mind-mindedness with their own infants and whether they were likely to attribute mindful intention to how unknown infants behaved, in an unpublished study by Meins, Fernyhough, Arnott, and Wilson (as cited in Arnott & Meins, 2007), was that mind-mindedness was specific to the mother-infant relationship. Their argument was that mind-minded mothers do not always show this tendency but instead are mind-minded when interpreting an infant's behaviour with whom they have a relationship. However, the limits of relationship-specificity are not clearly delineated. Questions regarding mother's mind-mindedness with two children she knows well or what the link might be to a specific known infant, for example a sibling, are not addressed.

A comparison of mothers' and fathers' mind-mindedness with one child, specifically looking at couples' levels of concordance, has also been a focus of research into the relationship-specificity of the construct. As part of a study looking at relations between parental attachment representations, mind-mindedness and infant attachment security, Arnott & Meins (2007) explored whether there were differences in mind-mindedness, operationalised using the interactional measure, between mothers and fathers or alternatively whether there was concordance between partners. A directional hypothesis was not proposed but it was thought that if no concordance was found between partners, this would lend support to mind-mindedness being relationship-specific. On the other hand, if parents interacted in similar ways with their offspring then concordance in mind-mindedness might be found. If a mother and father showed a similar tendency to represent their infant's internal states and to respond appropriately in an interaction, this was perceived to be a demonstration of partners' concordance in mind-mindedness. A trend was found towards concordance in partners' proportional use of appropriate mind-related comments but this positive correlation failed to reach significance. No concordance was found in partners' proportional use of non-attuned mind-related comments. Arnott and Meins argued that this lack of significant concordance between partners supported the proposal that mind-mindedness is a relationship-specific construct. However, a word of caution was given due to the sample size, pointing out that the findings should be considered preliminary until replicated in a larger sample.

The interpretation by Arnott and Meins (2007) of the relationship-specific nature of mind-mindedness as the reason behind the failure to find concordance between couples, can be critiqued along theoretical and methodological lines. Given that no information is provided about parents' mind-mindedness across other relationships, it could equally be argued that partners could have different tendencies from each other to be mind-minded with their child and that this is a result of mind-mindedness being a cognitive-behavioural trait rather than it being specific to that particular parent-child relationship. Importantly, it is not known whether mothers and fathers are equally mind-minded with their other offspring because only one child per couple was included in analysis. Consequently, it cannot be concluded that a lack of concordance in couples' levels of mind-mindedness with a single infant should be seen as strong evidence that mind-mindedness should be conceptualised as a relationship-specific construct.

Arnott and Meins (2007) also wanted to investigate how interactional mind-mindedness related to mothers' attachment representations, given that this operationalisation of mind-mindedness measures parents' representations during online interactions. The association found between parental attachment classification, measured using the AAI, and mind-mindedness was stronger in fathers than in mothers. When it came to whether or not they commented appropriately on their infants' internal states, fathers' interactions with their infants were governed more strongly by representations of their own attachment experiences than happened with infant-mother interactions. Arnott and Meins, in addressing why mothers appeared to be less influenced by their representations of childhood attachment than fathers while interacting with their infants, proposed that one explanation involved the potential relationship-specific quality of mind-mindedness. The authors argued that mothers may learn more than fathers about their infants, including what they like and dislike and their moods, because they often spend more time with them in the months following birth. This is consistent with the proposal that mind-mindedness is relationship-specific, and that relationships involving greater knowledge of the infant possibly increase the tendency to comment appropriately on an infant's internal states rather than particular parental attachment representations.

Whether adult mind-mindedness should be considered a quality of close relationships or instead should be considered trait-like was addressed in a series of four studies (Meins et al., 2014). Relations between mothers' representational mind-

mindfulness for a child and another individual had not been investigated before the current study was carried out but this was addressed in the first of Meins and colleagues' studies. In this, 37 mothers were interviewed and asked to describe their children, aged between 5 and 8 years, and their current romantic partner. These descriptions were coded using the standard representational measure (Meins et al., 1998). Mothers' mind-minded descriptions of their children were found to positively correlate with those of their partner. The authors argued that this was consistent both with mind-mindedness being a trait and a construct specific to close relationships because a mother's relationship with a child and a partner could be considered comparable in terms of intimacy. Importantly, it was not possible to investigate whether mothers' mind-mindedness generalised across relationships with their children because only one child was described per mother. Therefore, whether maternal mind-minded representations vary depending on the child was not addressed.

The remaining studies differed from the first in terms of participants and method. Participants comprised undergraduates who wrote their descriptions of others within seven lines (Study 2), or individuals who responded to an online questionnaire on a social networking site associated with a university (Studies 3 and 4). An adapted coding scheme which included two extra categories (self-referential comments and comments focusing on the relationship) was used (Meins, Harris-Waller, & Lloyd, 2008). In the second study, young adults' mind-minded descriptions of their romantic partner and close friend were positively correlated. This was also interpreted as being in line with mind-mindedness as a trait-like quality and a facet of close relationships. In the remaining studies, in addition to a close friend, famous people and paintings were described on the basis that evidence in support of mind-mindedness as a trait would be found if mind-mindedness did not vary depending on whom was being described. Individuals' mind-minded descriptions of a close friend were found to be unrelated to those of famous people and paintings. This was argued as support for mind-mindedness being a relational construct rather than a trait-like quality.

### **3.5 Mother-centred versus relationship-centred factors**

It can also be reasoned that maternal mind-mindedness should best be viewed as a relational construct which is influenced by cognitive-behavioural traits in the mother. This is consistent with the general premise that few effects in developmental psychology can be considered "pure" and that more than one factor tends to be

involved. Meins et al. (2011) explored possible explanations for the individual differences found in mind-mindedness. In the first of two studies, they investigated whether the two indices of mind-mindedness assessed using the interactional measure, appropriate and non-attuned mind-related comments, were determined by different factors. They argued that mind-mindedness may originate in mothers' specific experiences and evaluations of her relationship with her infant. Perhaps a mother would show high levels of mind-mindedness while interacting with her child if this was consistent with her experience of pregnancy and the child's birth and early life. On the other hand, mind-mindedness might reflect mother-centred characteristics such as mothers' socio-economic status (SES) and factors assessing mothers' psychological well-being. Accordingly, they investigated mind-mindedness with a socially diverse sample of 206 mothers recruited from the community and their 8-month-old infants looking at relations with mother-centred factors versus relationship-centred factors.

The primary aim was to explore links between maternal mind-mindedness in the first year of life and factors, considered to be relationship-centred, concerning mothers' experiences during pregnancy and the birth of their child. Appraisals of pregnancy included whether the pregnancy was planned, mothers' perceptions of pregnancy, for example whether it was viewed as difficult, and complications during pregnancy. Appraisals of birth experience included mothers' memories of their first impressions of their babies, labour complications and neonatal medical conditions. Mother-centred factors included mothers' SES, concurrent depressive symptoms and the amount of psychological support perceived by the mothers to be available to them.

Regarding mother-centred factors, appropriate mind-related comments were found to be positively related to mothers' SES ( $r = .16$ ) and non-attuned mind-related comments were found to be positively related to concurrent depression ( $r = .14$ ). However, both these findings, though statistically significant, only showed small effect sizes. The overall findings led the authors to suggest that the indices of mind-mindedness were independent of mother-centred factors. This was interpreted as being consistent with the hypothesis that mind-mindedness reflects cognitive-behavioural traits in the mother due to the fact that mind-mindedness appeared not to be influenced by mothers' social circumstances or psychological well-being. However, it does not necessarily follow that mothers' mind-mindedness, in being largely immune to their social circumstances or psychological well-being, should be viewed as evidence of a trait. The methodology of this study meant that the relative



consistency and stability of an individual's responses inherent in the trait approach were not able to be fully addressed because mind-mindedness was assessed only once and with only one child per mother. The failure to find a strong relationship between mind-mindedness and mothers' perceptions of their social support or symptoms of depression, suggests that mood-related characteristics only impact slightly on mothers' mind-mindedness. Based on this evidence, this does not rule out the possibility that mind-mindedness is instead a relational construct.

Regarding relationship-centred factors, appropriate and non-attuned mind related comments were found to be associated with different aspects of obstetric history: mothers' recollections of their relationship with their children during pregnancy and immediately following birth. For example, in mothers who perceived their pregnancy as easy, those who had planned to conceive had a greater tendency to comment appropriately on their infants' internal states than those with unplanned pregnancies. Contrasting with this, there was no difference in the tendency to make appropriate mind-related comments in mothers with planned pregnancies and those with unplanned pregnancies if they had perceived the pregnancy as difficult.

Consequently, Meins et al. (2011) argued that the study provided support for mind-mindedness being a facet of the specific caregiver-child relationship. However, the relationship-centred factors were based on retrospective reports concerning mothers' pregnancy history and birth experience instead of the current mother-infant relationship. The retrospective component of the relationship-centred factors contrasts with the online use of appropriate mind-related discourse during these interactions. The relationship-centred factors might not necessarily be based solely on the relationship between mother and child but could also reflect a general tendency in the mother. For example, mothers' perceptions of whether the birth was easy or difficult might reflect a cognitive bias in the mother towards a positive or negative evaluation of an event rather than being a facet of the relationship with the infant. Overall, mind-mindedness was not conclusively characterised as relational or as a trait by Meins et al. following this particular study but was viewed as reflecting aspects of the specific mother-infant relationship and as reflecting cognitive-behavioural traits in the mother that are not highly determined by mothers' social circumstances or psychological state.

### **3.6 Potential correlates with mother and child factors**

#### **3.6.1 *Mother factors***

Maternal depression has been linked to mothers experiencing distorted perceptions of their children's behaviour (Fergusson, Horwood, Gretton, & Shannon, 1985; Field, 1992). Research into mind-mindedness has investigated whether the key symptoms of depression might have an effect on mothers' ability to accurately read their infants' internal states and respond appropriately (Lok & McMahon, 2006; Lundy, 2003; Pawlby et al., 2010; Walker et al., 2011). The participants in the Meins et al. study (2011) previously mentioned were from the general community and most reported minimal levels of depression. Therefore, when looking more closely at mother-centred factors, specifically whether women's psychological state might be linked to levels of mind-mindedness, one might expect stronger effects in a clinical population. Pawlby et al. (2010) investigated this specific issue, looking at mind-mindedness and maternal responsiveness in infant-mother interactions with a community and a clinical sample, hypothesising a link between mothers with severe mental illness (SMI) and lower levels of mind-mindedness. Healthy mothers and infants were compared with mothers hospitalised with SMI including those given a diagnosis of schizophrenia or mood disorders with depression or predominantly mania. On admission, there was a trend for depressed mothers to be less likely to make appropriate comments on their infants' internal states although this was not observed at discharge. There were also no group differences found in mothers' tendency to make non-attuned comments. Overall, scant support was found for the prediction that mothers with SMI would show lower levels of mind-mindedness. Meins et al. (2011) subsequently interpreted Pawlby et al.'s findings, that mothers with SMI are able to respond appropriately to their infants' cues, as providing support for mind-mindedness being a relational construct as mothers' psychological state appeared not to be strongly related to levels of mind-mindedness. That said, it also does not rule out the possibility that mind-mindedness is a cognitive-behavioural trait which is not influenced by mothers' psychological state or these specific conditions.

However, the existing data regarding relations between mind-mindedness and mothers' psychological state are equivocal. Other studies have demonstrated a link between maternal mind-mindedness and depression in community samples. Lundy (2003) modified the Meins et al. (2001) interactional measure coding scheme by categorising parents' comments regarding their infants into one of five categories: 1) general thought processes, knowledge or desires; 2) mental processes concerned

with task completion or problem solving; 3) emotional engagement; 4) attempts to manipulate other people's thoughts; and 5) speaking from the infants' perspective. The authors found that in an interaction with their 6-month-old infants, mothers with more depressive symptoms, measured by the Centre for Epidemiological Studies' Depression scale (CES-D; Radloff, 1977), commented less frequently on one of these categories of mind-mindedness: infants' general thought processes. It is noteworthy though that Lundy only looked at appropriate mind-related comments made by the mother and did not include non-attuned mind-related comments in analysis. Therefore, the relationship between mothers' depression and a failure in their attunement to infants' internal states was not examined. Also, out of the five mind-related categories observed, only one of these categories, appropriate thought-related comments, was negatively correlated with depressive symptoms.

Further evidence adding to the mixed findings concerning mind-mindedness and the maternal factor of depression was found in a study by Lok and McMahon (2006). This measured mothers' mind-mindedness with 4-year-old children using the representational measure and mothers' depressive symptoms using the CES-D. The authors found that mind-mindedness was modestly related to maternal depressive symptoms with depressed mothers producing a smaller proportion of mind-related comments.

Socio-demographic factors may influence how mothers talk to their children and interact with them which may then affect children's understanding of thoughts and feelings. Supporting this, mothers' education (Cutting & Dunn, 1999, Meins & Fernyhough, 1999) and parental occupational class (Cutting & Dunn, 1999) have been found to correlate with children's theory of mind performance. Consequently, research into mind-mindedness has looked at potential links with certain socio-demographic variables, in particular mothers' SES and education, often to help control for possible confounding effects when investigating whether mind-mindedness correlates with children's mentalising abilities. These findings can contribute to the discussion as to whether maternal mind-mindedness should be viewed as a cognitive-behavioural trait in the mother because if so, it should not be related to factors such as maternal education or SES. Indeed, fairly consistently mothers' mind-mindedness indexed by the representational measure (Meins & Fernyhough, 1999; Walker et al., 2011) and by the interactional measure (Meins et al., 2002, 2011) has been found not to be related to maternal education; and mind-mindedness indexed by the representational measure (Meins et al., 1998; Walker et

al., 2011) and by the interactional measure (Meins et al., 2013) has also been found to be unrelated to SES.

Interestingly though, relations between mind-mindedness and socio-demographic variables have been found in some studies. Meins et al. (2011) showed that appropriate mind-related comments in a socially diverse sample of 8 month infant-mother dyads, were positively correlated with SES, albeit with a small effect size. The authors suggested this finding meant that mothers' mind-mindedness was not strongly related to their social background. In addition, Rosenblum, McDonough, Sameroff, and Muzik (2008) found that the frequency of mothers' appropriate mind-related comments made with their 7-month-old infants was positively correlated with maternal education levels. However, a methodological issue regarding Rosenblum and colleagues' measurement of mind-mindedness might, in part, be responsible for the relationship found. Mind-mindedness was based on mothers' comments made during a 3-minute free-play episode and two 3-minute teaching tasks whereas Meins and Fernyhough (2010) advised that they have typically observed mind-mindedness during a 20-minute free play session. It is possible that some social contexts may provide more opportunities than others for the production of mind-related comments in the same way that maternal internal state language has been found to differ across contexts (Beeghly, Bretherton, & Mervis, 1986). Also, different situations, specifically task constraints, have been shown to affect the quantity and quality of mothers' speech (Gelman & Shatz, 1977). Therefore, the relationship between mind-mindedness and maternal education might have been influenced by these different tasks requiring the mothers to teach the children. In addition, the study might be less representative of mothers' mind-mindedness due to the shorter observational time period than that generally employed in research investigating mind-mindedness.

In summary, evidence so far has tended to show that mothers' mind-mindedness is not strongly or consistently related to their social background, suggesting that mind-mindedness is not being heavily or consistently governed by general social factors. Mothers' mind-mindedness could be either a maternal trait or influenced by the relationship with a particular child, regardless of their social background, occupation or years spent in the education system.

Mothers' personality and empathy have also been considered as potential maternal traits which may influence maternal mind-mindedness. Illingworth and MacLean

(2011) conducted a study with 25 mothers with children aged between 3- and 8-years-old using the representational measure of mind-mindedness. The study investigated whether maternal mind-mindedness might be an aspect of a mother's socio-cognitive style, influenced by personality factors or related to mothers' empathising ability. Maternal personality, specifically the traits of neuroticism, extraversion, agreeableness, openness and conscientiousness, was assessed using the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1991). Empathy, the intuitive ability to understand other people's mental states and to respond in an emotionally appropriate way, was investigated due to its promising commonality with mind-mindedness regarding the perception of others' internal states. Maternal empathy was assessed using The Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004). No association was found between maternal mind-mindedness and mothers' self-reported personality traits or empathy. None of the traits investigated were found to preclude a mother from being mind-minded nor to increase the likelihood of a mother being more mind-minded.

Given the mixed findings concerning whether mind-mindedness is potentially related to factors within the mother, this thesis focuses on a variable which has not been examined in previous research but, due to how mind-mindedness is defined, may be promising as a possible correlate. The literature stresses that maternal mind-mindedness refers to a mother's *ability to treat her child as a "mental agent", a tendency to treat her infant as an individual with a mind, and a tendency to use mental state terms in her speech* (Meins, 1997); and that mind-mindedness is a *tendency to use an understanding of other people's internal states to describe and explain their behaviour* (Meins et al., 2008). By definition, this focuses on mind-mindedness being a general tendency or inclination in the mother to read behaviour in light of the internal states which might be shaping this behaviour. This led to an exploration of mothers' psychological mindedness as a possible correlate of mind-mindedness. Psychological mindedness refers to mothers' tendency to think about psychological factors while explaining events and people's behaviour. If mind-mindedness is indeed a cognitive-behavioural trait, it may be part of a more general tendency in the mother to consider psychological factors in everyday life. It may be that mothers with high levels of mind-mindedness generally consider the internal states underpinning other people's behaviour. The background and development of a new measure looking at psychological mindedness will be examined in Chapter 6.

### **3.6.2 Child factors**

If maternal mind-mindedness is a relational construct, then it may be possible that child characteristics play a part in influencing levels of mind-mindedness. Looking at the field of attachment research once again, developmentalists have contended that an infant, specifically via their temperament, may shape or directly affect the type of secure or insecure attachment relationship that develops between themselves and their mother via the nature of the interactions between the child and mother (Belsky, Rosenberger, & Crnic, 1995). In a similar way, a mother's capacity to engage in accurate and appropriate mind-mindedness may be influenced by a variety of child characteristics.

The age of the child included in research may be a factor which influences mothers' levels of mind-mindedness. Studies have suggested that mothers think more about their children's minds as they age, with an increase in mothers' references to their children's mental states in interactions during their second and third years (Beeghly, Bretherton, & Mervis, 1986; Dunn, Bretherton, & Munn, 1987). For example, age-related changes in a longitudinal study of mothers' use of internal state language with children at 13, 20 and 28 months have been observed (Beeghly et al., 1986). Mothers were found to use proportionately more internal state utterances and a larger variety of internal state words with the older, more linguistically mature children. Similarly, the developmental trajectory of children's mental activity and language capability could be seen as a potential influence on mind-mindedness both in terms of the appropriateness of mental attributes produced in descriptions and mind-related comments produced in observations.

Bernier and Dozier (2003) investigated whether mind-mindedness, assessed using the representational measure, mediated the association between foster mothers' attachment state of mind and infant attachment security. Foster mothers were asked to describe their foster children aged between 6 and 30 months. The authors pointed out that during the course of the second and third years of life, children's mental activity may become more readily observable due to the developmental course of language and the emergence of symbolic play. This led to the proposal that it might not be appropriate to focus on a child's mental attributes before the age of 3 and that doing so might be negatively related to security of attachment. A negative relationship was indeed found between mothers' tendency to use mental attributes and the security of both the mothers' attachment state of mind and their infants' attachment. As an explanation for this finding, which at first appears

counterintuitive, it was suggested that when mothers described young children with a higher number of mental attributes, it might correspond with the mothers being less attuned to their child, reducing the likelihood of a secure attachment relationship. Consequently, the authors suggested that a key element of mind-mindedness, assessed using the representational measure, is whether descriptions of the child are age-appropriate.

A child factor which has been included as a control variable in mind-mindedness research is gender. Gender has been found to be associated with differences in adults' attributions and mother-child conversations with daughters and sons. Firstly, gender has been shown to affect adults' attributions of emotions to children. In a classic study by Condry and Condry (1976) where adults labelled infants' emotions, a video was shown of an infant reacting to a Jack-in-the-box, and more anger and less fear was attributed to the child labelled as a boy than the same child labelled as a girl. Secondly, parents have been found to talk about emotions differently to boys and girls and are generally more likely to speak about emotions with daughters than sons (Cervantes & Callanan, 1998; Kuebli & Fivush, 1992). For example, gender differences have been found in the content of conversations about the emotional aspects of past experiences with 30–35-month-old children in mother-daughter and mother-son dyads (Fivush, 1989). Mothers were found to focus more on positive emotions with daughters and tended not to attribute negative emotions to the child whereas with sons, positive and negative emotions were discussed equally.

It is possible that whether a mother is talking about or interacting with her son or her daughter may have an impact on maternal mind-mindedness. A lack of gender effect on maternal mind-mindedness in infant-mother interactions has been found in some studies (Demers, Bernier, Tarabulsky, & Provost, 2010a; Meins et al., 2011, 2013; Walker et al., 2011). This null finding is not universal because gender of child differences have been shown in a study by Lok and McMahon (2006) which found that mothers of female children used a higher proportion of mental attributes when describing their children than mothers of male children. If gender of child affects levels of maternal mind-mindedness, this might imply that mind-mindedness is influenced by relational factors, in particular whether the mother is talking about or interacting with a son or daughter.

Some studies have looked at the possibility that individual differences in infants correlate with maternal mind-mindedness though so far little evidence has been

found in support of this supposition. Research has shown that maternal mind-mindedness appears to be unrelated to child-centred variables such as concurrent infant behaviour (Meins et al., 2001), and cognitive ability based on standardised scales in infancy (Meins et al., 2001) as well as verbal IQ at age 4 (Meins et al., 2002). Existing research led Meins et al. (2011) to state that there was little support for infant characteristics being related to mind-mindedness, for example that mothers would be more mind-minded because their infants were more socially engaging, interactive and cognitively able. The authors argued, however, that it could be viewed as too soon to state that mind-mindedness is not influenced by child characteristics based on the rather specific infant behaviours monitored in a laboratory or how a child performs on a standardised IQ test.

Meins et al. (2011) suggested that perhaps more generalised characteristics, in particular infants' temperamental tendencies, may be more related to mothers' proclivity to make appropriate comments regarding their infants' internal states and to misread their thoughts and feelings. Temperamental tendencies may be more likely to be linked to levels of mind-mindedness than other child factors if, for example, a child consistently shows a certain type of emotional response, then a mother may be more likely to comment appropriately on the corresponding internal state. Accordingly, this thesis investigates potential contributions of children's temperament to maternal mind-mindedness. Existing research exploring links between maternal mind-mindedness and infants' temperament, and the development of an observational measure looking at temperament with preschool and primary school children will be examined in Chapter 7.

### **3.7 Summary**

It is unclear from the existing literature whether maternal mind-mindedness is a cognitive-behavioural trait, a relational construct dependent on specific mother-child relationships or perhaps both. If a cognitive-behavioural trait, mind-mindedness should be stable over time and generalisable across relationships. Research into whether mind-mindedness shows temporal continuity has been limited by different mind-mindedness measures being used across time, hampering convergent validity, or by the same measure being used longitudinally but with only a short time period between observations. Also, existing research has investigated maternal mind-mindedness in relation to only one child per mother so it has not been possible to investigate whether mind-mindedness generalises across relationships – in other words whether a mother's mind-mindedness level is similar with different children.



There is conflicting evidence concerning whether mother and child factors are related to mind-mindedness but promising factors, specifically mothers' psychological mindedness and children's temperament will be investigated as potential correlates in this thesis.

### **3.8 Research questions**

The primary research question of the thesis is to investigate the extent to which maternal mind-mindedness can be seen as a cognitive-behavioural trait related to mothers' psychological mindedness or a relational construct, dependent on specific mother-child relationships. In doing so, the overall aim was to add to our understanding of the nature of the mind-mindedness construct. Mothers with two children, of preschool and primary school age, were included to allow assessment of whether maternal mind-mindedness was similar or not with siblings. Also, in answering whether mind-mindedness generalises across families or close relationships, mothers were asked to describe either their partner or a close friend so comparisons could be made with their representational mind-mindedness with children. One section of the analyses focuses on whether the construct generalises across relationships whereas another section focuses on the temporal stability of mind-mindedness.

The literature on maternal mind-mindedness has provided scant evidence confirming that the two operationalisations of the construct, one purely representational assessed by interview, and one which also takes behaviour into account assessed by observational methods, are related. This thesis utilised both representational and interactional measures to overcome this limitation.

Four main research questions were addressed and are presented here but given the exploratory nature of the research, only one directional hypothesis was made. Greater detail about each research question and the methods used to address them are given in the appropriate chapters.

1. Should maternal mind-mindedness best be viewed as a cognitive-behavioural trait or a relational construct?

If maternal mind-mindedness is a cognitive-behavioural trait it will:

- a. generalise across relationships and not be specific to mother-child relationships, by showing consistency across interactions and in

representations of different offspring, and in mothers' representations of both their children and their partner

- b. show stability across time in one or both of the measures
- c. be independent of child characteristics, specifically children's temperament and behaviour.

2. Are representational and interactional measures of mind-mindedness related?

If maternal mind-mindedness, operationalised in different ways, is examining the same overarching construct, representational and interactional measures will:

- a. be related within time points.

Representational and interactional measures of mind-mindedness may predict each other over time. Three alternatives are addressed:

- a. Maternal representations feed into subsequent interactive behaviour
- b. Interactive behaviour feeds into subsequent maternal representations
- c. There is no relationship and representations and interactions are not predictive of each other over time.

3. Is maternal mind-mindedness related to mothers' psychological mindedness?

A prediction was made that maternal mind-mindedness reflects a general tendency in the mother to consider psychological factors when explaining events and behaviour, therefore a measure looking at mothers' psychological mindedness will:

- a. be positively related to maternal mind-mindedness in one or both of the mind-mindedness measures
- b. show stability across time.

4. Is maternal mind-mindedness related to child temperament and behaviour?

If maternal mind-mindedness is a relational construct influenced by child temperament and behaviour:

- a. one or more of the mind-mindedness measures will be related to child temperament and behaviour.

If both maternal report (representational measure) and observational ratings (interactional measure) of maternal mind-mindedness and child temperament are used it will:

- a. address whether maternal report or observational ratings of child temperament are more strongly related to maternal mind-mindedness
- b. address whether the representational and interactional child temperament measures map onto the corresponding measures of maternal mind-mindedness.

# 4

## **Methodology and methods**

### **4.1 Introduction**

This chapter provides the methodology to the study including the rationale for the longitudinal design, data collection in the home and age of participants included. The recruitment methods and selection criteria for the participants will be elaborated upon as will mother and child socio-demographic variables collected for analysis. The study used a variety of assessment techniques including questionnaire, interview, projective test and observational methods and the corresponding procedure for data collection will be described. Both existing measures and newly developed measures will be briefly introduced here but discussed in greater detail in the appropriate chapters.

### **4.2 Methodology**

The study builds on those reviewed in the previous chapter, rectifying limitations previously mentioned, in order to shed light on whether maternal mind-mindedness should best be viewed as a cognitive-behavioural trait or a relational construct. By definition, a trait should be both relatively stable across time and consistent across situations. These two core components, stability and consistency, provided the rationale for the selected methodology.

To address the first core constituent of the trait definition, the temporal stability of maternal mind-mindedness, a longitudinal methodology was chosen. Longitudinal research involves studying the same group of individuals over an extended period of time. This methodology allows changes in variables of interest to be studied over time and to allow causal interpretations to be made which is of particular benefit in developmental research. Longitudinal data have an advantage over other types of data in this ability to examine both stability and change – the two essential characteristics of development (Rajulton, 2001).

The same individuals were measured twice, over a time span considered long enough to detect change. The length of time between repeated measurement is

crucial in longitudinal research because enough time must be allowed for change to take place. Previously, research involving use of the same mind-mindedness measure longitudinally had only been carried out with a 4-month gap between time points (Meins et al., 2011). This study aimed to more thoroughly investigate the proposed temporal stability of the construct which, if found, would lend support to the view of mind-mindedness as a maternal trait, by widening the gap between time points. A longitudinal design with two time points (Time 1 and Time 2), approximately 9 months apart, was employed in order to investigate the stability of constructs. The length of time between data collection was considered long enough to help ensure that at the second visit, mothers did not remember the descriptions they gave in the representational measure of mind-mindedness at the first visit. It increased the likelihood that their descriptions would be due to active processing of representations rather than “canned responses” based on recollections of what was said previously. The length of time was also long enough to enable children to develop and change, thereby allowing for alterations in both mothers’ description of children and for possible changes in child behaviour between visits.

The cross-lagged design, with two points at which data were collected, provided an opportunity to examine associations and to begin to speculate about possible cause and effects in maternal mind-mindedness. The data gathered were to provide a clearer picture of the possible influences at work on maternal mind-mindedness.

To address the second core constituent of the trait definition, the consistency of maternal mind-mindedness across situations, mothers with two children were included for the first time in mind-mindedness research instead of mothers with one child. This allowed maternal mind-mindedness to be compared across relationships with different children. If maternal mind-mindedness is a cognitive-behavioural trait, maternal mind-mindedness should show consistency across interactions and in representations of different offspring. Mother-child dyadic relations with more than one child were investigated to explore whether maternal mind-mindedness generalises across relationships, in which case it would support mind-mindedness being a trait. Mothers’ mind-mindedness with partners was also investigated to find out whether there was consistency in mothers’ representations of both their children and their partner which would further suggest that mothers’ mind-mindedness is a cognitive-behavioural trait, and not specific to mother-child relationships. Alternatively, if a lack of consistency in mind-mindedness looking at different

relationships was found, this would lend support to mind-mindedness being a relational construct.

An important question which has been addressed in research is whether mother-child interactions observed in a laboratory provide information on interactions taking place within the home. In a study by Belsky (1980) mothers were observed with one-year-old infants twice in the context of free play in the laboratory or at home under more naturalistic conditions. Maternal functioning was found to be affected by context with mothers being more active and responsive in the laboratory than at home. Belsky questioned whether behaviour observed in laboratory research could be generalised to real world settings based on the premise that this behaviour is representative of that which occurs in more natural conditions. Gardner (2000) conducted a review into methodological issues concerning observations of parent-child interactions. She concluded that one should be cautious in making assumptions that observations made in laboratory settings will produce similar outcomes to those witnessed in the more natural environment of the home.

A home setting was considered appropriate for this study rather than conducting the research within a university laboratory. Although mind-mindedness research involving the interactional measure has used laboratory-based observations, Meins and Fernyhough (2010) state that the coding scheme is also suitable for home use. The rationale behind the use of home visits in the research reported in this thesis is that the home is a more naturalistic setting to observe play sessions from which the observational measures of mind-mindedness and temperament were taken. When mother and child play together in the home, this is viewed as a naturally occurring situation. Contrasting with this, one can argue that play in the laboratory would be less likely to generalise to everyday situations. Laboratory studies are located in a setting which is unfamiliar to participants and this may produce behaviour which is not normally observed in the home. Thus, ecological validity could be said to be greater for these measures than those taken from observations of comparable laboratory-based play sessions. Research carried out in a laboratory does benefit from greater control but external distractions were reduced to a minimum in the present study. Mothers' only task was to interact with one of their children during the observational assessment and so it was possible for them to focus solely on the child taking part in the play session.

Mothers with older children rather than mothers with young infants were included in the study for two reasons: firstly, to build upon research to date and secondly, to reduce age as a possible confounding variable. Most mind-mindedness research has focused on mothers' relationships with infants. This study instead concentrated upon preschool and primary school children to extend our knowledge of mind-mindedness while keeping broadly within the age range in which research has shown mind-mindedness to be influential. To answer the primary research question, whether mind-mindedness is a trait or a relational construct, the research design was set up to uncover whether mind-mindedness generalises across relationships and whether it is stable across time. Crucially, if a mother's mind-mindedness was compared with an infant and a child with whom it was possible to have a two-way conversation, the developmental differences in the two children's mental activity and language capability could have proved confounding. This difference might have resulted in a disparity between what was considered an appropriate comment and what was considered a non-attuned comment with an infant compared with a child with language and more transparent mental states. This consequently could have had an effect on what is determined to be representative of mothers' mind-mindedness. This provided a rationale for selecting children in the study who were older than those who have been included in most mind-mindedness research.

#### ***4.2.1 Selection criteria of the sample***

##### ***Mothers' language***

An inclusion criterion was that all mothers had to be fluent English speakers due to the linguistic component of mind-mindedness. The construct is assessed, in part, through rating maternal language. It was viewed as essential that participants should have an ability to speak English sufficient for them to be able to express maternal representations and to converse with their children without impediment. However, English was not required to be a mother's first language so mothers speaking this as a second language were included as long as they were able to speak English fluently.

##### ***Age range of siblings***

Mothers who volunteered to take part were selected on meeting the inclusion criterion of having two children of preschool and primary school age, specifically those between two and a half and ten years.

Language ability was considered a key determinant in choosing the age range of the children. It was considered essential that mothers and children were able to vocalise their thoughts sufficiently to understand one another. Regarding infants' speech, there is a marked increase in vocabulary around 18-24 months of age (de Villiers & de Villiers, 1992) and the first attempts at mental reference have been found to appear in some children's speech around two and a half years of age (Shatz, Wellman, & Silber, 1983). This growth in language ability was taken into account when deciding the youngest age to be included in the study.

Preschool and primary school children are able to express themselves through language and so have more transparent mental states than infants and are theoretically then easier to read by the mother. If infants had been included without speech, it could have been seen as a confound in that mothers would have to "mindread" to a greater extent than with children with whom they could have a conversation. The inclusion of an infant at an early stage of language development, for example approximately 18 months of age, could have been seen to increase the possibility of a mother making fewer appropriate mind-related comments and more non-attuned mind-related comments in an interaction or fewer mental attributes in a description. Also, regarding transparency of mental states, it could be presumed that a mother would have more knowledge, or at least a greater accumulated experience, of her older child with whom she shared a language than knowledge of her young infant. This difference in how much a mother knows her child could have an effect on the ease at which a child's internal states can be read, so that a mother might be more likely to produce appropriate mind-related comments with a 6-year-old child than with a 6-month-old infant. Consequently, given that an ability for both mother and child to interact using language was considered essential, the youngest age limit for a child's inclusion in the study was two years, six months. The oldest age limit was ten years because it was thought that after this age, the play session with the mother might feel artificial and self-conscious rather than a natural interaction.

### ***The target child***

To address the potential link between maternal mind-mindedness and temperament and behaviour, data for one child per mother was needed. A decision was made to investigate temperament and behaviour only with the younger siblings but not with the older siblings. It was considered that the inclusion of only one child's data per mother might potentially aid recruitment by reducing the number of questionnaires



to be filled in and consequently mothers' time commitment to the study. The younger siblings more closely fitted the age range of one of the maternal report measures chosen for the study, the short form of the Children's Behavior Questionnaire (Putnam & Rothbart, 2006). Also, a tidy-up task at the end of the observational assessment of temperament was considered more likely to elicit control-related behaviours on the part of mother and child with younger rather than older children. Therefore, all measures including those looking at temperament and behaviour were completed with the younger sibling. Dizygotic twins were able to participate in the study because it was not considered necessary for there to be a difference in age between the siblings for the temperament and behaviour measures to be recorded. In addition, an aim of the study was to investigate relations between mothers' mind-mindedness with two children rather than whether mothers' mind-mindedness varied depending on the age of the child. However, monozygotic twins were excluded. It was considered that these twins' genetic similarity might prove a possible confound by increasing the likelihood of mothers' representations and behaviour towards their children being related.

### **4.3 Methods**

#### **4.3.1 Recruitment**

Recruitment began once ethical approval was given by the Oxford Brookes University Research Ethics Committee (see Appendix A for approval letter). Two phases of recruitment were conducted, all taking place within Oxfordshire.

##### ***First phase of recruitment***

Initially, four strategies were used to recruit mothers from as wide a pool of potential participants as possible: Firstly, recruitment through Oxford nursery schools; secondly, recruitment through playgroups and music groups; thirdly, recruitment through the Oxford Brookes BabyLab database; and, fourthly, recruitment through snowball sampling.

A letter/email was sent to managers of 13 nursery schools and to group leaders of three playgroups and one music group detailing the aims of the study, along with methods of data collection, inclusion criteria and the type of assistance the organisation would be expected to provide. Information packs containing letters, participant information sheets and contact consent forms were passed out by nursery schools to mothers. Flyers and posters were also provided to playgroups

and music groups where requested. Nine nursery schools, two playgroups and one music group agreed to help with recruitment.

An email with an attached participant information sheet was sent to mothers, with two children of the appropriate age, registered on the Oxford Brookes BabyLab database. This database contains information about mothers who have given permission for Oxford Brookes to contact them about research which may be of interest to them. Snowball sampling was also a chosen recruitment strategy. Mothers who took part in the study were given a couple of letters and participant information sheets to pass on to mothers whom they thought might be interested in taking part.

### ***Second phase of recruitment***

The initial phase of recruitment had limited and disappointing success. Only four mothers had volunteered to take part: one from a nursery school and three from the Oxford Brookes BabyLab database. A few potential reasons for this may be proposed: lengthy recruitment material without imagery to read about the study; mothers may have been attending playgroups with their first child and so not have had two children; and, mothers with children in nursery schools may have been working full-time and possibly have felt less able to take part. An amendment to the recruitment strategy was deemed to be necessary. Recruitment material was then revisited to make it more participant-friendly. Also, a decision was taken to reimburse mothers for their time with a £10 retail voucher given at each home visit so that in total, mothers received £20 of retail vouchers if they took part in both phases. Ethical approval for this amendment was granted by the Oxford Brookes University Research Ethics Committee. Four strategies were subsequently used to recruit mothers: Firstly, recruitment through Oxford primary schools; secondly, recruitment through websites; thirdly, recruitment through posters; and, fourthly, recruitment again through the Oxford Brookes Babylab database.

Recruitment was conducted through primary schools using the same procedure as previously mentioned for nursery schools but with 24 head teachers being the initial contact for the study. Seven primary schools agreed to help with recruitment and of these, six gave out information packs and one advertised the study in their weekly newsletter. Information about the study was placed on two parenting websites and the Oxford Brookes website; and posters about the study were put up in Oxford Brookes campus buildings and within three organisations in Oxford. The same

recruitment procedure was followed as mentioned previously with the Oxford Brookes BabyLab database, though a different group of mothers was emailed, whose children were now in the appropriate age range but had not been for the first phase of recruitment.

### ***Recruitment summary***

In total, 32 mothers volunteered to take part who met the inclusion criteria: 18 were recruited from primary schools; ten from the Oxford Brookes BabyLab database; one from a nursery school; one from a parenting website; one from a poster; and one by word-of-mouth.

### ***4.3.2 Participants***

#### ***Overview***

Participants were 32 families from Oxfordshire, predominantly from Oxford itself and the surrounding area. Socio-demographic details were collected by questionnaire at the start of each home visit. All mothers were English-speaking, complying with an inclusion criterion for the study, with four mothers speaking English fluently as a second language. Two of the bilingual mothers and their bilingual children often conversed in a language other than English at home but were able to speak fluently to each other in English in the play sessions. The participants were predominantly from an educated, middle-class background. Mothers who had participated at Time 1 were contacted again approximately eight months later to be asked if they would take part at Time 2. The gap between visits at Time 1 and Time 2 was approximately 9 months ( $T$  in weeks = 38.50,  $SD = 2.15$ ), and ranged from 35 to 43 weeks. Sample attrition was minimal between data collection time points: of the 32 mothers who had participated at Time 1, 30 mothers agreed to take part at Time 2. Of the mothers who did not take part at Time 2, one was unable to be contacted again and one was unable to schedule a visit. Of the families which participated at Time 1 and Time 2, sixteen of them had more than two children. The number of children in each family ranged from two to six children. The mean age gap between siblings in Time 1 was 27.66 months ( $SD = 11.65$ ) and ranged from 0 (two sets of twins took part) to 56 months. In establishing the characteristics of the sample, mothers were asked if they had been separated from their children for a significant length of time (longer than a couple of months), and this was not found to be the case with any of the families.

### ***Age and gender***

Demographic characteristics of the sample in terms of mothers' and children's age and children's gender at both time points are given below.

#### ***Time 1***

The mean age of the mothers was 38.63 years ( $SD = 4.68$ ) and ranged from 24 to 45 years. The mean age of the older siblings was 75.19 months ( $SD = 14.35$ ), corresponding to 6;3 years, and ranged from 4;10 years to 9;5 years. The older siblings comprised 19 male (59.4%) and 13 female (40.6%) children. The mean age of the younger siblings was 47.53 months ( $SD = 13.54$ ), corresponding to 4 years, and ranged from 2;7 years to 6;4 years. The younger siblings comprised 19 male (59.4%) and 13 female (40.6%) children.

#### ***Time 2***

The mean age of the mothers was 39.23 years ( $SD = 4.77$ ) and ranged from 25 years to 46 years. The mean age of the older siblings was 83.90 months ( $SD = 15.02$ ), corresponding to 7 years, and ranged from 5;6 years to 10;2 years. The older siblings comprised 18 male (60%) and 12 female (40%) children. The mean age of the younger siblings was 55.63 months ( $SD = 13.23$ ), corresponding to 4;8 years, and ranged from 3;3 years to 7;2 years. The younger siblings comprised 19 male (63.33%) and 11 female (36.67%) children.

### ***Maternal education***

Mothers' level of education was included as an independent variable since it was necessary to control for the possibility that maternal mind-mindedness might be related to the amount of time a mother had spent in education. Mothers were given a score which corresponded with their highest educational level, choosing from the following categories: 1, no examinations; 2, CSEs; 3, GCSEs or O-levels; 4, A-levels; 5, further qualification, not to degree level; 6, undergraduate degree; and 7, postgraduate qualification. At the time of recruitment, a very high proportion, 93.75% of mothers ( $n = 30$ ) had achieved educational qualifications beyond school level. The distribution of qualifications for the sample at Time 1 is shown in Table 4.1.

**Table 4.1.** Mother's highest educational qualification at Time 1

<b>Educational qualification</b>	<b>N</b>	<b>%</b>
No examinations	0	0
CSEs	0	0
GCSEs or O-levels	2	6.25
A-levels	0	0
Further qualification, not to degree level	2	6.25
Undergraduate degree	12	37.5
Postgraduate qualification	16	50

### ***Socio-economic status by occupation***

The Standard Occupational Classification 2000 (SOC2000) was used to assess participants' SES. Information on both mothers' and partners' occupations was collected due to the possibility that participants could have been stay-at-home mothers or full-time students at the time of the visits and only people in paid employment can be assigned to one of the nine occupational categories in the SOC2000. Accordingly, a tenth category, "other", was available as an option on the questionnaire and this represented stay-at-home mothers or mothers in full-time education. If mothers did not have a partner, this was available as an option and labelled "not applicable" as a category. Mothers were asked to select one occupational category for themselves and one for their partners from one of the following major groups:

- 1) Manager and senior officials;
- 2) Professional occupations;
- 3) Associate professional and technical occupations;
- 4) Administrative and secretarial occupations;
- 5) Skilled trades occupations;
- 6) Personal service occupations;
- 7) Sales and customer service occupations;
- 8) Process, plant and machine operatives;
- 9) Elementary occupations;
- 10) Other.

At the time of recruitment, a high proportion, 43.7% of mothers ( $n = 14$ ) and 68.75% of mothers' partners ( $n = 22$ ) were in the highest two groups (managers and senior officials, and professional occupations). Of the mothers, 34.4% were stay-at-home

mothers and not in paid employment ( $n = 11$ ). No significant difference in occupations was found between Time 1 and Time 2, therefore only Time 1 will be reported. The distribution of occupation by mother and by partner at Time 1 is shown in Table 4.2.

**Table 4.2.** Occupation by mother and partner at Time 1

Occupation	Mother		Partner	
	N	%	N	%
Manager and senior officials	5	15.6	7	21.9
Professional	9	28.1	15	46.9
Associate professional and technical	6	18.8	2	6.3
Administrative and secretarial	1	3.1	0	0
Skilled trades	0	0	4	12.5
Personal service	0	0	0	0
Sales and customer service	0	0	0	0
Process, plant and machine operatives	0	0	0	0
Elementary	0	0	2	6.3
Other	11	34.4	0	0
Not applicable	-	-	2	6.3

In order to assess SES for each household, the highest household occupation was taken from either mothers' or partners' occupations depending on which was allocated the highest group category. No significant difference in highest household occupation was found between Time 1 and Time 2, therefore only Time 1 will be reported. The highest household occupations are shown for Time 1 in Table 4.3.

**Table 4.3.** Highest household occupation at Time 1

<b>Occupation by household</b>	<b>N</b>	<b>%</b>
Manager and senior officials	9	28.1
Professional	15	46.9
Associate professional and technical	4	12.5
Administrative and secretarial	0	0
Skilled trades	2	6.3
Personal service	0	0
Sales and customer service	0	0
Process, plant and machine operatives	0	0
Elementary	1	3.1
Other	1	3.1

#### **4.4 General procedure**

Once participants had given permission for the researcher to contact them, an initial telephone call was made so that the researcher could answer any questions the mother might have and to check that the criteria for the study were met before arranging the first home visit. Arrangements were also discussed about who would look after children while the mother was engaged in a play session with another child. All data collection took place within the home and all visits were undertaken by the researcher. Each visit lasted approximately an hour and a half. At the beginning of the first visit, after discussion of the study, mothers were asked to sign a consent form if they agreed to participate. At the end of each visit, mothers were given a £10 retail voucher to thank them for their participation and asked if they would like a DVD of their play sessions sent to them. Mothers were asked at the end of the first visit whether they could be contacted again to find out if they wanted to take part in the second time point of the study. All mothers agreed to be contacted again.

Regarding information given to participants, mothers were not explicitly told that the study was investigating maternal mind-mindedness to avoid potential bias which would invalidate the results. Mothers were told that the study was about mother-child relationships and was investigating whether mothers' descriptions of their children and their interactions were more influenced by the relationship, or by mothers' characteristics or by other things such as the child's temperament. Debriefing was carried out in stages. After each home visit, participants were given a general debrief and told that more information including specific aims would be

given after data collection had ended. After their final home visit, mothers were asked if they would like a summary of the study sent to them. This summary, including details about mind-mindedness, was sent to mothers by letter or email after all data collection had taken place. Finally, a summary of study findings was also sent later on once the data were analysed.

#### 4.5 Measures

Measures were selected, adapted or developed for the study as appropriate. All measures will be described briefly here including a short introduction to the development of new measures. Full descriptions, including a detailed development of the measures where appropriate, will be given in the relevant chapters listed in Table 4.4.

**Table 4.4.** Measures: existing, adapted and developed

Chapter	Measure	Type of measure
5	Mind-mindedness: <ul style="list-style-type: none"> <li>• Representational measure</li> <li>• Interactional measure</li> </ul>	Existing measure but enhanced coding Adapted measure for new age range
6	Psychological mindedness measure	New measure
7	Temperament and behaviour measures: <ul style="list-style-type: none"> <li>• Maternal report</li> <li>• Observational measure</li> </ul>	Existing measures New measure

#### ***Representational measure of mind-mindedness (Meins et al., 1998)***

Mothers were asked to describe their two children and their partner separately. Their answers were audio-recorded and subsequently transcribed and coded. The representational measure of mind-mindedness was devised by the authors to be used with mothers with children of preschool age and above so no adaptations were deemed necessary. However, an enhancement to the measure was developed, including a list of mental attributes and behavioural attributes, to aid consistency of coding.

#### ***Interactional measure of mind-mindedness (Meins et al., 2001)***

Mothers were asked to play with their child just as they might do if they had some free time together. A 15-minute play session was filmed with mother-older sibling



and mother-younger sibling and subsequently transcribed and coded. The interactional measure of mind-mindedness was devised by the authors to be used with infants up to the age of 12 months. This measure was used with an older age group in this study and consequently this was piloted through play sessions with three mothers and their children in order to establish whether adaptations were necessary for the new age group. Reliability of the measure was investigated with two second coders and any necessary adaptations for this older age group were made by expanding the coding scheme.

**Psychological mindedness measure**

A measure which captures mothers’ general tendency to reason or speculate in psychological terms was devised with mothers being scored by what they project onto ambiguous images. Mothers were asked to tell a story about a photograph. Two photographs were shown at Time 1 and two different photographs were shown at Time 2. The stories were audio recorded and subsequently transcribed and coded. The measure was piloted on four people, a coding scheme was written, reliability was examined through the use of a confusion matrix, and adaptations were made to the coding scheme as required.

**Child temperament and behaviour: maternal report measures**

Maternal report of younger siblings’ temperament and behaviour was measured using two questionnaires:

- *Children’s Behavior Questionnaire (CBQ)*

The short form of the 195-item Children’s Behavior Questionnaire (CBQ; Rothbart, Ahadi, & Hershey, 1994; Rothbart, Ahadi, Hershey, & Fisher, 2001) is a caregiver report measure designed to provide an assessment of temperament in children aged 3 to 8 years. This version has 94 items and 15 scales, with 13 of these scales mapping onto three factors: Surgency, Negative Affectivity and Effortful Control. Mothers were asked to rate their child on a 7-point scale ranging from 1 (extremely untrue of your child) to 7 (extremely true of your child). An option of “Not Applicable” was provided in case the child had not been observed in the situation described.

- *Strengths and Difficulties Questionnaire (SDQ)*

The SDQ is a well-validated caregiver report measure which matches onto children’s behavioural and emotional difficulties as well as strengths and prosocial functioning. Two versions of the SDQ were used in the study with the

version being sent dependent on the age of the child in question. The first was designed to be used by mothers assessing children from 4- to 16-years-old and the second, a slightly modified version, was designed to be used by mothers assessing children aged between 3 years and 4 years. Both versions have 25 items which map onto five scales with five items each: emotional symptoms scale, conduct problems scale, hyperactivity scale, peer problems scale and prosocial scale. A total difficulties score is then calculated by summing the first four subscales. Mothers were asked to rate their child on a 3-point scale depending on whether a behaviour was “not true”, “somewhat true” or “certainly true” of their child.

#### ***Child temperament: observational measure***

A 15-minute play session with the younger sibling (also used to observe interactional mind-mindedness) plus a tidy-up task, where the children were asked to tidy up the toys into a case at the end of the play session, was filmed and subsequently coded. An observational coding scheme was developed to assess the younger siblings' temperament which coded behaviour against selected temperament dimensions taken from the SF-CBQ (Putnam & Rothbart, 2006). The Laboratory Temperament Assessment Battery: Preschool version (Lab-TAB; Goldsmith, Reilly, Lemery, Longley, & Prescott, 1999) was adapted and piloted on three mothers and their children and the reliability of the measure and coding scheme was investigated.

#### **4.6 Data collection procedure**

As well as the methodological reasons regarding ecological validity, data were collected in participants' homes in order to aid recruitment and to reduce demands on families taking part in the study. It was considered that bringing two children into the university would be quite demanding both for the mothers and for the children. When a mother was involved in a play session with one child, seeing families at home meant that child care was easier with the children not involved in the play session. Also, if families had more than two children, making trips to the university might have been more problematic. The same measures were conducted to collect data using the same procedure at both time points and this process is outlined below.

**Prior to home visit:**

- Two temperament/behaviour questionnaires were sent to participants so they could fill these out at their convenience and were subsequently collected by the researcher at the home visits. If the questionnaires had not been completed in time for the visit, the researcher left a stamped addressed envelope so they could be returned later.

**At the home visit:**

The order of completion of the measures and information regarding procedure is given below:

- Mothers were asked to fill out the questionnaire in order to provide background information for the study. If any of the questions were unclear, the researcher was available to clarify what was being asked of them. The Standard Occupational Classification 2000 was taken to the home visits and if necessary was used as a reference to help allocate occupational groups.

- - for two siblings
  - for partner/close friend

To control for possible order effects, at Time 1, the order of this measure was counterbalanced for which child was described first or second so that approximately half the older siblings and half the younger siblings were the first to be described. At Time 2, it was counterbalanced across visits so that if a mother had initially been asked about her older child first, followed by her younger child, then at the next time point she was asked about her younger child first, followed by her older child. At Time 1, 15 older siblings were described first, followed by 17 younger siblings and at Time 2, 17 older siblings were described first, followed by 13 younger siblings. The partner or close friend was always described last.

- - two stories

Photographs were shown in the same sequence for all participants: two photographs were shown to mothers at Time 1 and two different photographs were shown to mothers at Time 2. The measure was developed for this study and presentation ensured that all mothers experienced the same stimuli in the same order. This consistency was to enable an investigation into potential

relations between mothers' mind-mindedness and psychological mindedness whilst reducing the likelihood that a variation in stimuli presentation might influence mothers' storytelling at each time point.

- T1  
  - 15-minute play session with older sibling enabling interactional mind-mindedness measure to be completed
  - 15-minute play session with younger sibling plus tidy-up task afterwards enabling interactional mind-mindedness measure and observational temperament measure to be completed

Mother-child interactions in the form of play sessions, allowing for the observational assessments to be carried out, were scheduled with one mother-child dyad followed by the other. A range of age-appropriate toys to be used in play sessions was brought by the researcher, with the same toys being supplied at both time points. A camera on a tripod was set up in the room and left to record. These sessions were carried out in a separate room to the researcher and the rest of the family in order to help ensure that the mother and child were able to interact without external distractions. However, occasionally if space did not permit this, the researcher sat unobtrusively in the same room as the play session. Also, when interruptions to the play sessions happened, for example when another child wanted to join in, time was added onto the recording to take this into account.

Either the older or the younger sibling participated in the play session with the mother first or second depending on availability of the child and the family's preference. To control for possible order effects, the order of play sessions was counterbalanced both within and between time points as much as possible but availability and preference took precedence. At Time 1, 16 older siblings and 16 younger siblings participated in the first play session and at Time 2, 15 older siblings and 15 younger siblings participated in the first play session.

#### **4.7 Statistical analyses**

The stages outlined in this section relate to the analysis of variables discussed later in this thesis, in Chapters 8, 9 and 10. Tests for normality were conducted on data throughout the study using the Shapiro-Wilk test. This particular test was chosen because it is quite sensitive to a wide range of non-normality even with small samples (Shapiro & Wilk, 1965), and has been found to have considerable power to detect a deviation from normality in small samples ( $N = 20$ ) (Shapiro, Wilk, & Chen,

1968). Skewness and kurtosis were investigated by converting these values to  $z$ -scores; a value above 1.96 or -1.96 was considered significant at  $p < .05$ , as recommended by Field (2009).

Depending on the outcome of this investigation into the distribution of the data, a decision was taken as to whether parametric or non-parametric analyses should be employed with each variable. Transformations of data were explored with applicable variables to investigate whether this would correct problems with normality, enabling parametric analyses to be conducted.

Descriptive statistics are displayed in tables for all variables (means, standard deviations and range). Inferential statistics focused largely on the relationship between variables. Bivariate correlational analysis is the most frequently used method of investigation in this thesis; Pearson's correlations were used when the variable was found to be normally distributed, whilst Spearman's rho test was used when the variable violated parametric assumptions. In order to avoid redundant analyses, correlation tables only report results pertinent to the specific research question. For example, correlations were carried out separately for frequency scores and for proportion scores; correlations between frequency and proportion scores were not investigated and this is displayed in tables with a dash. Effect sizes are reported throughout to account for the possibility that significant associations may not have been found due to the study's sample size. Using Cohen's (1988) conventions, effect sizes for correlation coefficients (Pearson's  $r$  and Spearman's  $\rho$ ) were interpreted as: .10 (small), .30 (medium), and .50 (large). All tests were two-tailed with a significance ( $p$ ) value of .05 unless stated otherwise. Exact  $p$ -values are reported except when  $p < .001$ . Results with a marginal significance level ( $p$ -value of just below .05) are noted. Likewise, a trend towards a significant result is noted ( $p$ -value of just above .05).

#### **4.8 Summary**

This chapter described the chosen methodology of the study, providing the rationale behind its design, incorporating its longitudinal element and inclusion of two time points, the decision to collect data in the home, and to include preschool and primary school children. A detailed description of the characteristics of the sample was given as well as how participants were recruited into the study. Both general and data collection procedures were described for the two time points. The measures outlined here will be developed in subsequent chapters in order to

determine whether mind-mindedness should best be viewed as a cognitive-behavioural trait or a relational construct.

# 5

## Measures of mind-mindedness

### 5.1 Introduction

Mind-mindedness has been assessed using a representational measure (Meins et al., 1998) and an interactional measure (Meins et al., 2001), previously described in Chapter 2, with the choice of measure used in research being related to the age of the mother's child. The representational measure was developed for use with mothers with preschool and older children, whilst the interactional measure was developed for use with infants in the first year of life. This chapter provides the rationale for the inclusion of an expanded measure of mind-mindedness, looking at the content of mothers' speech (Demers, Bernier, Tarabulsy, & Provost, 2010a, 2010b). This measure analyses the emotional valence both of what the mother says about her child and to her child.

A comprehensive account of the mind-mindedness measures which were used in this study is then provided, including the procedure and coding scheme followed and how the measures were scored. Firstly, the existing measure of representational mind-mindedness is described and the enhanced coding which was developed to aid reliability of coding. Secondly, the interactional mind-mindedness measure is described and how this was adapted to take into account the older age of the children taking part in the play sessions. Lastly, the emotional valence measure of mind-mindedness developed by (Demers et al., 2010a, 2010b) is described.

### 5.2 The emotional content of mothers' speech

The representational measure (Meins et al., 1998) and interactional measure (Meins et al., 2001) were developed to assess mothers' levels of mind-mindedness. The only qualitative indicator included in these measures assesses whether mothers' mind-related comments are appropriate in the interactional measure. Demers and colleagues (2010a, 2010b) extended these measures in order to include an assessment of the content of mothers' speech. This assesses the valence of mental attributes given in the representational measure and the valence of mind-related

comments given in the interactional measure. The quality of valence depends on whether the mental attribute or mind-related comment given is positive, neutral or negative. The authors suggested this extended measure would be beneficial for use with mothers with an increased risk of having caregiving difficulties and that negative comments may be more frequent in these populations. The focus of research has been on mothers' use of positive and negative valence, with neutral valence being of limited theoretical interest.

Demers and colleagues (2010b) investigated the association between the expanded representational measure of mind-mindedness and maternal sensitivity with adult and adolescent mothers and their 18-month-old infants. Adolescent mothers were considered to have a higher risk of caregiving difficulties. It was predicted that positive mind-mindedness would be more strongly related to maternal sensitivity than the original, non-valenced, mind-mindedness measure and that a negative relationship would be found between negative mind-mindedness and maternal sensitivity. Unlike the findings of Meins and colleagues (1998), the study failed to find a significant relationship between overall mental descriptors, assessed using the original representational measure of mind-mindedness, and maternal sensitivity. A possible reason for this could be due to different measures of maternal sensitivity being used in the two studies; Meins et al. obtained a measure of a mother's sensitivity to her child during a maternal tutoring task whilst Demers et al. used the Maternal Behavior Q-Sort (MBQS; Pederson & Moran, 1995). Yet, the valenced measure of mind-mindedness did reveal a significant relationship. Positive mental descriptors were related to maternal sensitivity so the more sensitive a mother was observed to be, the more positive mental descriptors were given about the child ( $r = .20$ ). Contrary to what was predicted, a negative relationship was not found between negative mental descriptors and maternal sensitivity, possibly due to the low frequency of negative mental descriptors ( $T = .06$ ) given overall.

Using their extended interactional measure, Demers et al. (2010a) examined whether there were any group differences in maternal mind-mindedness in adult and adolescent mothers in their play sessions with 18-month-old infants. It was predicted that adult mothers would show higher levels of mind-mindedness (whether or not comments were appropriate) and a difference in quality (whether or not the comments were positively valenced) than the adolescent mothers. Adult mothers were found to use more appropriate and positive mind-related comments than adolescent mothers. Adolescent mothers made almost no positive comments with



these constituting only 0.3% of all comments compared with 2.8% of all comments with adult mothers. Adolescent mothers made on average twice as many negative mind-related comments (10.4%) as adult mothers (5.1%) but this difference failed to reach significance. The authors argued that the study findings overall indicated that the valence of mind-related comments should be considered as an important qualitative indicator of mind-mindedness and that this might be even more salient as infants aged. This stemmed from the speculation that the mental activity of young infants may tend to be opaque due to their limited motor skills and limited ability to express themselves. This was thought to result in mothers, who struggled to see their infant's perspective, being more likely to misinterpret their infant's signals, leading to non-attuned mind-related comments. As infants age and gain increasing independence, it was thought they were more likely to have their own agenda. If a child's own agenda was perceived as contrary to the mother's, less mind-minded mothers might then express this through the negative valence of their comments.

The emotional valence measure was included in this study because it allowed a more comprehensive assessment of mind-mindedness. In this way, the study incorporated both a quantitative index (levels of maternal mind-mindedness) and a qualitative index (emotional content of maternal mind-mindedness). The study was able to examine whether not only the level of mind-mindedness changed over time or remained relatively stable but through the use of this extended measure, whether this was true also with the content of mind-mindedness. The measure was also designed to be used in the study as an additional method of assessing quality to that of appropriateness of mind-related comments. This was due to the possibility that non-attuned mind-related comments might occur far less frequently with the age range in the study than with infants, with whom it has traditionally been used.

### **5.3 The representational measure of mind-mindedness**

The representational mind-mindedness measure was developed by Meins and colleagues in 1998 using coded responses to an interview question. This was to assess representational mind-mindedness with mothers with children of preschool age and above. Therefore, the age of the children included in this study meant that the established representational measure of mind-mindedness could be used.

#### **5.3.1 Procedure**

Mothers were first informed that they were going to be asked to describe both their children and their partner or close friend. They were told that there were no right or

wrong answers to the question they were going to be asked and that they should feel free to talk about the first things that came into their head. Mothers were then asked the question: “Can you describe [name] for me?” If mothers sought guidance on how to answer the question, it was repeated that no specific type of description was required, and that the mother should talk about whatever came into her head. Mothers were asked to describe their children before they described their partner or close friend. In order to obtain separate descriptions for the children, they were asked to describe one child before subsequently being asked to describe the other child. After these descriptions had been given, the mother was then asked to describe either a partner or close friend. The mothers’ descriptions were audio recorded and later transcribed verbatim.

The socio-demographic questionnaire was completed prior to the interview in order to collect background data, and it was established during this whether the mother had a current partner. If the mother did not, she was asked to describe a close friend instead. All mothers who had partners chose to describe them rather than a close friend which meant that only two out of the 32 mothers in Time 1 and only one out of the 30 mothers in Time 2 described a close friend instead of a partner.

### **5.3.2 Coding**

The transcripts were coded for maternal mind-mindedness using Meins and Fernyhough’s (2010). Each attribute referring to the child or to the partner/close friend was placed into one of four exhaustive and exclusive categories. Due to the representational nature of this measure, precise repetitions of attributes were only coded once because repetitions were not thought to provide a more detailed description or more varied representation of the child. The manual provides information on how to code one description per mother so it was necessary to determine how to code an attribute which involved a comparison being made with the other child in the study (e.g., “she is much more reserved”, “he is more academic”, “my daughter is a bit older”). Attributes were coded solely in relation to the child who was being described in that particular interview and were not added to the coding for the other sibling.

### **Categories**

The four categories of attributes are given below.

- i. Mental

Any comment referring to the child's mental life relating to will, mind, interests, pretence, imagination, intellect, knowledge, memory or metacognition, e.g., "clever", "opinionated", "mind of his own", "thoughtful", "creative", "curious". References to the child's desires, wishes, likes and dislikes, and emotions were also coded as a mental attribute unless these related to behavioural preferences or manifestations, e.g. "she loves her brother" would be coded as a mental attribute whereas "he likes riding his bike" would be considered an indication of what the child liked doing and so would be coded as behavioural. In the same way, "he is mostly happy" would be coded as a mental attribute whereas "she is usually smiling" would be considered a behavioural manifestation of the emotion.

ii. Behavioural

Any comment referring to the child's behaviour, for example, games and activities the child takes part in and their interactions with other people on a behavioural level, e.g. "he makes jokes all the time" and "she gets involved in everything". Also, when a purely nonmentalistic interpretation was possible, this was coded as behavioural, e.g. "chatty", "aggressive", "friendly", "sporty", "naughty".

iii. Physical

Any comment referring to the child's physical appearance, age or position in the family, e.g. "she has curly hair"; "she is five"; "he's my youngest child".

iv. General

Any comment referring to the child that does not fit into the preceding three categories, e.g. "he's just great"; "she's a lovely girl".

### **5.3.3 Enhanced coding of attributes**

The original, preceding coding was adhered to but the following enhanced coding was developed to aid reliability of the measure, particularly to ensure that a mental attribute was only coded as such when a clear reference was made to another's internal state.

i. Colloquialisms

In order to code as a mental attribute, a participant needs to include a reference to another's internal state. However, by using a colloquialism, the participant has unequivocally chosen not to use a mental state term. Also, coding a colloquialism as a mental attribute would involve too much interpretation on the part of the coder. Coding needs to be conservative and defensible therefore the following colloquialisms were not coded as mental but as behavioural, e.g., "he's very into soldiers and the military"; "he's very much into computers"; "she gets that".

ii. Other people's comments and opinions

It was decided not to code the mother's reference to an attribute if a child had interrupted the description and mentioned an attribute about themselves or about another person, which the mother then repeated, e.g. "he's um... [child interjects: 'loud'] yes, he's very loud"; "[child interjects: 'scared of dogs']. You are a bit scared of dogs". It was also decided not to code the mother's reference to an attribute if she repeated other peoples' opinions, e.g., "people say he's very organised"; "the children think he's a bit mad".

iii. Qualifying comments

Comments which include a mental state term (underlined in following examples), qualify the comment so it is coded as a mental attribute, e.g., "if there's a slightly bizarre way of doing things, he'll choose the slightly off-centre"; "she's got friends whom she's known since she was born"; "he likes telling me that he loves me"; "she loves caring about other people".

iv. Enjoy

It was decided not to treat "enjoy" in the same way as if the mother had used "like" when it is coded as behavioural (e.g. "she likes to play tennis"). This is because enjoy was thought to involve an explicit reference to an internal state and therefore when used it was coded as a mental attribute, e.g. "he mostly enjoys school"; "she enjoys reading stories with me".

v. Examples of mental and behavioural attributes

To aid consistency of coding, a reference list of mental and behavioral attributes was compiled from examples given in the *T* from existing literature, and from those provided by participants' descriptions. New examples were only added to the list after agreement was reached with a second coder regarding which was the appropriate category for a given attribute. See below, for an abbreviated list of mental and behavioural attributes (for a full list, see Appendix B).

*T*

Angry	Anxious
Bad-tempered	Bored
Cautious	Committed
Confident	Conscientious
Dedicated	Deep-thinker
Determined	Empathic
Excited	Fearful
Focused	Frustrated

Good sense of humour	Grumpy
Imaginative	Interested
Knows what he/she wants	Loves other children
Loyal	Manipulative
Moody	Optimist
Rational	Self-centred
Self-conscious	Sensitive
Serious	Wants [something/to do something]
Well-organised	Wilful
Witty	Worried
Á	
Ó	
Artistic	Affectionate
Articulate	Assertive
Boisterous	Bossy
Bubbly	Calm
Capable	Charming
Competitive	Compliant
Eccentric	Encouraging
Enthusiastic	Extrovert
Feisty	Gets in big tantrums
Honest	Independent
Kind	Level headed
Light-hearted	Lively
Loud	Outgoing
Patient	Passive
Relaxed	Reserved
Sensible	Sociable
Supportive	Timid
Tolerant	Well-behaved

#### **5.3.4 Indices of representational mind-mindedness**

Two scores were calculated for representational mind-mindedness:

- $\emptyset \wedge \sim \wedge \} \& \wedge \& \wedge \wedge$

The mental attributes produced by the mother in each description were totalled to give a frequency score.

- *Úi[[[ iā} aA& !^Á*

A proportional score was then given by calculating the mental attributes as a proportion of the total number of attributes produced by the mother in each description. This proportional score controlled for differences in verbosity during the interview.

Higher scores in these measures were indicative of greater mind-mindedness.

### **5.3.5 Reliability of coding**

To establish reliability of coding at Time 1, a randomly selected 25% of mothers' descriptions of younger and older children combined (8 transcripts for both older and younger children), and 25% of mothers' descriptions of partners/close friends (8 transcripts) were second coded. The agreement between two coders was calculated using a chance-adjusted measure of agreement, Cohen's kappa. This statistic was chosen rather than an alternative such as an agreement percentage because unlike Cohen's kappa, this fails to take into account that some agreement will occur by chance. Inter-rater agreement for the assignment of a comment to the category of a mental attribute was good,  $\kappa = .80$  for children and  $\kappa = .81$  for partners/close friends.

## **5.4 The interactional measure of mind-mindedness**

The interactional mind-mindedness measure was developed by Meins and colleagues in 2001 using an observation of a mother-child play session. This was to assess interactional mind-mindedness in mothers with children in the first year of life. This meant that the children taking part in the study were older than those routinely involved in research investigating interactional mind-mindedness. The extant measure was used but with adaptations to take into account the age of the children taking part in the play sessions. The established measure used is first described below. This is followed by how the coding scheme was both adapted for the preschool and primary school children taking part in the study, and extended to aid reliability of coding.

### **5.4.1 Procedure**

The mother and child were asked to sit together in a room with a range of age-appropriate toys brought by the researcher (for photographs of the toys, see Appendix C). These included:

- 3 x Disney soft toys (Winnie the Pooh, Tigger & Eeyore)
- 3 x toy cars

- Ballerina doll
- Farm animals
- Geomag magnetic construction toy
- Lightning McQueen lorry
- Playmobil playground
- Puzzles
- Tea set
- Wooden train track and wagons

Mothers were then asked to play with their child just as they might do if they had free time together at home. They were asked to sit and play together in the area in front of the camera. They were told that the researcher would come back into the room after 15 minutes to let them know that the play session had ended. If the mother was with the younger sibling, a tidy-up task was then carried out to contribute to the observational temperament measure but this was not included in the mind-mindedness analysis. The play session was filmed throughout using a camera left in the room with the mother and child, and subsequently the mothers' speech was transcribed verbatim and coded.

#### **5.4.2 Coding**

Mind-related comments were identified in the transcripts using the procedures described in Meins and Fernyhough's *Talking to Myself* (2010). In instances when it was unclear whether the comment was mind-related from the transcript, the coding decision was made in conjunction with the video. Mind-related comments were defined as any comment that uses either an explicit internal state term referring to what the infant may be thinking, experiencing or feeling, or which involves the mother talking on her infant's behalf in the form of a dialogue.

#### **Categories**

The five categories which were used to identify mind-related comments are given below.

- Desires and preferences

Any comment referring to the child's wishes and desires, e.g. 'which is your favourite toy?'; 'what would you like to play with?'

ii. Cognitions

Any comment referring to the child's mental states, such as their thoughts or knowledge, and to mental processes, such as recognition and decision making, e.g. "what do you think that does?"; "do you remember when we went to the fair?".

iii. Emotions

Any comment referring to the child's emotions, e.g. "you're bored of doing that now"; "if you can't make it work, don't get angry".

iv. Epistemic states

Any comment referring to the child's attempts to manipulate other people, e.g. "are you teasing me?"; "you're joking".

v. Talking on the child's behalf

Any comment involving the mother "putting words into her child's mouth", e.g. "that's a sandpit, Mummy".

***Appropriate and non-attuned comments***

After mind-related comments were identified, these were then coded dichotomously as appropriate or non-attuned by observing the video of the interaction. Mind-related comments were coded as appropriate if these met at least one of the following criteria: (a) the coder agreed with the mother's interpretation of the child's internal state; (b) the comment linked the child's current activity with similar events in the past or future; and, (c) the comment clarified how to proceed after a lull in the interaction. Mind-related comments were coded as non-attuned if these met at least one of the following criteria: (a) the coder believed that the mother had misinterpreted the child's internal state; (b) the comment referred to a past or future event that was not obviously related to the child's current activity; and c) the referent of the mother's comment was unclear.

***5.4.3 Adaptations to interactional measure coding***

The interactional measure of mind-mindedness has been used predominantly with infants up to the age of 12 months. Adaptations to the coding scheme were necessary to take into account the fact that the children in the play sessions were older (between 2½ and 10 years). The child's use of language and greater comprehension necessitated these amendments. Children are generally able to talk fluently and are increasingly able to communicate their mental states at around the age of 3 years (Bretherton & Beeghly, 1982). The interactional measure, if used in the first year of life, would require far more interpretation on the part of the mother to identify appropriate mind-related comments. Ainsworth et al. (1974) noted that in the



second year of life, it is appropriate for a mother to respond to an infant's signals in terms of a compromise between what the child wants and what will be best for the child in the long term. An important point to note is that an appropriate response from the mother does not always mean that she complies with the child's wishes. This was taken into account when deciding which comments were appropriate and which comments were non-attuned in the adapted coding scheme.

In order to help clarify which comments were mind-related and which were not, as well as which comments were appropriate and which were non-attuned, the adapted coding scheme below was used as an addition to the original measure of mind-mindedness previously described.

**Comments that may or may not be mind-related**

i. Comments without completion

Sentences without a verbal completion to make the comment specific were coded as mind-related comments only if the referent of the mother's comment was clear. This occurred, for example, if mothers referred to a previous comment (what had been said before) or to a previous activity (what had occurred before). To count as a mind-related comment, what mothers were referring to with their comments had to be clear. For example:

- *Q*æ Á[ ~ Á[ Á ] Á @æã Á, ã \* ÆÖ[ Á[ ~ Á[ ^{ à^!Ñ (while mother and child were playing with a toy swing)
- Y @æ Á @ Á @ \* ÑÖ[ Á[ ~ Á ] [, Ñ
- T æ à^ Á[ Á @æã Á[ \ ^ } Ñ Y @æã [ Á[ ~ Á @ \ Ñ
- Y @æã [ Á[ ~ Á ^ ^ á Á[ Á[ Á[ Á æ ^ Á[ Á[ : @ ! Á[ ~ ÑÖ[ Á[ ~ Á @ \ Ñ (while mother and child were playing with a toy swing)
- Child: Á @ Á ã @ Á È  
 Mother: Ö[ Á[ ~ Á @ \ Ñ

If the referent was not clear, then it was } [ ccoded as mind-related. The non-specific use of "think" was in accordance with Meins and Fernyhough (p. 8, 2010). For example:

- Á } [, Á @æã ^ Á[ Á[ : ^ ÆÖ[ Á[ ~ Á @ \ Ñ
- Ö[ Á[ ~ Á @ \ Ñ Y @æã | • Á[ Á @ ^ Á @æã Á[ Á[ ã, ã Ñ  
 Á

ii. Want

“Want” was coded as mind-related if it referred to wishes or desires. For example:

- Y @ [ Á [ ~ Á ] æ Á ] æ Á ã Á
- Ö [ Á [ ~ Á ] æ Á ^ Á [ Á @ ] Á [ ~ Á ]

“Want” was sometimes used in the same way as “need” when instructions were being given and in this case was considered not to be referring to mental processes/desires of the child and was } [ c coded as mind-related. For example:

- Q [ \ Á [ ~ Á ] æ Á [ Á ] æ Á [ , ] .
- Û [ Á [ ~ Á ] æ Á [ Á [ Á @ ] } ^ È (when mother was giving instructions for building a toy).

“You want” was sometimes used as a general phrase in the same way as “one wants” and was thought not to be referring to mental processes of the child and was } [ c coded as mind-related. For example:

- Š [ \ Á [ ~ Á ] æ Á æ Á ^ Á [ ~ Á ] æ Á [ ~ Á ] æ Á (when mother was talking about how you could make any shape you wanted to make with a magnetic toy).

iii. Try

If the mother used “try” relating to a mental state requiring the child to have intention or to be involved in problem solving then this was coded as a mind-related comment. For example:

- Û [ Á ^ Á [ ~ Á ] æ Á [ Á ] æ Á ^ Á @ Á [ ~ Á ]

If the mother used “try” as a command or referred to the child’s effort, this was } [ c coded as mind-related. For example:

- Y @ [ Á ] } Á [ ~ Á ^ Á @ ] ^ Á
- Ö [ Á [ ~ Á ^ Á @ ] } Á
- Ý [ ~ Á ^ Á ] æ Á [ Á @ ] } Á @ Á ] æ Á ^ Á

iv. Pretend

“Pretend” was considered to relate directly to the child’s mental state and so was coded as a mind-related comment. For example:

- Ú [ ^ Á ] æ Á ^ Á [ Á ] [ \ Á ] Á @ Á [ Á ] ^ Á

“Let’s pretend” or “we pretend” were not considered to relate directly to the child unequivocally as it was thought that the mother may have been concentrating on her own mental state rather than the child’s and so this was coded as mind-related. For example:

- Š[ q Á ! ^ c } á Á q Á ^ æ j ^ Á æ { È Á
- Û @ Á ^ Á ! ^ c } á Á @ ^ q ^ Á @ ! ^ Ñ Á

v. Validations

Mothers validated their child’s thinking or problem solving using mind-related comments when the child performed an action which required thought or which addressed or solved a problem. For example:

- V @ Á Á [ [ á Á ^ æ j
  - Ý [ ^ q ^ Á [ Á ^ ç ^ ! È Á
  - Y ^ || Á [ ! ^ á Á ^ c Á
  - Õ [ [ á Á ^ ! ^ ç ^ ! æ & ^ È Á
  - Õ [ [ á Á @ \ ð \* È Á
- Á

vi. Comments for older age range

Some mind-related comments were more likely to be included in mothers’ speech to preschool and primary school children than to infants. For example:

- Q E ^ Á [ ^ Á ^ ! ^ Ñ Á
- Ý [ ^ Á @ [ ^ Á @ Á } ^ Á Á ^ ç j È Á (when mother suggested child selects toys for an activity).
- Y @ Á [ Á [ ^ Á ] ] [ ^ Á @ q Á [ q Á } Á @ Á @ æ Ñ Á
- Ý [ ^ Á ð @ [ ! Á ^ ç ^ ! æ j Á @ \* Á @ Á ^ Á [ ! á } q Á [ ! Á ^ c Á
- Õ [ ^ Á @ Á { ð á Á [ ^ Á ^ ç ^ ! æ \* Ñ Á
- P æ ^ Á [ ^ Á ^ ç ^ ! æ j á Á @ ^ q ^ Á [ ð \* Á Á [ Á ! , æ á Á ! Á æ , æ á Ñ Á
- Ý [ ^ Á ð @ Á ^ Á Á æ ð ^ Á @ Á @ ! ^ q Á Á } ð ^ Á @ ^ Á @ ! ^ È Á
- W j ! ^ Á [ ^ Á @ Á ^ ! ^ Ñ Á
- Û [ Á @ Á @ Á [ Á [ ^ Á & ! ] Ñ Á
- Q ^ á Á Á ^ Á @ Á ^ ! ^ ç ^ ! æ j [ ! È Á [ Á [ ^ Á ð á Ñ Á

**Comments that are not mind-related**

i. Commands

Comments which used words such as “want” or “would you like to” may sometimes have been commands and were embedded in control activities (what the mother

wanted) rather than references to the child's mental states and therefore were }[ coded as mind-related. These control activities usually involved the mother positioning the child in relation to the camera or when the mother was concerned that the toys might be broken. For example:

- Ö[ Á[ ~ Á æ ö[ Á á[ , } Á@} Ñ[ (while the mother was trying to get her child to sit in front of the camera).
- Ý[ ~ Á[ } ö[ æ ö[ Á / ^ æ á[ Á[ ö[ / Á[ ^ Ë[ (while the mother was trying to stop her child doing something which might have resulted in damaging a toy).

An exception to this occurred when an alternative was offered. This was coded as mind-related because the child was given a choice and it was not solely a command. For example:

- Ö[ Á[ ~ Á æ ö[ Á á[ , } Á / Á[ d[ Á  
Á

ii. You're/that's right

Comments such as "you're right" or "that's right" were }[ coded as mind-related because they could be viewed as positive feedback or reinforcement for a behaviour. For example:

- V[ ö[ Á á[ ö[ Á á[ ~ • ö[ } ö[ Ñ[
- Ý[ ^ æ ö[ / ~ ö[ Á á[ ö[ Á  
Á

iii. Incomplete comments

If a sentence or comment was unfinished and the referent was not known, this meant they were open to interpretation and were }[ coded as mind-related. For example:

- Ö[ Á[ ~ Á æ ö[ Á ö[ Á á[ ö[ Á á[ Ñ[
- Ý[ ö[ Á / ^ Á[ Á[ ~ Á æ ö[ Ñ[
- P[ , Á[ Á[ ~ Á æ ö[ Á[ Ñ[  
Á

iv. The use of "we"

Comments which referred to both mother and child by using "we" were }[ coded as mind-related comments. This is because the comments were not necessarily about the child. For example:

- Ý[ ^ Á[ } ö[ æ ö[ Á / ^ æ á[ Á[ ö[ ~ \* ö[
- Ý[ ^ Á[ á[ ö[ / \ Á[ ~ Á[ ö[ } Á[ ^ ö[ / æ á[ \* Ë[

v. "Need"

If a mother referred to "need" this was } [ c coded as mind-related because it referred to a physical state or an action rather than to a mental state. For example:

- Ö[ Á[ ~ Á ^ á Á[ Á[ Á[ @ Á[ ã d ÑÁ
- Ö[ Á[ ~ Á ^ á Á[ ~ á [ { ^ Á ã ÑÁ
- Ö[ á Á[ @ Á[ Á[ ~ Á ^ á Á[ Á[ • ^ Á ÑÁ
- Ö[ Á[ ~ Á ^ á Á[ Á] ã Á[ c : Á[ Á[ ], ^ ÑÁ in relation to making a swing go further out). Á

vi. "You know" as a stock phrase

If the mother said "you know" in a sentence as a stock phrase and this did not refer to whether a child had knowledge of something, then this was } [ c coded as mind-related. For example:

- Ý[ ~ Á ^ á Á[ Á[ c ^ Á[ [ á Á[ ^ c \* Á[ @ • ^ Á } Á[ ~ Á } [ ], È
- Á ^ & [ } Á[ ~ Á ^ á Á[ @ Á[ ~ Á } [ ], Á ^ & c • ^ Á [ } Á } [ ], Á @ Á[ • ^ Á @ Á[ ~ á Á ^ Á ; È Á

vii. Repeating child's speech

If the mother repeated the child's speech containing a mental state term, this was not thought to be an example of a mother spontaneously considering her child's internal state and so was } [ c coded as mind-related. For example:

- Mother: Ö[ á Á[ @ Á[ Á[ ~ Á | á Á[ á c Á[ á á Ñ
- Child: Ö[ } Á } [ ], È
- Mother: Ö[ } Á } [ ], È
- Child: Á[ á[ á[ Á[ { ^ Á } Á[ [ È
- Mother: Ý[ ~ Á[ á[ á[ Á[ { ^ Á } Á[ [ Ñ
- Child: Á[ á[ á[ Á[ á[ á[ Á[ á[ È
- Mother: Ý[ ~ Á[ á[ á[ Á[ á[ á[ Á[ á[ È \ È

viii. Role play

Mothers and children sometimes took on toys' roles while playing and mothers occasionally made mind-related comments about the toys while doing so. When a mother indirectly asked her child what s/he wanted to do, by asking what a toy wanted to do, this was } [ c coded as mind-related as it was too open to interpretation and was not clearly directed at the child. For example, when a mother and child pretended they were Playmobil people and took on characters' personas, and the mother asked her child's Playmobil toy:

- Ö[ Á[ ~ Á æ ö[ Á ^ Á [ { ^ Á \* \* • Á [ { Á @ Á @ } • Á ç ^ Á @ ! ^ Ñ Á
- Q[ Á ^ Á @ Á æ ^ Á æ á Á [ ~ Á ^ Á @ Á ^ ! • [ } È Ò ^ [ [ È V [ ~ | á Á [ ~ Á ^ Á [ ~ ! Á æ Á Á ^ Á  
• ^ ! ç æ ^ á Ñ Á

**Classifying mind-related comments as appropriate/non-attuned**

i. Solo/collaborative play

Due to the age of the children, it was not expected that the mother would always focus on what the child was doing to the exclusion of being involved in the play session herself. Mothers sometimes chose to play with toys themselves rather than being involved in collaborative play. This was not thought to imply that the mother was by definition non-attuned to her child. While deciding on whether the comment was appropriate, it was important to have a sense of how the mother and the child reacted to and listened to each other. When the mother asked the child whether they wanted to become involved in a new activity and the child was already actively playing, this was coded as appropriate or non-attuned depending on the particular instance. Examples of appropriate and non-attuned mind-related instances are given below.

Q[ ] ! [ ] ! ä æ ^ Á ä á È ^ | æ ^ á Á [ { { ^ } • Á

If the mother was playing with one toy, while her child was playing with another toy, if she asked the child a question about her toy, this was coded as appropriate. For example:

- Ö[ Á[ ~ Á @ Á @ Á [ / ! • Ñ Á (while building train track while child was playing with something else).
- Š[ [ \ È æ ä ^ Á Á [ ~ Á ^ ! Á @ Á æ \ È @ @ } ^ Á [ ~ | á Á [ ~ Á [ Á ] Ñ

If the mother asked her child to come back to the toy they were both constructing as the child had moved on to play with another toy rather than helping to finish what they had started, this was coded as appropriate. For example:

- P ^ @ È @ á Á æ ^ Á @ [ ] Á ~ È @ á Á æ ^ Á [ ~ Á æ á Á @ Á } ^ È Á

P[ ] È æ ^ Á ä á È ^ | æ ^ á Á [ { { ^ } • Á

If a mother appeared to have her own agenda for play, rather than taking into account her child's wishes, then this was coded as non-attuned. For example, when a child was actively engaged in playing with a toy and it appeared the mother may want to play with another toy:

- Mother: Ú@#|Á ^Á[ Á[ { ^c@ \*Á|•^ÑÁ  
 Child: P[ Ë  
 Mother: Ö[ } ¢Á[ ~Á æ ¢Á Á^ Á@Á ~: |^•ÑÁ  
 Child: P[ Ë

ii. Child's level of involvement

If the child did not look too involved in playing with the current toy, then if the mother asked if they wanted to do something else, this was coded as appropriate. For example:

- Y æ ¢Á Á[ Á[ { ^Á [ / ^Á |æ \*! [ ~ } áÑ (while child was playing with another toy without focus).

iii. Previous knowledge of child

The mother had previous information about the child and this meant that comments could be coded as appropriate because of this level of knowledge. The mother might know that her child would be upset if s/he did not get to play with other toys. So, if the mother suggested that the child wanted to become involved in a new activity when already actively engaged in playing with something else, this was coded as appropriate given prior knowledge. For example:

- V@ / ^Á @Á | ¢Á Á ^Á @ / ^Á áÁ [ ~ Á ã @Á ^Á æ Á [ ~ Á [ } ¢Á ^Á |æ Á ~ ¢Á Á [ ~ Á @ { ËÖ [ Á [ ~ Á æ ¢Á Á^ Á } Á |æ ã \*Á ~ ¢Á } ^Á | Á [ ~ Á æ ¢Á Á  
 • [ { ^c@ \*Á|•^ÑÁ

iv. The use of "no"

Mind-related comments were coded as appropriate even if a child responded with a "no" to the mother's comment if it appeared appropriate to the observer. For example:

- Mother: Á[ ~ Á @ | Á @ Á ^Á ã @Á |, Á ç^i?  
 Child: Á [ .  
 • T [ c@ / Á @ Á } Á ~ Á Á æ ^Á Á [ ~ Á @ |?  
 Ô @ Á [ Ë

v. Tangential conversations

The ability of the child to converse meant that the mother could make mind-related comments which could be coded as appropriate, even if not linked directly to the current activity, because they were linked verbally. Conversations between the

mother and older child meant that tangential comments were more likely to occur than with a mother and young infant. For example, a child mentioned that a Playmobil toy had bare feet because of a sandpit. Later on, the mother noticed there was a toy sandpit and said:

- You know you said a clever thing because you said the little boy’s got bare feet because he was in the sandpit and then I saw there was a real sandpit. I didn’t see that, did you?

### **Counting comments**

While counting up the number of comments produced by the mother, if alternative mind-related comments were given, then this was coded twice and counted as two comments. For example, comments are divided up below by the use of “or”:

- Ö[ Á[ ~ Á æ ö[ ^ Á Á @. Á[ ~ Á @. Á Á ] ^ } Á Á ! Á [ Á[ ~ Á @ \ Á[ ~ Á æ Á [ / \ Á Á ~ d V Á
- Ö[ Á[ ~ Á æ ö[ Á æ i ~ Á } Á | æ ä \* Á ä @ Á } ^ Á ! Á [ Á[ ~ Á æ ö[ Á Á { ^ c @ \* Á  
^ | . ^ Ñ Á

### **5.4.4 Indices of interactional mind-mindedness**

Two scores were calculated for interactional mind-mindedness:

- $\emptyset: ^\wedge \sim \wedge \} \& \wedge \& [ \wedge \wedge$

The appropriate and non-attuned mind-related comments produced by the mother in an interaction were totalled to give a frequency score for each type of comment.

- $Ú[ ] [ / \text{ä} \} \text{ä} \& [ \wedge$

A proportional score was then given for both by calculating the total number of mind-related comments as a proportion of the total number of comments produced by the mother in each interaction. A vocal comment was identified using the definition set out by Meins et al. (2001) which states that a comment is a discrete sound, single word, or a longer utterance in the form of a sentence.

The proportional score controlled for differences in verbosity during the play session.

Higher scores in appropriate mind-related comments were indicative of greater mind-mindedness.

### **5.4.5 Reliability of coding**

To establish reliability of coding at Time 1, a quasi-randomly selected 19% of mothers’ interactions with older children and younger children (6 transcripts for both older and younger children) were second coded. Mothers’ interactions were only



able to be included with one child but not with both children so that 12 different mothers were included during second coding. The raters achieved perfect agreement on which comments were mind-related. Due to the small number of non-attuned comments observed, the researcher showed recordings of these comments to a second rater and disagreements were resolved by discussion.

## 5.5 The emotional valence measure of mind-mindedness

The representational and interactional measures of mind-mindedness were adapted by Demers et al. (2010a, 2010b) to take into account the emotional valence of mothers' mentalistic descriptions and mind-related comments in an interaction.

### 5.5.1 Coding

Coding was based on Demers et al. (2010b) for the representational measure and on Demers et al. (2010a) for the interactional measure. In addition, a coding manual (Demers, n.d.; J. Laranjo, personal communication, May 31, 2012) was used after the sections concerning valence were translated from the French into English. An indicator of the quality of valence (positive, neutral, negative) was assigned to each mental attribute or mind-related comment. The valence of some mental attributes was more open to interpretation than others. With these attributes, if the context did not make it clear that the valence was positive or negative, the attribute was coded as neutral. For example, "sensitive" was coded as neutral unless a mother used a positive quality of valence such as "he is sensitive to other people's feelings", or a negative quality of valence such as "she is too sensitive to criticism". In the case of mind-related comments, the classification of valence was based on the comment itself and on the context and mothers' tone of voice.

Examples for both measures can be seen below.

*Ü^J !^•^} œœ} œÁ ^œ ~ !^Á*

- Positive: e.g. "bright"; "good sense of humour"; "imaginative"; "loving"
- Neutral: e.g. "quite cautious"; "emotional"; "scared of dogs"; "knows how to do things"
- Negative: e.g. "manipulative", "stubborn"; "neurotic"; "stroppy"

*Qc'œœœ} œÁ ^œ ~ !^Á*

- Positive: e.g. "you're so clever"; "oh, that's a good idea"; "a good choice"
- Neutral: e.g. "which colour do you like?"; "do you want me to hold that for you?"; "who do you think is the hungriest?"

- Negative: e.g. “you’re jealous because I’m better than you”; “your concentration is awful”

### 5.5.2 Indices of valence

Two scores were calculated for the valence of representational and interactional mind-mindedness.

*Representational mind-mindedness*

- *Frequency score*

The number of positive, neutral and negative mental attributes given by the mother in a description were totalled to give a frequency score for each quality of valence.

- *Proportional score*

A proportional score was then produced by calculating the total number of each quality of valence as a proportion of the total number of mental attributes given by the mother in each description.

*Interactional mind-mindedness*

- *Frequency score*

The number of positive, neutral and negative appropriate and non-attuned mind-related comments given by the mother in an interaction were totalled to give a frequency score for each quality of valence.

- *Proportional score*

Where applicable, a proportional score was then produced by calculating the total number of quality of valence as a proportion of the total number of each type of mind-related comment (appropriate or non-attuned) given by the mother in an interaction.

### 5.5.3 Reliability of coding

To establish reliability of coding valence of the representational measure at Time 1, a randomly selected 19% of mothers’ descriptions of younger and older children combined (6 transcripts for both older and younger children), and 19% of mothers’ descriptions of partners/close friends (6 transcripts) were second coded. Inter-rater agreement for the assignment of the quality of valence of a mental attribute was good,  $\kappa = .84$  for children and  $\kappa = .79$  for partners/close friends.

A quasi-randomly selected 19% of mothers’ interactions with older children and younger children (6 transcripts for both older and younger children) were second

coded for the quality of interactional valence at Time 1. It was possible for mothers' interactions to be included with only one of their children which meant that the valence of 12 different mothers was second coded. The raters achieved perfect agreement on the assignment of the quality of valence of a mind-related comment.

## **5.6 Summary**

Representational and interactional measures of mind-mindedness have been used in the study with either an extended or adapted coding scheme to aid reliability and, in the case of the interactional measure, to take into account the age of the children taking part. The valence measure of mind-mindedness was used to enable not only the level but also the emotional content of mothers' mind-mindedness to be examined.

# 6

## **The psychological mindedness measure**

### **6.1 Introduction**

Scant evidence has been found so far linking mother factors to maternal mind-mindedness. If viewed as a cognitive-behavioural trait, maternal mind-mindedness may be part of a mother's general tendency to think about other people with reference to their internal states. In this thesis, mothers' tendency to consider psychological factors when explaining events and other people's behaviour is referred to as their psychological mindedness. This chapter provides the rationale for, and development of, a new measure looking at mothers' psychological mindedness and its potential links with maternal mind-mindedness. The procedure, coding scheme and scoring of the measure are described in full.

### **6.2 Rationale for the psychological mindedness measure**

Meins and colleagues suggested that mind-mindedness should not be regarded as an index of a person's "underlying competence in mentalizing abilities" (2008, p. 147). Instead, mind-mindedness has been described as a person's proclivity, propensity or tendency to think about others' internal states and to use an understanding of these states to explain others' behaviour. Mind-mindedness is suggestive of a psychological process rather than an intellectual task. The more general tendency to consider psychological factors might be related to mind-mindedness if it helps to account for the likelihood that mothers attribute mindful intentions to their children.

One study which assessed mind-mindedness in children provided promising information on whether a general tendency to think about others' internal states might be related to mind-mindedness. Meins et al. (2006) investigated relations in 7- to 9-year-old children between children's use of internal-state talk in two tasks, a book narration and a "describe-a-friend" task, and their theory of mind performance. The book narration task involved children narrating a wordless picture book. The experimenter introduced the main storyline and characters and the child was then asked to tell a story, picture by picture, about the book. Children's narratives were

placed into categories including one comprising internal state comments referring to the characters in the story. The describe-a-friend task was adapted from Meins et al.'s (1998) maternal mind-mindedness interview. Extra questions were added to this interview to elicit children's descriptions about their best friends but the coding scheme remained the same as the standard measure. An interesting finding was that children's proportional use of internal state language while telling a story and describing a best friend was strongly related ( $r = .67$ ). This led the authors to suggest that children's tendency to focus on people's internal states when describing and interpreting their behaviour generalises across contexts. It could be said that the same effect might well be found in adults. Additionally, mind-minded descriptions of friends and use of internal state language in narrations were found to be unrelated to the children's theory of mind abilities. While a clear distinction between a proclivity and an underlying cognitive competence is hard to establish, this suggests that mind-mindedness is likely to be a proclivity rather than an ability to attribute mental states to others.

In investigating mothers' mental state talk with children, stand-alone photographs have been used to elicit mothers' storytelling instead of a sequence of photographs as used by Meins et al. (2006). As part of a literature displaying a similar focus to that of mind-mindedness research, Taumoepeau and Ruffman (2008) investigated longitudinal relations between maternal mental state talk and children's mental state language and emotion understanding. Participants included 74 mothers and infants aged 15, 24 and 33 months. Mothers' talk about specific mental state terms was examined using a picture book task which included photographs of people with either children or animals. Mothers were asked to describe the pictures to their children as if they were at home reading them a story. Coding of mental states in these stories followed general criteria set by Bartsch and Wellman (1995) and Ruffman, Slade and Crowe (2002). Mental state utterances were expressed as a percentage of the total utterances to control for verbosity. The authors found that mothers' talk about thoughts and knowledge increased as their child got older (between 15 and 33 months) but that talk about desires and emotions remained relatively stable. Mothers' talk with their infants at 24 months about emotions, desires, and thoughts/knowledge, were all found to predict children's social understanding at 33 months.

A measure was required to examine mothers' psychological mindedness; whether mothers had a general tendency to reason or speculate in psychological terms and

to use mental-state explanations in interpreting or explaining others' behaviour and motivations. In searching for a suitable measure, the existing concept of psychological mindedness and its associated measures, at first appeared to have potential. Psychological mindedness has been defined as "a form of metacognition: a predisposition to engage in metacognitive acts of inquiry into how and why people behave, think, and feel in the way that they do" (Grant, 2001, p. 8). However, this concept originated in the psychoanalytic literature and is also defined as the "capacity to achieve psychological understanding of the self and of others" (Hatcher, Hatcher, Berlin, Okla, & Richards, 1990, p. 308). Clinicians have considered that a person's prospects for successful psychoanalytic treatment would be improved if they were psychologically minded (Taylor, 1995). The psychoanalytic basis to psychological mindedness, with its focus on assessing patients' suitability for therapy, meant that related measures were not chosen to investigate mothers' psychological mindedness in this study. The emphasis on self-awareness and a willingness to access one's own feelings was seen as not equivalent to an individual's general tendency to focus on other people's internal states.

### **6.3 Development of the psychological mindedness measure**

#### **6.3.1 Background to the measure**

Due to the lack of a suitable measure of individuals' tendency to impart mental states to other people, a new measure and coding scheme were developed for this study. In order to extend previous research by Meins et al. (2006), a storytelling paradigm was chosen. However, the narration task used by Meins and colleagues was not replicated but instead was adapted for the study. A book including pictures portraying the full story was considered unsuitable for adults. Nor was the task developed by Taumoepeau and Ruffman (2008) chosen because even though mothers told stories about stand-alone photographs, these were tailored to their children. It was therefore necessary to develop an alternative set of stimuli which would reduce constraints on mothers' responses in their storytelling. The new measure needed to mirror the openness of the mind-mindedness interview measure which stems from an open question, where individuals are free to say whatever they like in their descriptions of others.

A projective technique was chosen as a method of accessing mothers' tendency to think of others' internal states through their interpretations of a set of stimuli. Projective techniques use ambiguous stimuli with the items in projective instruments allowing for open-ended responses. The projective hypothesis (Frank, 1948)

provided the rationale behind these techniques, proposing that respondents project aspects of their personalities while making sense of the stimuli. The ambiguity of the stimuli stands in contrast to standardised tests. It is how the respondent constructs their own meaning which is of interest. Respondents are asked to interpret the stimuli and these interpretations are thought to reveal aspects of the individual's personality (Pervin et al., 2005). Most projective techniques permit participants considerable flexibility in the nature and, sometimes, the number of responses to the stimuli (Lilienfeld, Wood, & Garb, 2000) and this was thought to reflect the openness of the representational mind-mindedness measure.

This led to an examination of thematic apperceptive techniques, which are methods used to elicit and interpret stories told about pictures (Teglasi, 2010). The Thematic Apperception Test (TAT) has been classified as a projective instrument whereby an individual "projects" their unconscious motivations and attitudes by telling a story about ambiguous stimuli. This was selected to be the chosen projective technique to access mothers' psychological mindedness in this study. Morgan and Murray developed the TAT in 1935 using a selection of cards showing ambiguous situations. Participants were asked to tell a story about the characters in the pictures. When a story was told about these pictures, this was considered to be "an *ad hoc* task requiring the interpretation of the pictured cues to discern characters' motives, intentions and expectations" (Teglasi, p. 2). The TAT and its predecessors have been widely used by clinical psychologists (Watkins, Campbell, Neiberding, & Hallmark, 1995) as well as in the study of motivation (McClelland, Koestner, & Weinberger, 1989), needs (McClelland, Ross, & Patel, 1985) and defence mechanisms (Cramer, 1991).

Accordingly, a projective measure was devised with mothers' psychological mindedness being scored by what they projected onto ambiguous images. The four images selected for the study were all full-colour photographs and included pictures of people in various settings (see Appendix D for photographs). Participants were asked to tell a story about each photograph. This narrative approach was somewhat different to a snapshot description of a picture as it allowed the participants maximum scope to elaborate on the image before them. Photographs were selected to give a range of ages and to incorporate both genders in order not to limit participants' interpretations of the people pictured. The measure focused on the extent to which the storyteller referred to the mental lives of the people in the story (the protagonists). The protagonists were defined as any person who took part in

the participant's story, including those pictured in the photographs as well as other people who were mentioned. The measure was concerned with references to the protagonists' mental properties at the level of belief, thinking and intent. It looked at participants' spontaneous cognitive and emotional perspective taking in that it assessed their tendency to make inferences about what the protagonists in the story were thinking and feeling.

The coding scheme and scoring procedure was adapted from that developed by Meins et al. (1998, 2001) and Meins and Fernyhough (2010). Mental-state explanations and mind-related comments and descriptions were thought to provide information about the protagonists' mental lives. This was contrasted with non mind-related comments relating to the protagonists, which focused at a behavioural, physical or general level of description. Detailed information about coding is provided later in this chapter. As such, it was then possible to establish the extent to which the participant referred to mental states in their representations of other people.

The measure was piloted on four people and the coding scheme was developed and adapted where appropriate. Additions to the coding scheme continued throughout the process of coding the transcripts. This addressed any issues which had not arisen in previous stories and helped ensure the coding scheme was both extensive and grounded in the transcripts. The psychological orientation of a researcher may influence how a participant's talk is analysed (Degotardi, Torr, & Cross, 2008). Consequently, a conservative approach was taken to coding when deciding whether a participant had used mental state language about the protagonists. This was to reduce subjective interpretation on the part of the coder as much as possible and to help ensure that a psychological component was not attributed to the protagonist when none was given. It could be argued that the unit of analysis in coding participants' spontaneous talk might suffer from coder subjectivity regarding when one code ends and another begins. This could lead to issues of poor inter-coder reliability. To aid consistency between stories and between raters, the coding scheme also included a detailed explanation as to how the stories should be divided into units of analysis.

### **6.3.2 Procedure**

Mothers were presented with two photographs at Time 1 and two different photographs at Time 2, with each photograph shown individually. At each time



point, a photograph was shown with one person and another photograph was shown with more than one person to enable a social situation to be represented. At Time 1, a group photograph of four young adults (two males, two females) and a photograph of a young boy was shown. At Time 2, a photograph of two elderly people (one male, one female) and a photograph of one adult was shown.

To introduce the measure, the researcher told the participant that they were going to show them two photographs and that they would like the participant to tell them a story about each picture. In order to reduce potential anxiety, participants were told that it was up to them how short or long each story would be. They were told that the story could include a beginning, middle and end but that this was just a guide to what a story might be. They were then shown the first photograph. When the participant had finished telling the first story, they were then shown the second photograph and asked to begin their story. When the participant had finished telling the second story, the researcher thanked them for the stories and informed them that was the end of the task. Participants who had difficulty in telling the story were reassured that the task was not looking at creativity and that they could say whatever came into their heads. At this point, if participants were still unable to provide a response, a final prompt was given that they could say whatever they wanted to say in their stories. Therefore, any instructions given encouraged participants to tell their stories without these narrations being influenced by the researcher.

The mothers' stories were audio recorded and later transcribed verbatim. The story was coded in its entirety, but the focus of the analysis was on the people who took part in the story rather than general descriptions given by the participants of what they noticed in the photograph, for example, the scenery or the weather.

### **6.3.3 Coding**

The transcripts were coded for psychological mindedness using the following coding scheme adapted from Meins et al. (1998, 2001) and Meins and Fernyhough (2010).

Protagonists were defined as all the people who participated in the story and not just those pictured in the photographs, for example:

- ~~Someone~~ (pictured in photo)
- ~~Others~~ (pictured in photo)

- **W** [ pictured in photo) ]
- **P** [ mentioned in story, but not pictured in photo) ]
- **V** [ mentioned in story, but not pictured in photo) ]

#### 6.3.4 Categories

Each reference to the protagonist was placed into one of the following two exhaustive and exclusive categories. The category depended on whether the comment referred to either the protagonists' mental lives (Category A) or whether non mind-related comments, focusing at a behavioural, physical or general level, were given (Category B). In examples of coding, all words which were instrumental in deciding the category of coding can be seen below in bold. Examples of exceptions are given to help clarity and consistency of coding.

##### *Category A: Mental-state explanations and mind-related comments/descriptions*

Category A included mental-state explanations and mind-related comments and descriptions about protagonists. These included:

##### i. Cognitions

Any comment referring to protagonists' mental life, relating to will, mind, interests, pretence, imagination, intellect, knowledge, memory and metacognition.

The following comments are examples of adjectives relating to cognitions:

*... was **conscious** of ...*  
*... **was** aware of ...*  
*... **was** thinking about ...*  
*... **was** aware of ...*

The following comments are examples of verbs relating to cognitions:

*... **thought** about ...*  
*... **was** aware of ...*  
*... **was** aware of ...*  
*... **was** aware of ...*

Examples of coding:

- **P** **tried** to figure out how to unlock ...
- **V** **decided** to lie down
- **V** **was dreaming** of ...
- **V** **was distracted** by ...
- **P** **was engrossed** in ...
- **V** **was sharing** that moment with ...

Á

##### ii. Desires, wishes and preferences

Any comment referring to protagonists' desires, wishes and preferences such as:

Sā ^Éā |ā ^É| ç ^É| æ dā ā @| / ^ ^ |Éæ| ~ |ā Éæ Éæ qÁ æ áÉ

Examples of coding:

- T [ / ^ Á ~ • Éæ ^ Á } Á @ Á @ ^ ÁikedÉ
- Ú @ ÁwishedÁ @ Á [ { ^ } é| ~ |ā Áæ é| / ^ ç ^ |É

(Exceptions:

Any comment referring to a protagonist's likes and dislikes which refer to behaviour, and merely indicate what a protagonist likes doing or what s/he does a lot, were coded as non-mental (Category B).

Example of coding:

- P ^ Álikes to run around.

However, if 'love' or 'enjoy' were used, these were viewed as mental due to the emotional element involved.

Examples of coding:

- P ^ Áreally loved to play , æ @ Áæ qÁ @ } ^ É
- Ú @ Áparticularly enjoyed playingÁ æ @ ~ { { ^ qÁ @ } ^ É Á

iii. Emotions

Any comment referring to protagonists' emotions (but not behavioural manifestations of emotions) such as:

Pæ Á } [ ~ \* @ Á á Á ] É @ É [ / { } É ^ | - É } • é ~ • É @ } ^ É æ É & æ ^ á Éæ æ É ~ | É \* / ^ ~ | É ^ | q ~ • É ^ | { } ^ É d ^ • • ^ á É [ [ á ^ É Á Á [ [ á É æ Á [ [ á É d [ ] ] ^ É ^ q \* Á á á ~ | d [ / | | á á É q ~ • É æ ^ á É } ~ • ^ á É ç æ á É [ • • É æ q ^ á É ~ | ] | á ^ á É á á \* ~ • ç á É [ / ^ á É } \* ^ É æ Á { } ^ | ^ á É | ç q \* É } ç } d [ [ á Á ^ ] • Á Á @ { [ ~ | É & æ \* É } • æ ^ æ É æ q ~ | æ ^ É

Examples of coding:

- V @ ^ Ámanage to calm downÉ
- V @ ^ q ^ Áfeeling the most amazing sense of freedomÉ
- P ^ q ^ Áfed up with watchingÉ
- P ^ Á æ Áfeeling lonelyÉ
- V @ ^ Áhad a lot of fun dancingÁ @ Á á @ æ æ É

Á  
Qæ á á } æ | q ç Á @ / ^ á Á } @ } & | á q \* Á

i) Adverbial mental state reference

The use of adverbs sometimes modified or gave more information about a behaviour which meant it was treated as a mind-related comment.

Examples of coding:

V@^Á ^i^**happily playing** ã Á@Á æ\ Ë

V@^Á ^i^**contentedly looking** Á@Á ^ Ë

ii) Protagonists' speech

When a protagonist spoke in a story, the content of the speech, not the action of talking was coded. This meant that if a protagonist talked about the mental state of another protagonist, it was coded as mental.

Example of coding:

- Pã Á@Á ^i^] Á æ ã \* Á@ Á @ Á [ } Á [ ^ **Want to play** } Á@Á, ã \* • Á

**Category B: Non mind-related comments**

Category B included all other comments about protagonists (i.e. non mind-related comments, comprising references to behaviour, and physical and general attributes). These included:

i. Behaviour/action

Any comment referring to the behaviour of, or action by, a protagonist which did not include a mental component.

Examples of coding:

- V@^ **headed off** Á Á@Á ã Á Á@Á æ\ Ë
- V@^ **got married** Ë
- P^ **camped** Á ç^i; ã @ Ë
- Pã Á@Á ^i^ **playing cricket** Ë
- U)^ Á Á@ { **noticed** Á [ { ^c@ \* Á Á@Á ^ Ë

ii. Behavioural descriptions

Any comments referring to behaviour, activities and interactions with others on a behavioural level and when a purely non-mentalistic interpretation was possible such as:

Šã ^i^ Ë æ ã ^ Ë @c Ë [ ã c | [ ^ • Ë \* ^ • • ã ^ Ë æ • ã ^ Ë / a } ã ^ Ë ^ d æ ^ ã Ë [ ^ c [ ã \* Ë æ \* @ Ë @c 'à [ Ë ] [ i c Ë ^ | Ë æ ã ^ Á @c ^ Ë ã || Á Á } Ë

Examples of coding:

- P^ Á@Á ^i^ } Á ^i^ **naughty** Á [ ^ Á á ^ ã Ë
- Ú@Á æ Á [ c Á **fun** Ë

(Exceptions:

Comments about a protagonist being funny would be coded as mind-related (Category A), if they referred to their sense of humour rather than their behaviour.

Example of coding:

- *P^A\_ æ Á really funny, knowing exactly how to make his mother laugh*

iii. Behavioural manifestations of emotions

Any comment referring to emotions that could be interpreted on a purely behavioural level such as:

*Q\_ æ • Á { æ \* É æ ~ á á | ^ É*

iv. Perception

Any comment referring to perception such as:

*Ù ^ Á æ \* É æ & @ \* É [ | \ æ \* É æ c } æ \* É [ ~ & @ \* É æ æ \* É*

v. Physical states

Any comment referring to physical states such as:

*V á ^ á É @ } \* i ^ É*

Examples of coding:

- *V @ ^ Á ^ / ^ } *feeling particularly well**
- *P ^ Á æ Á ^ æ \* Á [ / ^ Á æ á Á [ / ^ Á *ired**  
*Á*

vi. Physical descriptions

Any comment referring to physical descriptions such as physical appearance, age or position in family.

Examples of coding:

- *P ^ Á æ Á *only child**
- *Ù @ Á @ Á *short blonde hair**

vii. General descriptions

Any comment about a protagonist that did not fit into the preceding mind-related, behavioural or physical categories.

Examples of coding:

- *P ^ Á æ Á *lovely**
- *V @ ^ Á ^ / ^ Á *students at the university**

### **Comments that were not included in analysis**

Comments that did not relate directly to the protagonists in a story were not included in analysis. These included:

i. General descriptions and events

Examples of coding:

- *V@Á~}Á æÁ @ ã \*ÉÁ æÁÁ [[ áÁæÉÁ*
- *QÁ æÁ@Á^\*ã}ã \*Á-Á@Á~{ { ^/Áæ áÁ&@ [ /Á@ÁÁ•Á} á^áÉÁ*
- *QÁÉ ^/æÉ@/ ^q^Á [ Á-Á ] ^} Á [ æ•Á / Ái^Á } \*ÉÁÁ*
- *V@Á&^} ^Á æÁæ æã \*Áæ áÁ@/ ^Á æÁÁ, á { ã \*Á [[ /Áæ áÁæ\*^Á æá^} ÉÁ*  
Á

ii. Passive voice

Any comment referring to protagonists in a story when they were given the passive voice were not included because these did not relate directly to the participants' internal states or behaviour.

Examples of coding:

- *Òç^} c æ^ Á@Á [ /æ^ **are called**ÉÁ*
- *V@^ç^ æ^ **been righted**ÉÁ*  
Á

**6.3.5 Unit of analysis**

Stories were divided into separate codes and these are shown below through the use of '/' between codes.

The following examples are given to clarify how stories were divided into codes with the relevant coding being shown as follows:

- Category A
- Category B

i. Adjective and noun

Sentences may be coded using descriptions concerning protagonists and may be coded by adjective and noun.

Examples of coding:

- He was an **older** **boy** = 1 code
- V@/ ^Á æÁ **little** **young**Á = 2 codes
- He was a **genius** = 1 code

ii. Verb

Sentences should be put into different codes by clause. They may be coded by more than one verb, if not linked to or qualified by preceding verb.

Examples of coding:

- Stayed / gazing / thinking = 3 codes

- When they got to the beach, / they found some beautiful seashells = 2 codes

iii. Conjunctions

Sentences and clauses may be coded by more than one verb, if joined by a conjunction (e.g. and, or, but, so, yet).

Examples of coding:

- Decided to find / lie down / think = 3 codes

- They come back / and have a lovely meal / and admire the view = 3 codes

iv. Exceptions to coding as two codes before and after conjunction

If the storyteller uses two verbs which are not stand-alone, then these should only be coded as one comment. Examples include the use of:

- Gone and [verb]
- Come and [verb]
- Went and [verb]

Examples of coding:

- Gone and hidden
- to come and call him away
- Went and sat

v. Mind-related verbs followed by more than one non mind-related verb in same sentence

Mind-related verbs should only be linked to and coded with adjacent non mind-related verb. Non mind-related verbs which follow after should be treated as stand-alone verbs in the same sentence.

Examples of coding:

- They decided that the best thing to do / because the police station wasn't that far away / was that they'd just nip up into the town, / pop into the police station / and have a cup of tea while they were there = 4 codes  
(section not underlined does not refer to protagonists and so is uncoded)
- They decided to sell off everything in their little village, / pack up / and move off to the seaside = 3 codes
- They had thought about what they were going to wear , / and who they were going to go with = 2 codes

vi. Verbs which are followed by another verb beginning with 'to' (infinitives)

If a verb is followed by an infinitive, then only one code is given.

Examples of coding:

- Know what to do = 1 code
- Trying to get = 1 code

vii. Verbs which are coded together as one (complement clauses)

If verbs are linked to other verbs in sentence, by complementisers (e.g. that, whether, if) then only one code is given.

Examples of coding:

- Recognised the place that they were going to = 1 code
- Decided that he wanted to treat = 1 code
- She didn't know whether to go or not = 1 code

viii. Verbs which are coded together as one (with invisible complementisers)

If verbs are linked to other verbs in sentence, when complementisers are optionally omitted, then only one code is given.

Examples of coding:

- She hasn't realised he's got her phone = 1 code
- She thought she would wish this moment could last forever = 1 code

ix Repetitions

Repetitions which do not provide a more diverse representation of a protagonist's actions are not coded twice.

Examples of coding:

- Little = 1 code
- Off they went = 1 code

Repetitions which do provide a more diverse representation of a protagonist's actions are coded twice, for example:

- Off they went = 2 codes

### 6.3.6 Indices of psychological mindedness

Two scores were calculated for mothers' psychological mindedness: a frequency score and a proportional score:

- $\frac{\text{Frequency score}}{\text{Total number of items}}$



Mental-state explanations and mind-related comments/descriptions (Category A comments) produced by the mother about protagonists in each story were totalled to give a frequency score. The frequency scores for the two stories told at each time point were then summed to give a total frequency score for that time point.

- $\frac{\text{Frequency of Category A comments}}{\text{Total number of comments}} \times 100$

A proportional score for each time point was given by calculating the total frequency score as a proportion of the total number of comments (Category A and B comments) given about protagonists. The proportional score controlled for differences in verbosity during storytelling.

Higher scores were indicative of a more mind-related psychological mindedness.

### **6.3.7 Reliability of coding**

To establish reliability of coding at Time 1, a randomly selected 25% of mothers' stories (8 transcripts for Photo 1 and 8 transcripts for Photo 2) were second coded. The agreement between two coders was calculated separately for the two photos. This decision was taken due to the novelty of the measure warranting an investigation into whether the reliability of rating was consistent between stimuli. Inter-rater agreement for the assignment of a comment to a mental state category was good,  $\kappa = .86$  for Photo 1 and  $\kappa = .81$  for Photo 2. Any disagreements about coding were resolved by discussion.

### **6.4 Summary**

Mother's mind-mindedness may be part of a general tendency to attribute internal states to other people. Children's use of mental state talk has been found to be linked in a book narration task and mind-mindedness interview (Meins et al., 2006). Building upon the storytelling paradigm, mother's psychological mindedness was assessed in this study using a newly developed measure. This looked at mothers' tendency to consider psychological factors when talking about protagonists in a story. This was to enable relations between maternal mind-mindedness and mothers' psychological mindedness to be examined.

# 7

## **Mind-mindedness and child temperament/behaviour**

### **7.1 Introduction**

In assessing whether child factors are related to maternal mind-mindedness, researchers have turned their attention to child temperament and behaviour (Demers et al., 2010b; Meins et al., 2011, 2013; Walker et al., 2011). This chapter introduces the main approaches to child temperament. Research findings are presented focusing on studies which have investigated possible links between mind-mindedness and child temperament and behaviour. The rationale is provided for the inclusion of both maternal report and observational ratings of temperament in this study. While existing questionnaires were available, a new measure enabling assessment of temperament in the home was required. The development of this observational measure is discussed and the coding scheme followed is described in full.

### **7.2 Defining child temperament**

Child temperament is recognised to play a role in influencing developmental pathways and outcomes (Rothbart & Derryberry, 2000). Individual differences in temperament have been of interest to psychologists partly because of the influence on development through interactions with parenting. It has been argued that parenting may have varying consequences for development depending on the child's characteristics (Rubin, Hastings, Chen, Stewart, & McNichol, 1998). For example, authoritarian parenting might have a positive outcome regarding prosocial behaviour for children with high activity levels and a negative outcome for low-activity children (Russell, Hart, Robinson, & Olsen, 2003). In addition, a child's temperament has been thought to influence the attachment relationship which develops with their mother (Belsky et al., 1995).

Although there is a long history of ideas about temperament, modern research into this concept began in the 1950s with the pioneering New York Longitudinal Study (NYLS; Thomas, Chess, Birch, Hertzog, & Korn, 1963; Thomas & Chess, 1977). The

NYLS fostered a widespread interest in temperament. Thomas and Chess (1977) defined temperament as behavioural style and identified nine dimensions of temperament based on content analysis of parental interviews: Activity Level, Rhythmicity, Approach/Withdrawal, Adaptability, Sensory Threshold, Intensity of Reaction, Quality of Mood, Distractibility, and Attention Span/Persistence. These dimensions were used to group children into three temperament types: easy, difficult and slow-to-warm-up. However, only 65% of the children taking part in the NYLS were able to be placed into one of these categories. The concept of a difficult temperament type has been viewed as problematic in part due to the questionable desirability of labelling children negatively early in life (Rothbart, 1982), the lack of consistency in its operationalisation (Rothbart & Derryberry, 2000) and the recognition that what is considered difficult by parents is not universal (Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma (2007).

Other influential approaches have focused on different aspects of child temperament including genetics and heritability (Buss & Plomin, 1975, 1984), behavioural inhibition (Kagan, 1998), emotionality (Goldsmith & Campos, 1982) and self-regulation (Rothbart & Derryberry, 1981). Buss and Plomin defined temperament as personality traits with an inherited component (1975) and categorised temperament into the three dimensions of Emotionality, Activity, and Sociability (EAS; 1984). Kagan (1998) used a biological approach in the study of behavioural inhibition in infants which resulted in a classification of infants into distinct categories of high- and low-reactive infants. A further approach proposed by Goldsmith and Campos (1982) considered the defining feature of temperament to be individual differences in the propensity to experience and express primary emotions. In this approach, emotionality is not viewed as a single dimension but instead focuses on discrete emotions (e.g., anger, fear).

Rothbart and Derryberry (1981) went beyond the behavioural style definition proposed by Thomas and Chess (1977). The authors proposed that temperament should be viewed as “constitutional differences in reactivity and self-regulation” and that these were “influenced over time by heredity, maturation, and experience” (p. 37). “Reactivity” referred to an individual’s biological reactions to changes in the environment, whilst “self-regulation” referred to the processes involved in modulating this reactivity. Rothbart and Derryberry (2000) wrote that this broad definition, with its general constructs of reactivity and self-regulation, encompassed other researchers’ temperament dimensions. This included Buss and Plomin’s

(1984) EAS, Kagan's (1998) behavioural inhibition, and Goldsmith and Campos' (1986) emotionality dimensions.

Therefore, within the field of temperament research, various approaches have emerged over the years and these are not necessarily discrete. A recent definition, arising from the newest work on temperament, was suggested by Shiner, Buss, McClowry, Putnam, Saudino, and Zentner (2012): "Temperament traits are early emerging basic dispositions in the domains of activity, affectivity, attention, and self-regulation, and these dispositions are the product of complex interactions among genetic, biological, and environmental factors across time." (p. 437).

### **7.3 Maternal mind-mindedness and temperament/behaviour: research to date**

Child factors may contribute to maternal mind-mindedness if this is best viewed as a relational construct. In this way, mothers' mind-mindedness may not be independent of child characteristics. However, little evidence has been found supporting this link including a failure to find a relationship between maternal mind-mindedness and concurrent infant behaviour (Meins et al., 2001), and cognitive ability and IQ (Meins et al., 2001, 2002). Research has investigated the possibility that a mother's mind-mindedness may be influenced by other child factors, specifically looking at relations with child temperament. If an association between mind-mindedness and temperament was found, this would support the view that maternal mind-mindedness is a relational construct influenced by aspects of the other person in the relationship, such as child temperament.

Relations between maternal mind-mindedness and infant temperament assessed by questionnaire have been investigated in a couple of studies (Demers et al., 2010b; Meins et al., 2011), and relations between parental mind-mindedness and behavioural and emotional difficulties, again assessed by questionnaire, have been explored with preschool and primary school children (Meins, Munoz Centifanti, Fernyhough, & Fishburn, 2013; Walker et al., 2011). Meins et al. (2011) investigated relations between levels of maternal mind-mindedness and infant temperament in 40 mother-infant dyads from predominantly lower-middle class families.

Assessments took place when the infants were 7 months. Mind-mindedness was assessed using the interactional measure and mothers were asked to rate infant temperament using Rothbart's Infant Behavior Questionnaire (IBQ; 1981). The IBQ provides scores on six temperament dimensions: Activity Level, Smiling and Laughter, Fear, Distress to Limitations, Soothability, and Duration of Orienting.

Meins and colleagues found no relationship between mothers' scores for either appropriate or non-attuned mind-related comments and any of the temperament dimensions. Effect sizes for these non-significant correlations were also negligible or small, except for the medium effect size found in the negative correlation between mothers' non-attuned mind-related comments and infant smiling and laughing ( $r = -.34$ ). However, the temperament dimension of Smiling and Laughter suffered from the lowest internal reliability which may have impacted on this finding. In conclusion, the study provided no support for infant temperament being related to mothers' tendency to appropriately interpret their infants' thoughts or feelings, or to misinterpret their infants' internal states.

Demers and colleagues (2010b) examined relations between the content of mothers' mind-mindedness and their infants' temperament. A convenience sample took part, comprising 37 adult and 69 adolescent mothers. The authors predicted that a mother's mind-mindedness would be positively associated with a perception of an easier child temperament. Mind-mindedness was assessed when infants were 18 months using an expanded representational measure which includes an assessment of the emotional valence of mothers' attributes about their child (positive, negative, and neutral attributes). Temperament was assessed twice by maternal report when infants were 6 months and 10 months. The Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979) was selected to measure temperament. This comprises four scales: Difficultness, Dullness, Unadaptability and Unpredictability. Higher scores are associated with mothers perceiving their infant as more difficult, dull, unadaptable, and/or unpredictable. Aggregated scores for the two time points were included in analysis. The authors predicted that scores would correlate negatively with positive maternal mind-mindedness. Due to low levels of stability found for unpredictability and dullness, only scales relating to negative infant emotionality (difficultness and unadaptability) were examined in relation to maternal mind-mindedness.

Adult and adolescent mothers did not differ in their perceptions of the child as being difficult or unadaptable or in their use of positive and negative mental attributes in descriptions. Scores for the two groups of mothers were combined and positive maternal mind-mindedness was found to correlate negatively with mothers' perceptions of the child as being difficult. Demers et al. (2010b) proposed that the longitudinal nature of the study, whilst acknowledging that no causal inference could be made, raised the possibility that perceptions of the child as relatively "easy"

during the infant's first months may contribute to more positive and more mind-minded representations of the child as the infant-mother relationship develops over the first 18 months of the child's life. The authors argued that mothers' perceptions of child characteristics seemed to be relevant to an understanding of maternal mind-mindedness and its emotional content.

The next two studies to be discussed focused on maternal report of child behavioural and emotional difficulties as opposed to the previous two studies which focused on maternal report of child temperament characteristics. Walker et al. (2011) investigated relations between representational mind-mindedness and child behavioural and emotional difficulties in two groups of parents: a community sample of parents, and parents whose children had been referred to Child and Adolescent Mental Health Services (CAMHS). The primary caregiver was included in the study, and 47 mothers and two fathers took part with children between the ages of 3- to 5-years-old. The severity of children's difficulties was measured using the SDQ. As previously described in Chapter 4, this measure gives scores for four scales looking at difficulties (Emotional Symptoms, Conduct Problems, Hyperactivity, Peer Problems) which are summed to give a Total Difficulties score, and one scale looking at Prosocial Behaviour. It was predicted that parental mind-mindedness scores would be negatively correlated with children's behavioural difficulties in both groups.

The authors found no relationship between parental mind-mindedness and children's behavioural and emotional difficulties in the clinical group. A different story emerged from the community group. Here, a strong negative relationship was found between mind-mindedness and total difficulties ( $r = -.56$ ). A closer look at the scales using Spearman's rho correlations revealed a medium negative relationship between mind-mindedness and conduct problems ( $r = -.41$ ) and a strong negative relationship between mind-mindedness and hyperactivity ( $r = -.65$ ). No relationships were found between mind-mindedness and the scales in the clinical group. The clinical group had been found to rate their children's difficulties as significantly higher than the community group. In explaining why mind-mindedness was only related to parental ratings of children's behavioural and emotional difficulties in the community group and not in the clinical group, the authors argued that mind-mindedness may only be related to lower levels of child difficulties.

The longitudinal nature of a study by Meins et al. (2013) enabled an investigation into whether early maternal mind-mindedness might protect children against developing problem behaviours. The focus of this study was different to those mentioned previously in that it was no longer investigating whether child factors influenced maternal mind-mindedness but whether maternal mind-mindedness influenced child behaviour. Mothers' interactional mind-mindedness was assessed with 8-month-old infants, and child's behavioural difficulties were assessed by maternal report at 44 months and by both maternal and teacher report at 61 months using the SDQ. Participating families came from socially diverse backgrounds which meant the sample could be divided into low and high SES groups to explore whether SES moderated any relation between mind-mindedness and child difficulties. The SDQ was used to score externalising difficulties (conduct problems and hyperactivity), and internalising difficulties (emotional symptoms and peer problems) as well as total difficulties.

Maternal mind-mindedness in the first year of life was related to children being reported with fewer behavioural difficulties but only in the low SES group. A mind-minded mother mitigated the negative effects of difficulties associated with a low income status on children's behaviour at 44 and 61 months. Importantly, this relationship existed when maternal sensitivity was controlled, suggesting that mothers' attunement to the infants' internal states played a role in the prevention of behavioural difficulties irrespective of more general responsiveness to the infant. This contrasted with findings regarding mothers and children in the high SES group where maternal mind-mindedness was unrelated to behavioural difficulties. Instead, early maternal sensitivity was found to predict fewer externalising behaviours at 44 months. This suggests that in low-risk families, mothers' sensitivity rather than mothers' mind-mindedness may be important in reducing subsequent externalising behavioural difficulties.

It is noteworthy not only that mothers in the low SES group scored their children more highly for internalising and externalising behaviours at 44 months and for externalising behaviours at 61 months (with a non-significant trend for higher scores in internalising behaviours) than the high SES group, but also that the groups did not differ with respect to appropriate mind-related comments. Therefore, the finding of relations between interactional mind-mindedness and reports of child behavioural difficulties in the low SES group and not in the high SES group could be viewed as contrary to Walker et al.'s (2011) proposal that mind-mindedness may only be

associated with lower levels of child difficulties. However, it is too soon to rule this proposal out for representational mind-mindedness given that findings may have been influenced by different mind-mindedness measures being used in the two studies. In addition, Walker and colleagues investigated concurrent relations between measures rather than the predictive nature of mind-mindedness.

On the basis of the studies previously reported, evidence appears to be mixed as to whether maternal mind-mindedness is related to child temperament and behaviour. However, a methodological issue needs to be considered because all these studies used maternal reports rather than observation-based measures of temperament and behaviour. Walker et al. (2011) only included parental ratings in their study so no observational data were available about children's difficulties. This meant the study was limited to finding out whether there was a concurrent relationship between representational mind-mindedness and parents' perceptions of behavioural difficulties. The findings of Meins et al. (2013) were also limited to questionnaire report of behavioural difficulties and so it was not possible to establish whether mothers' early interactional mind-mindedness related to observational assessments of child behaviour in the preschool and early school years. One could argue that a relationship is more likely to be found between mothers' mind-mindedness and maternal report of temperament than between mothers' mind-mindedness and observational ratings of temperament because both maternal report and mind-mindedness (representational and interactional) depend on the mother's interpretation of child characteristics and behaviour. Additionally, one could argue that there is an increased likelihood for observational assessments of mind-mindedness and temperament to be related given that they are both online measures of behaviour. In this way, how much a mother focuses on her child's internal states whilst playing might be influenced by the child's behaviour in that particular interaction.

#### **7.4 Methodological issues in the study of temperament**

The optimal methodology to assess child temperament has been the subject of much discussion (Kagan & Fox, 2006; Rothbart & Bates, 2006). Maternal report and observations both offer advantages and disadvantages in the study of temperament. On the plus side, maternal-report questionnaires are advantageous in their ability to access the extensive knowledge about a child at a mother's disposal. Importantly, they allow the sampling of behaviours across a range of settings and over a long time period (Kagan & Fox). However, maternal report measures may result in



informant biases. For example, maternal report may not constitute the most accurate assessment due to a possible maternal bias towards representing children positively. Mothers may also foist a construction on their child's behaviour in line with their representation of an ideal child (Kagan & Fox). Naturalistic observations on the other hand provide the potential for a high degree of objectivity and ecological validity (Rothbart & Bates). Observer ratings may therefore allow for greater objectivity and accuracy. Conversely, observational data may suffer from relatively low day-to-day reliability making it difficult to accrue an adequate sample of relevant behaviours (Rothbart & Bates).

It is noteworthy that in multi-method studies, agreement between maternal reports of child temperament and other temperament measures, such as observational assessments, is modest (Goldsmith & Campos, 1990; Kochanska, Coy, Tjebkes, & Husarek, 1998). A single method approach has been used in many temperament studies and these have usually involved maternal reports (Hayden, Durbin, Klein, & Olino, 2010), despite the fact that using multiple sources of evidence has been highly recommended (Kagan, Snidman, McManis, Woodward, & Hardway, 2002; Rothbart & Hwang, 2002).

### **7.5 Selection of measures**

This study used both maternal reports and observer ratings in order to give a more balanced view of temperament and, as with maternal mind-mindedness, to again use a representational measure (maternal report) and a behavioural measure (observational assessment). This enabled an examination of whether maternal mind-mindedness was related to either maternal report or observational assessment of temperament or both measures. Two studies previously discussed in this chapter investigated infant temperament in relation to maternal mind-mindedness (Demers et al., 2010b; Meins et al., 2011); two other studies had asked mothers to fill out a behavioural screening questionnaire about their preschool and primary school children (Meins et al., 2013; Walker et al., 2011). This study used temperament measures with a new age group, that of preschool and primary school children. Therefore, it aimed to extend existing research knowledge not only by adding to our understanding of the possible relationship between representational and observational measures of maternal mind-mindedness and children's temperament but also by looking into relations with older children.

The two instruments used to measure temperament were selected or developed from existing measures originating from a shared theoretical perspective (Goldsmith & Rothbart, 1991). The short form of the Children’s Behavior Questionnaire (SF-CBQ; Putnam & Rothbart, 2006), designed for use with parents with 3- to 8-year-old children, was used in conjunction with a newly developed observational measure based on the SF-CBQ and the preschool version of the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith et al., 1999). Both the CBQ and the Lab-TAB are theory-derived instruments based on a common definition of temperament as “constitutionally based, individual differences in reactivity and self-regulation” (Rothbart et al., 2001, p. 1395). The Lab-TAB comprises a set of episodes, designed to generate certain child emotions and behaviours; for example, an episode where a stranger approaches which may elicit social fear, and an episode where a toy spider jumps which may provoke fear based on an unexpected event. This meant that an observational measure needed to be developed for the current study because the Lab-TAB is based on laboratory procedures rather than free play in the home.

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997, 2001) was selected for use in this study as a brief behavioural screening questionnaire. It was designed to be used with children aged between 3 and 16 years. The emphasis on a child’s strengths as well as difficulties makes the SDQ particularly acceptable to community samples (Goodman & Scott, 1999). This questionnaire has been extensively validated across countries (Muris, Meesters, & van den Berg, 2003; Smedje, Broman, Hetta, & von Knorring, 1999) and been found to be as good as other screening questionnaires at discriminating between high and low-risk samples (Goodman & Scott). Including the SDQ enabled a further investigation, but with a different measure aimed at an older age group, into the finding by Demers and colleagues (2010b) that positive maternal mind-mindedness correlated negatively with mothers’ perceptions of the child as being difficult.

**7.6 Maternal report measures of child temperament and behaviour**

The measures selected to access maternal report of children’s temperament and behaviour are described below.

FDÁ V@ÁÚ@!cÁ!{ Á Á@Á@Á!^} qÁ^ @eÁ!ÁÚ^ ^•q}} æÁ^ÁÚ@EÖÓÚÁÚ~ ç æ ÁBÁ  
 Ú[ c@ædÁEeî DÁ

Mothers were asked to rate statements describing children's reactions to situations on the basis of whether the description was "true" or "untrue" of the child's reaction within the past six months. Each item was rated using a seven-point Likert scale ranging from 1 (extremely untrue) to 7 (extremely true) with high scores indicating more frequent behaviours. The SF-CBQ dimensions, for assessment of temperament in 3- to 8-year-old children, are age-appropriate dimensions derived from constructs used to assess temperament in younger and older populations; from infancy, as measured by the IBQ, and from adulthood, as measured by the Physiological Reactions Questionnaire (PRQ; Derryberry & Rothbart, 1988). The questionnaire has 94 items and 15 scales, with 13 of these scales mapping onto the factors of Surgency, Negative Affectivity and Effortful Control. These factors have been found to map onto the Extraversion, Neuroticism and Conscientiousness dimensions of the Big Five in studies of adult personality (Ahadi & Rothbart, 1994; Rothbart, Ahadi, & Evans, 2000). Surgency combines children's positive affect and rapid approach tendencies; Negative Affectivity is demonstrated by forms of negative emotionality such as anger/frustration and fear; and, Effortful Control concerns individuals' voluntary deployment of attention, which allows the regulation and suppression of reactive tendencies (Rothbart & Derryberry, 2000).

A mean score of all items judged by the mother to be applicable to the child was given for each scale. The scales of Approach/Positive Anticipation and Smiling and Laughter were not included whilst creating the three factors due to the unstable and conceptually questionable factor loadings these have demonstrated in some samples (S. Putnam, personal communication, August 7, 2012). Scores for the factors were calculated by averaging the relevant scale scores which combined to produce the factor. The factors and corresponding scales are shown in Table 7.1.

**Table 7.1.** SF-CBQ: Temperament factors and scales

<b>Factor</b>	<b>Scale</b>
Surgency	Activity Level
	High Intensity Pleasure
	Impulsivity
	Shyness (reversed)
Negative Affectivity	Anger/Frustration
	Discomfort
	Fear
	Sadness
	Falling Reactivity/Soothability (reversed)
	Effortful Control
	Inhibitory Control
	Low Intensity Pleasure
	Perceptual Sensitivity

Mothers were asked to rate their children on a 3-point scale on the basis of whether the item was “not true”, “somewhat true” or “certainly true” of their child’s behaviour over the last six months or this school year. The informant-rated version of the SDQ was used with 25 items which provide five scales. Four of these scales (Emotional Symptoms, Conduct Problems, Hyperactivity and Peer Problems) are summed to give a Total Difficulties score. The remaining scale represents Prosocial Behaviour. The scale scores range from 0-10 whilst the Total Difficulties score ranges from 0-40. High scores indicate greater difficulties apart from the Prosocial Behaviour scale where it indicates greater prosocial behaviour.

Two versions of the SDQ were used depending on the age of the child in question (designed for mothers with children aged 3 years to 4 years, or 4 to 16 years) with 22 of the 25 items being identical. In the version used by mothers of younger children, the item on reflectiveness is softened, and the two items on antisocial behaviour are replaced by items on oppositionality. SDQ scores were left as continuous variables rather than classifying scores into normal, borderline and abnormal; the participants taking part in the study were not viewed as an at risk sample and the measure was not being included as a screening tool as part of a clinical assessment.

## 7.7 The observational measure of temperament

### 7.7.1 Development of the measure

The observational measure of temperament included both mother-child free play and a tidy-up task. Following on from Gardner (2000), the different tasks (playing and tidying-up) were not expected to elicit comparable rates of behaviour. The tidy-up task was included to create a situation which might occur in everyday life and to observe the child's responses to the instruction. It was thought likely to encourage negative behaviours with some children (e.g., non-compliance) or negative affect when the child was no longer able to play with the toys (e.g., sadness). In this way, a child might clear up the toys without any dissent or might instead carry on playing with the toys, ignoring their mother's request.

The observational coding scheme was developed which coded behaviour against selected temperament scales taken from the SF-CBQ. This enabled the child's behaviour to be rated against the same temperament scales across the measures: by mothers, while filling out the SF-CBQ, and by raters, while watching videos of the interactions. Convergent validity has been demonstrated in parental assessment of temperament using the CBQ and observational measures of temperament assessed in the laboratory (Carlson & Moses, 2001; Kochanska, Murray, Jacques, Koenig, & Vandergeest, 1996; Rothbart, Derryberry, & Hershey, 2000). Temperament measures assessed in the laboratory with infants have been found to predict parental reports of child temperament assessed at age 7 with the CBQ (Rothbart, Derryberry, & Hershey). Also, individual differences in the inhibitory control of toddlers and preschool children assessed using the Inhibitory Control scale of the parental report in the CBQ have been found to positively correlate with laboratory observations of temperament (Carlson & Moses; Kochanska et al.).

Definitions of temperament scales were taken from the CBQ. In order to guide coding, examples of these scales were taken from the CBQ sample items (Rothbart, Ahadi, Hershey, & Fisher, 2001) and adapted where appropriate to the play session under observation. Of the 15 scales included in the SF-CBQ, eight were included in the observational measure.

Five scales were not included due to the behaviours not being considered observable in the context of a mother-child play session at home:

- Discomfort

- Falling Reactivity/Soothability
- Fear
- Perceptual Sensitivity
- Shyness.

Two scales were not included due to the unstable and conceptually questionable factor loadings they demonstrated in some samples using the SF-CBQ (S. Putnam, personal communication, August 7, 2012):

- Approach/Positive Anticipation
- Smiling and Laughter.

Eight scales of child temperament were rated:

- Activity Level
- Anger/Frustration
- Attentional Focusing
- High Intensity Pleasure
- Impulsivity
- Inhibitory Control
- Low Intensity Pleasure
- Sadness

The coding scheme was influenced by the scoring used in the Lab-TAB: Preschool version; a set of emotion-eliciting procedures developed for use with 3- to 5-year-old children. The content areas of temperament in the Lab-TAB are referred to as dimensions and include Fear, Anger/Frustration, Sadness/Disappointment, Exuberance, Interest/Persistence, Activity Level, Inhibitory Control and Contentment. Goldsmith and colleagues (1999) expected that the Lab-TAB would be typically used in conjunction with caregiver ratings provided by the CBQ. The coding scheme was also influenced by the temperament-related behaviour measures developed by Lua (1995). This influence included the use of a similar 7-point global rating scale anchored from 'hardly ever' to 'almost always', with certain scales also being guided by Lua's ratings of temperament-related behaviours. For example, specific behaviours in the "Activity" scale (p. 137-138) helped shape the current scheme's Activity Level scale and "On/Off task behaviours" (p. 140) helped shape the Attentional Focusing scale.

Some behaviours were more likely to occur in the play session or in the tidy-up task. For example, high intensity pleasure was more likely to be observed when the child was playing with new toys, or anger/frustration or sadness were more likely to be observed when the child was no longer able to play with the toys. However, coding took place after the rater watched the entire play session and tidy-up task for each child and so behaviours were coded irrespective of when these occurred. A global rating for each temperament scale was given. A 7-point rating scale was used for each temperament scale and ranged from “hardly ever...” to “almost always...”. This was to mirror the 7-point rating scale used in the SF-CBQ. The rating scale took into account the frequency and intensity of the child’s behaviour. The new measure was piloted on three mothers and their children and the coding scheme was developed and amended where appropriate to enhance reliability.

### **7.7.2 Procedure**

Mothers were asked to play with their younger child just as they might do if they had free time together. At the end of the play session, when instructed by the researcher, the mother asked the child to stop playing and to tidy up the toys into the case supplied by the researcher. The play session and tidy-up task were filmed and the child’s temperament was subsequently coded using the observational temperament coding scheme.

### **7.7.3 Coding scheme**

The temperament scales, with their definitions (taken from Rothbart et al., 2001 and adapted where appropriate) and rating scales (influenced by the Lab-TAB Goldsmith et al., 1999; Lua, 1995) are given below.

#### **i. Activity Level**

Definition: Level of gross motor activity including rate and extent of locomotion.

Example: “Seems always in a big hurry to get from one activity to another.”

The 7-point rating scale (1 = hardly ever active, to 7 = almost always active).

1 = Hardly ever active

Very little movement, practically no self-initiated movement, sedentary, does not change position, hardly touches toys.

2 = Infrequently active

Tends to sit quietly, rarely responds to situations calling for activity, moves very slowly.

3 = Occasionally active

Responds actively to situations calling for activity.

4 = Moderately active

Moderately active and alert, moves without haste.

5 = Often active

Not quiet for sedentary play, often moving, seems restless, moves rapidly from one set of toys to another.

6 = Very often active

Keeps moving but will keep still upon repeated directions.

7 = Almost always active

Moves rapidly, shifts position often, does not remain playing with one toy for long, runs around a great deal.

## **ii. Anger/Frustration**

Definition: Amount of negative affect related to interruption of ongoing tasks or goal blocking.

Example: "Has temper tantrums when s/he doesn't get what s/he wants."

The 7-point rating scale (1 = hardly ever angry, to 7 = almost always angry).

1 = Hardly ever angry

No facial expression of anger, no presence of bodily anger, no apparent protest, no apparent opposition.

2 = Infrequently angry

Rarely shows facial expression of anger, rarely shows bodily anger, rarely protests or shows opposition. Expressions of anger are minimal: facial expressions have only one facial region showing codeable movement, identifying a low intensity anger, or expression is ambiguous, minimal body or verbal protest showing negative affect.



3 = Occasionally angry

Occasional signs of anger through facial expressions, bodily anger or verbal protest showing negative affect. Expressions of anger are minimal: facial expressions have only one facial region showing codeable movement, identifying a low intensity anger, or expression is ambiguous, minimal body or verbal protest showing negative affect.

4 = Moderately angry

Facial expressions of anger are sometimes apparent, bodily demonstrations of anger or verbal protests showing negative affect are sometimes apparent. Expressions of anger are moderate: facial expressions have two facial regions showing codeable movement, or expression in one region (e.g., brows) is definite, moderate body or verbal protest showing negative affect.

5 = Often angry

Facial expressions of anger, bodily demonstrations of anger and verbal protests showing negative affect are often apparent. Expressions of anger are moderate: facial expressions have two facial regions showing codeable movement, or expression in one region (eg., brows) is definite, moderate body or verbal protest showing negative affect.

6 = Very often angry

Facial expressions of anger, bodily demonstrations of anger and verbal protests showing negative affect are very often apparent. Expressions of anger are intense: an appearance change occurs in three facial regions or coder has strong impression of anger, intense bodily anger or verbal protest showing negative affect.

7 = Almost always angry

Facial expressions of anger, bodily demonstrations of anger and verbal protests showing negative affect are almost always apparent. Extreme anger shown through facial expression, body and verbal protests showing negative affect.

### **iii. Attentional Focusing**

Definition: Tendency to maintain attentional focus upon task-related channels.

Example: "When picking up toys or other jobs, usually keeps at the task until it's done."

The 7-point rating scale (1 = hardly ever focused/persistent, to 7 = almost always focused/persistent).

1 = Hardly ever focused/persistent

Engaged in conversation with the mother which is not related to playing with the toys.

2 = Infrequently focused/persistent

Frequently glances at mother, continuously breaks off from doing the play activity, talks continuously to the mother. Mother has to insist that the child finishes the play-related task.

3 = Occasionally focused/persistent

Only occasional glances at the mother, tries to make bids for attention or help.

4 = Moderately focused/persistent

Sometimes points to something else in the room not related to the play activity, stops doing the play activity and asks mother questions not related to the activity, shows bodily movement and then comes back and continues playing with toy, looks away and stares in a non-focused way.

5 = Often focused/persistent

Only rarely glances at the mother when engaged in play activity.

6 = Very often focused/persistent

Ignores mother's attempts to interrupt child's actions.

7 = Almost always focused/persistent

Completely ignores surrounding noises, does not look around room at all, no glances at mother while playing with toy, ignores mother's instructions.

#### **iv. High Intensity Pleasure**

Definition: Amount of pleasure or enjoyment related to situations involving high stimulus intensity, rate, complexity, novelty and incongruity.

Example: "Likes playing with new toys."

The 7-point rating scale (1 = hardly ever shows pleasure, to 7 = almost always shows pleasure).

1 = Hardly ever shows pleasure

Hardly ever shows positive affect to high intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Remains impassive. Features and body movements show no animation. Extremely low level of contentment shown through activities being seen as a chore and minimal exhibition of pleasure.

2 = Infrequently shows pleasure

Infrequently shows positive affect to high intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Tends to be passive and shows limited engagement in high intensity activity. Low level of contentment shown through little engagement and limited exhibition of pleasure. May act disinterested.

3 = Occasionally shows pleasure

Occasionally shows positive affect to high intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Often passive but shows some engagement in high intensity activity. Fairly low level of contentment shown through little engagement and fairly limited exhibition of pleasure.

4 = Moderately shows pleasure

Sometimes shows positive affect to high intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Sometimes passive but shows moderate engagement in high intensity activity. Moderate level of contentment shown through moderate engagement and exhibition of pleasure.

5 = Often shows pleasure

Often shows positive affect to high intensity stimulus through facial expressions, such as smiling, or through verbal responses. Often shows engagement in high intensity activity. Fairly high level of contentment shown through fairly high engagement and exhibition of pleasure.

6 = Very often shows pleasure

Very often shows positive affect to high intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses.

Very often shows engagement in high intensity activity. High level of contentment shown through high engagement and exhibition of pleasure.

7 = Almost always shows pleasure

Almost always shows positive affect to high intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses.

Almost always shows engagement in high intensity activity. Very high level of contentment shown through very high engagement and exhibition of pleasure.

#### **v. Impulsivity**

Definition: Speed of response initiation.

Example: "Usually rushes into an activity without thinking about it."

The 7-point rating scale (1 = hardly ever impulsive, to 7 = almost always impulsive).

1 = Hardly ever impulsive

Hardly ever changes toys selected for play, tentative, always deliberates for a long time before beginning new activity.

2 = Infrequently impulsive

Infrequently changes toys selected for play, tentative, usually deliberates for a long time before beginning new activity.

3 = Occasionally impulsive

Occasionally changes toys selected for play, occasionally deliberates before beginning new activity and when does so it is for a moderate amount of time.

4 = Moderately impulsive

Sometimes changes toys selected for play, sometimes deliberates before beginning new activity and when does so it is for a moderate amount of time.

5 = Often impulsive

Often changes toys selected for play, sometimes deliberates before beginning new activity and when does so it is only for a short amount of time.

6 = Very often impulsive

Very often changes toys selected for play, rarely deliberates before beginning new activity and when does so it is only for a short amount of time.

7 = Almost always impulsive

Continually changes toys selected for play, rarely stops to think before beginning new activity.

**vi. Inhibitory Control**

Definition: The capacity to plan and to suppress inappropriate approach responses under instructions or in novel or uncertain situations.

Example: "Can lower his/her voice when asked to do so. Can control responses while engaged in play with mother."

The 7-point rating scale (1 = hardly ever exerts inhibitory control, to 7 = almost always exerts inhibitory control).

1 = Hardly ever exerts inhibitory control

Non-compliant, continually ignores mother's instructions or suggestions, does not follow mother's instructions to tidy up toys.

2 = Infrequently exerts inhibitory control

Rarely compliant, frequently ignores mother's instructions or suggestions, does not follow mother's instructions to tidy up toys.

3 = Occasionally exerts inhibitory control

Occasionally compliant, often ignores mother's instructions or suggestions with compliance often delayed, follows mother's instructions to tidy up toys after prolonged or intense verbal and bodily protest.

4 = Moderately exerts inhibitory control

Sometimes compliant, sometimes ignores mother's instructions or suggestions with compliance sometimes delayed, follows mother's instructions to tidy up toys after short or moderate verbal and bodily protest.

5 = Often exerts inhibitory control

Often compliant, occasionally ignores mother's instructions or suggestions with compliance occasionally delayed, follows mother's instructions to tidy up toys after very brief or minimal verbal and bodily protest.

6 = Very often exerts inhibitory control

Very often compliant, usually follows mother's instructions or suggestions without delay, follows mother's instructions to tidy up toys without verbal and bodily protest.

7 = Almost always exerts inhibitory control

Compliant, almost always follows mother's instructions or suggestions without delay, follows mother's instructions to tidy up toys without verbal and bodily protest.

**vii. Low Intensity Pleasure**

Definition: Amount of pleasure or enjoyment related to situations involving low stimulus intensity, rate, complexity, novelty and incongruity.

Example: "Rarely enjoys just being talked to."

The 7-point rating scale (1 = hardly ever shows pleasure, to 7 = almost always shows pleasure).

1 = Hardly ever shows pleasure

Hardly ever shows positive affect to low intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Remains impassive. Features and body movements show no animation. Extremely low level of contentment shown through activities being seen as a chore and minimal exhibition of pleasure.

2 = Infrequently shows pleasure

Infrequently shows positive affect to low intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Tends to be passive and shows limited engagement in interaction or low intensity activity. Low level of contentment shown through little engagement and limited exhibition of pleasure. May act disinterested.

3 = Occasionally shows pleasure

Occasionally shows positive affect to low intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Often passive but shows some engagement in interaction or low intensity activity. Fairly low level of contentment shown through little engagement and fairly limited exhibition of pleasure.

4 = Moderately shows pleasure

Sometimes shows positive affect to low intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Sometimes passive but shows some engagement in interaction or low intensity activity. Moderate level of contentment shown through moderate engagement and exhibition of pleasure.

5 = Often shows pleasure

Often shows positive affect to low intensity stimulus through facial expressions, such as smiling, or through verbal responses. Often shows engagement in interaction or low intensity activity. Fairly high level of contentment shown through fairly high engagement and exhibition of pleasure.

6 = Very often shows pleasure

Very often shows positive affect to low intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Very often shows engagement in interaction or low intensity activity. High level of contentment shown through high engagement and exhibition of pleasure.

7 = Almost always shows pleasure

Almost always shows positive affect to low intensity stimulus through facial expressions, such as smiling, or through bodily movements or verbal responses. Almost always shows engagement in interaction or low intensity activity. Very high level of contentment shown through very high engagement and exhibition of pleasure.

### **viii. Sadness**

Definition: Amount of negative affect and lowered mood and energy related to exposure to suffering, disappointment and object loss.

Example: "Shows sadness when no longer able to play with toys."

The 7-point rating scale (1 = hardly ever sad, to 7 = almost always sad).

1 = Hardly ever sad

Hardly ever shows sadness, no facial region shows codeable movement, no bodily detectable sadness, no detectable resignation, almost no gaze aversion from parent.

2 = Infrequently sad

Infrequently shows sadness, only one facial region shows codeable movement, identifying a low intensity, little bodily detectable sadness such as downcast head, almost no gaze aversion from parent.

3 = Occasionally sad

Occasionally shows sadness, only one facial region shows codeable movement, identifying a low intensity, little bodily detectable sadness such as downcast head and slumped shoulders, averts gaze from parent for less than 2 seconds.

4 = Moderately sad

Shows moderate sadness, only two facial regions show codeable movement, or expression in one region is definite (e.g., brows), some bodily detectable sadness such as downcast head and slumped shoulders, averts gaze from parent for less than 2 seconds.

5 = Often sad

Often shows sadness, only two facial regions show codeable movement, or expression in one region is definite (e.g., brows), some bodily detectable sadness such as downcast head and slumped shoulders, averts gaze from parent for more than 2 seconds.

6 = Very often sad

Very often shows sadness, an appearance change occurs in all three facial regions or coder otherwise has impression of strong facial sadness, intense bodily detectable sadness such as head in arms or hands, very little eye contact with parent.

7 = Almost always sad

Almost always shows sadness, an appearance change occurs in all three facial regions or coder otherwise has impression of very strong facial sadness, intense bodily detectable sadness such as head in arms or hands, no eye contact with parent.

**7.7.4 Indices of temperament assessed by observation**

The mean scale scores were averaged to produce the three factors of Surgency, Negative Affectivity and Effortful Control as shown in Table 7.2. Due to certain child behaviours not being observable in the context of a mother-child play session at



home, the content of the factors is not an exact replica of those assessed by maternal report in the SF-CBQ. The factor of Surgency does not include Shyness; Negative Affectivity does not include Discomfort, Fear, and Falling Reactivity/Soothability; and Effortful Control does not include Perceptual Sensitivity.

**Table 7.2.** Observational measure: Temperament factors and scales

<b>Factor</b>	<b>Scale</b>
Surgency	Activity Level
	High Intensity Pleasure
	Impulsivity
Negative Affectivity	Anger/Frustration
	Sadness
Effortful Control	Attentional Focusing
	Inhibitory Control
	Low Intensity Pleasure

### **7.7.5 Reliability of coding**

To establish reliability of coding, a randomly selected 19% of mother-child interactions were second coded (6 play sessions) at Time 1. Inter-rater agreement was established using intra-class correlations and found to be satisfactory for two factors: Surgency (ICC = .77); Negative Affectivity (ICC = .71); and to be good for the remaining factor of Effortful Control (ICC = .87). The measure was developed from the existing literature on temperament and as a result, the validity of the measure was taken as sufficiently established by this existing literature.

### **7.8 Summary**

A key research question to be addressed in this study focused on whether maternal mind-mindedness is a relational construct influenced by children's temperament and behaviour. Relations between mind-mindedness and children's temperament and behaviour have only been investigated using maternal report measures (Demers et al., 2010b; Meins et al., 2011, 2013; Walker et al., 2011). Recommendations for the use of more than one source of evidence led to the inclusion of both maternal report and observational assessments of temperament. In order to maintain a shared theoretical perspective between measures, the maternal report measure of temperament (SF-CBQ) and observational assessment developed for this study comprised the same temperament scales and factors. Furthermore, the inclusion of the SDQ enabled an investigation into the findings of previous studies that maternal

mind-mindedness is negatively correlated with mothers' perceptions of her child as being difficult.

# 8

## **Maternal mind-mindedness and consistency across relationships**

### **8.1 Introduction**

Maternal mind-mindedness may be a cognitive-behavioural trait or maternal characteristic in the mother. This idea would be supported if one found evidence of consistency in a mother's mind-mindedness across relationships with her different children, resulting in similar representations and behaviour. Therefore, a mother displaying high levels of mind-mindedness with one child, assessed using either the representational or the interactional measure, would be expected to display similar levels of mind-mindedness with the child's sibling. Conversely, if a mother's mind-mindedness is inconsistent across relationships, with no association between her mind-mindedness levels with the different children, this would support the idea of a relational construct.

Research into mind-mindedness has concentrated on a mother's relationship with only one child. Consequently an investigation into whether maternal mind-mindedness generalises across relationships within families has not been possible. This study overcame this limitation by examining mothers' mind-mindedness not only with two of their children, but also in the case of representational mind-mindedness, with their partner or close friend. This design enabled comparisons to be made across relationships.

To enable a comprehensive assessment of mind-mindedness, a quantitative index (assessing levels of mind-mindedness) and a qualitative index (assessing emotional content of mind-mindedness) were included. This meant that the study could examine whether not only the level of mind-mindedness was consistent across relationships but also whether this was true with the content of mind-mindedness. It could be hypothesised that a mother might show similar levels of mind-mindedness with her two children and yet might produce vastly different emotional content. For

example, a mother might lean towards providing more positive mental attributions about one child whilst focusing more on negative attributions with her other child.

The aim of this chapter was to address the following research question:

1. Is maternal mind-mindedness consistent across relationships?

The consistency of relationships was explored looking at both levels and emotional content of maternal mind-mindedness for representational and interactional mind-mindedness. Consistency could be examined not just once but twice, thereby initial findings at Time 1 could be supported by or weakened by subsequent findings at Time 2. Therefore, the following questions were addressed for Time 1 and then for Time 2:

- a. Are levels of maternal mind-mindedness (representational and interactional) consistent across relationships?

The level of mind-mindedness was scored in two ways:

- i. Frequency of mental attributes (representational mind-mindedness) and frequency of appropriate mind-related comments (interactional mind-mindedness)
  - ii. Proportion of mental attributes (representational mind-mindedness) and proportion of appropriate mind-related comments (interactional mind-mindedness)
- b. Is the emotional content of maternal mind-mindedness consistent across relationships?

The emotional content of mind-mindedness was similarly scored in two ways:

- i. Frequency of valence of mental attributes (representational mind-mindedness) and frequency of valence of appropriate mind-related comments (interactional mind-mindedness)
- ii. Proportion of valence of mental attributes (representational mind-mindedness) and proportion of valence of appropriate mind-related comments (interactional mind-mindedness)

Due to the exploratory nature of the study, no prediction regarding the consistency of levels and emotional content of maternal mind-mindedness across relationships was made. However, if mind-mindedness is primarily a cognitive-behavioural trait, levels and emotional content of mind-mindedness would be found to:

- a. generalise across relationships and not be specific to mother-child relationships, by showing consistency across mothers' representations of both their children and their partner.
- b. generalise across relationships by showing consistency across mothers' interactions with different offspring.

Mind-mindedness was assessed at both Time 1 and Time 2 and the consistency of mothers' mind-mindedness with two children and their partner/friend was investigated at each time point. The longer-term stability of mothers' mind-mindedness with both of their children and their partner/close friend is addressed by the longitudinal analysis reported in Chapter 10.

## **8.2 Method**

### **8.2.1 Participants**

The participants were 32 mothers with two children seen at Time 1 and 30 of the same mothers with two children seen at Time 2. Two families did not take part in the study at Time 2. Detailed information about participants can be found in Chapter 4.

### **8.2.2 Measures**

Two measures were used to collect data on mind-mindedness:

- Representational measure of mind-mindedness (Meins et al., 1998)  
This enabled an investigation into the consistency of mothers' representational mind-mindedness across relationships with two children and partner/friend.
- Interactional measure of mind-mindedness (Meins et al., 2001)  
This enabled an investigation into the consistency of mothers' interactional mind-mindedness across relationships with two children.

Information on procedure, coding and scoring of these measures can be found in Chapter 4 and Chapter 5.

One measure was used to collect data on the demographics of the sample:

- Socio-demographic questionnaire

This enabled an investigation into whether the characteristics of the sample were related to mothers' mind-mindedness and included questions regarding mothers' age, child's age and gender, mothers' education and socio-economic status measured by highest household occupation.

Information on the specific measures and coding used, and the demographics of the sample, can be found in Chapter 4.

### **8.3 Results**

Descriptive statistics and analyses are presented separately for mothers' levels of mind-mindedness and for the emotional content of mothers' mind-mindedness. Results are presented first for Time 1, followed by results for Time 2. Preliminary analyses were conducted to investigate whether the demographic characteristics of the sample related to mothers' levels of mind-mindedness and whether any variable needed to be controlled for in subsequent analysis. Descriptive statistics are displayed in tables for all mind-mindedness variables (means, standard deviations and range). The mind-mindedness variables were then analysed to address the research question. The consistency of levels and emotional content of mind-mindedness across relationships at each time point was investigated using bivariate correlational analysis.

#### ***8.3.1 Levels of mind-mindedness: Normality of distributions***

Tests for normality were conducted on the data at each time point and are reported here. The mind-mindedness indices of frequency of mental attributes and proportion of mental attributes were examined for the representational measure. Shapiro-Wilk tests indicated non-normal distribution for some mental attribute frequency scores (with older sibling at both time points and with younger sibling at Time 1). The values of skewness and kurtosis were converted to  $z$ -scores and both were found to be above 1.96 for the frequency scores with a non-normal distribution. Square root and log transformations were chosen as methods of data transformation which are known to be useful in reducing positive skew (Field, 2009). However, after these transformations were carried out on frequency data, neither method helped correct problems with normality. Therefore, non-parametric data analyses were employed with mental attribute frequency scores. Mental attribute proportion scores were normally distributed, and skewness and kurtosis were within acceptable limits. Therefore, parametric data analyses were employed with these variables.

The mind-mindedness indices of frequency of appropriate mind-related comments and proportion of appropriate mind-related comments were examined for the interactional measure. The frequency and proportion of appropriate mind-related comments were normally distributed except for the frequency and proportion of appropriate mind-related comments with older siblings at Time 1. The z-scores for skewness and kurtosis were found to be within acceptable limits for all variables, except for frequency of appropriate mind-related comments with older siblings at Time 1 for both skewness and kurtosis, and for proportion of appropriate mind-related comments with older siblings at Time 1 for skewness. The frequency of appropriate mind-related comments with older siblings at Time 1 also contained one outlier. A square root transformation of appropriate mind-related comment variables corrected problems of non-normality, enabling parametric analyses to be carried out with these variables. These transformed scores were used in subsequent analyses focusing on levels of mind-mindedness.

### ***8.3.2 Preliminary analyses for Time 1***

#### ***Are levels of representational mind-mindedness related to mother and child socio-demographics at Time 1?***

In order to find out whether there was a relationship between mind-mindedness and the demographic characteristics of the sample, associations between mental attribute frequency and proportion scores and socio-demographic variables relating to the mother (age, education and socio-economic status assessed by household occupation) and to the child (age) were investigated. Higher scores on education refer to higher educational attainment whilst higher scores on socio-economic status refer to lower socio-economic status. Non-parametric correlational analysis, specifically Spearman's rho, was carried out and correlations are shown in Table 8.1.

**Table 8.1.** Correlations between levels of representational mind-mindedness (mental attribute frequency and proportion) and demographic variables at Time 1

Variable	Mother's age	Education	SES	Child's age
<i>U â^!A â â * K</i>				
Mental attributes (freq)	.44*	.15	-.33	-.03
Mental attributes (prop)	.35	.27	-.11	.03
<i>ÿ[ ^} * ^!A â â * K</i>				
Mental attributes (freq)	.18	.15	-.26	-.01
Mental attributes (prop)	.10	.22	-.20	.16
<i>Úæç ^!D â} âK</i>				
Mental attributes (freq)	.31	.00	-.31	n/a
Mental attributes (prop)	.16	.20	-.24	n/a

*P* < .05. SES = socio-economic status; freq = frequency; prop = proportion.

*n* = 100

Mothers' education and socio-economic status (measured by household occupation) and children's age were not correlated with the variables of mental attribute frequency and proportion. Mothers' age was not correlated with mental attribute frequency and proportion except for the positive correlation found between mothers' age and mental attribute frequency with older siblings ( $r = .44, p = .01$ ). In other words, when verbosity (total attributes given in a mother's description regardless of category) was controlled for by expressing frequency of mental attributes as a proportion of total attributes, no relationship was found with mothers' age. No further analysis on mothers' age, education, SES and child's age was carried out in relation to these variables at Time 1.

In order to explore whether mind-mindedness was associated with experience of motherhood, correlational analysis investigated relations between mothers' levels of representational mind-mindedness and the number of children in the family. This revealed that mothers' levels of representational mind-mindedness were not related to how many children they had.



**Are levels of interactional mind-mindedness related to mother and child socio-demographics at Time 1?**

A similar set of analyses were carried out to investigate whether there was a relationship between frequency and proportion of appropriate mind-related comments and the sample's demographic characteristics.

**Table 8.2.** Correlations between levels of interactional mind-mindedness (appropriate mind-related comment frequency and proportion) and demographic variables at Time 1

Variable	Mothers' age	Education	SES	Child's age
AMRC (freq)	-.12	-.11	.04	-.15
AMRC (prop)	-.12	-.05	.00	-.12
AMRC (freq)	.20	.08	.07	-.21
AMRC (prop)	.23	.18	.11	-.06

AMRC = appropriate mind-related comments; SES = socio-economic status; freq = frequency; prop = proportion.

Table 8.2 shows a similar pattern of results as for representational mind-mindedness with mothers' age, education and socio-economic status (measured by household occupation) and children's age being unrelated to interactional mind-mindedness. As a result, these socio-demographic variables were not included in further analysis at Time 1.

Although representational mind-mindedness was unrelated to experience of motherhood, it was still possible that interactional mind-mindedness might be related to the number of children in the family. However, mothers' levels of interactional mind-mindedness were also unrelated to how many children they had.

**Do levels of mind-mindedness vary according to gender at Time 1?**

To investigate whether levels of mothers' mind-mindedness varied according to child's gender, non-parametric analyses (Mann-Whitney *W*tests) were carried out with mental attribute frequency, and parametric analyses (independent samples *t* tests) were carried out with mental attribute proportion and appropriate mind-related comment frequency and proportion. Representational mind-mindedness measured by the frequency of mothers' mental attributes did not significantly differ with gender

for older siblings ( $W= 99.50, r = -.93, J = .37$ ) nor for younger siblings ( $W= 111.50, r = -.46, J = .65$ ). Representational mind-mindedness measured by the proportion of mothers' mental attributes did not significantly differ with gender for older siblings ( $\chi(30) = 1.04, J = .31$ ) nor for younger siblings ( $\chi(30) = -.43, J = .67$ ). Interactional mind-mindedness measured by the frequency of mothers' appropriate mind-related comments did not significantly differ with gender for older siblings ( $\chi(30) = -.43, J = .67$ ), nor for younger siblings ( $\chi(30) = 1.24, J = .23$ ). Interactional mind-mindedness measured by the proportion of mothers' appropriate mind-related comments did not significantly differ with gender for older siblings ( $\chi(30) = -.08, J = .94$ ) nor for younger siblings ( $\chi(30) = 1.50, J = .14$ ).

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None of the representational or interactional measures of mind-mindedness showed any gender differences for either older or younger siblings and as a result gender was not included in any subsequent analysis at Time 1.

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#### ***Do levels of mind-mindedness vary according to order of interview and play session at Time 1?***

The order of mind-mindedness interviews were counterbalanced so mothers had been asked to describe a different child first at Time 1 and Time 2. To find out whether mothers' responses to the mind-mindedness interview were influenced by the order in which they were asked to describe their older or younger child, given the possibility that one description in some way "primed" responses in the other, Mann-Whitney  $W$  tests were carried out with mental attribute frequency, and independent samples  $t$  tests were carried out with mental attribute proportion. No order effects were found with mothers' representational mind-mindedness.

Representational mind-mindedness measured by the frequency of mothers' mental attributes did not significantly differ with the order of the interview for older siblings ( $W= 84.50, r = -1.63, J = .11$ ) or for younger siblings ( $W= 119.50, r = -.30, J = .77$ ). Representational mind-mindedness measured by the proportion of mental attributes did not significantly differ with the order of the interview for older siblings ( $\chi(30) = -1.89, J = .07$ ) or for younger siblings ( $\chi(30) = .12, J = .91$ ).

The order of play (with older and younger child) had been systematically varied and to check whether mothers' responses in the play sessions were influenced by the order in which they played with their older or younger child, independent samples  $t$  tests were carried out with both variables of interactional mind-mindedness. No order effects were found with mothers' interactional mind-mindedness. Interactional

mind-mindedness measured by frequency of appropriate mind-related comments did not significantly differ with the order of the play session for older siblings ( $t(30) = .65, J \hat{A} .52$ ) or for younger siblings ( $t(25.38) = .46, J \hat{A} .65$ ). Interactional mind-mindedness measured by proportion of appropriate mind-related comments did not significantly differ with the order of the play session for older siblings ( $t(30) = .33, J \hat{A} = .75$ ) or for younger siblings ( $t(30) = .53, J \hat{A} .60$ ). Therefore, the order of both interview and play session were not shown to be confounding variables in mothers' levels of mind-mindedness with older and younger siblings and so were not included in further analysis at Time 1.

### **8.3.3 Descriptive statistics for levels of mind-mindedness at Time 1**

The descriptive statistics for mothers' levels of representational mind-mindedness for older and younger sibling and partner/friend and for mothers' levels of interactional mind-mindedness for older and younger sibling can be seen in Table 8.3.

**Table 8.3.** Descriptive statistics for levels of representational mind-mindedness (mental attribute frequency and proportion) and interactional mind-mindedness (appropriate/non-attuned mind-related comment frequency and proportion) at Time 1

<b>Variable</b>	<b>Mothers using mental attributes or mind-related comments (N = 32)</b>	<b>Mean</b>	<b>SD</b>	<b>Range</b>
<i>Ujã^!Áã ã *KÁ</i>				
Mental attributes (freq)	32	6.41	4.83	1-22
Mental attributes (prop)	32	.37	.16	.08-.75
<i>ÿ[ ~ } *^!Áã ã *KÁ</i>				
Mental attributes (freq)	27	4.88	4.09	0-17
Mental attributes (prop)	27	.31	.19	0-.67
<i>Úæç ^!Bã} áKÁ</i>				
Mental attributes (freq)	29	4.28	2.66	0-10
Mental attributes (prop)	29	.33	.17	0-.59
<i>Ujã^!Áã ã *KÁ</i>				
AMRC (freq)	32	12.38	7.90	3-36
AMRC (prop)	32	.06	.03	.01-.14
<i>ÿ[ ~ } *^!Áã ã *KÁ</i>				
AMRC (freq)	32	15.16	7.89	3-31
AMRC (prop)	32	.07	.03	.02-.13
<i>Ujã^!Áã ã *KÁ</i>				
NAMRC (freq)	9	0.34	0.60	0-2
NAMRC (prop)	9	0	0	0-.01
<i>ÿ[ ~ } *^!Áã ã *KÁ</i>				
NAMRC (freq)	5	0.16	0.37	0-1
NAMRC (prop)	5	0	0	0-.01

*p[ ç Æ*freq = frequency; prop = proportion, AMRC = appropriate mind-related comments; NAMRC = non-attuned mind-related comments.

All mothers spontaneously mentioned a mental attribute about their older child whilst describing them but not all mothers did so for their younger child or for their partner/friend; though, those who did not were few (five mothers for younger sibling and three mothers for partner/friend). All mothers gave an appropriate mind-related comment whilst interacting with their older child and with their younger child. The frequency of these comments ranged widely with 3 to 36 comments made by

mothers with older siblings and 3 to 31 comments made by mothers with younger siblings.

The frequency and proportional scores for mental attributes (mothers' representational mind-mindedness) were positively correlated for the older sibling ( $r = .69, p < .001$ ), younger sibling ( $r = .83, p < .001$ ), and partner/friend ( $r = .68, p < .001$ ). The frequency and proportional scores for appropriate mind-related comments (mothers' interactional mind-mindedness) were positively correlated for the older sibling ( $r = .92, p < .001$ ), and younger sibling ( $r = .93, p < .001$ ).

***The distribution of non-attuned mind-related comments at Time 1***

The frequency and proportion of non-attuned mind-related comments made by mothers with both older and younger siblings were very low as shown in Table 8.3. The maximum number of non-attuned mind-related comments made by a mother in a play session was small, two with an older sibling, and one with a younger sibling. The number of mothers who did not make a non-attuned mind-related comment was high: 23 mothers with older siblings and 27 mothers with younger siblings.

The distribution of non-attuned mind-related comments was further investigated and can be seen in Table 8.4. The frequency of non-attuned mind-related comments, and the percentage of mothers who did and did not make these comments with their children, are displayed.

**Table 8.4.** Non-attuned mind related comments by percentage of mothers and frequency at Time 1

NAMRC frequency		% of mothers making NAMRC		
		0 NAMRC	1 NAMRC	2 NAMRC
Time 1	Older sibling	71.9	21.9	6.2
	Younger sibling	84.4	15.6	0

*p* < .05. NAMRC = non-attuned mind-related comments; % = percentage of mothers making non-attuned mind-related comments with older or younger sibling at Time 1 ( $p < .32$ ).

A small percentage of mothers made one non-attuned mind-related comment and even fewer mothers made two non-attuned mind-related comments. The high number of mothers making no non-attuned mind-related comment, combined with the low frequency of comments made by those who did (1-2 comments), resulted in

the decision to drop this variable from subsequent coding and analysis focusing on the emotional content of mind-mindedness at Time 1.

***Do mothers who use non-attuned mind-related comments do so with both siblings at Time 1?***

Due to the high percentage of mothers who made no non-attuned mind-related comments, and the low frequencies of comments of those who did, maternal non-attuned mind-related comments were dichotomised into whether mothers did or did not make these types of comment. To investigate whether mothers who made non-attuned mind-related comments with the older sibling, also made non-attuned mind-related comments with the younger sibling, a 2 x 2 contingency table was employed to assess the relationship.

**Table 8.5.** Relations between mothers who did or did not make non-attuned mind-related comments with older and younger siblings at Time 1

		NAMRC with younger sibling		
		Yes	No	Total
NAMRC with older sibling	Yes	2	7	9
	No	3	20	23
	Total	5	27	32

*NAMRC* = non-attuned mind-related comments.

Table 8.5 shows the overlap; only two mothers made non-attuned mind-related comments with both children and 20 mothers did not make non-attuned mind-related comments with either child. Since two cells (50%) had an expected frequency of less than 5, Fisher's exact test is reported, showing that there was no significant association between mothers who made this category of comment with their older child and their younger child ( $J = .60$ ). Mothers who made non-attuned mind-related comments with one child were not more likely to make non-attuned mind-related comments with their other child. This suggests there is no association between mothers' use of non-attuned mind-related comments in interactions with two children in this sample.

***8.3.4 Consistency of relationships for levels of mind-mindedness at Time 1  
Relations between mothers' levels of representational mind-mindedness with older sibling, younger sibling and partner/friend at Time 1***

The aim of the next analysis was to determine whether there was a relationship between levels of mothers' representational mind-mindedness with their offspring and partner/friend. Correlations are shown separately for mental attribute frequency and proportion. Analyses were calculated using Spearman's rho correlations for frequency and Pearson's correlations for proportional scores. Correlations between mothers' levels of representational mind-mindedness with older sibling, younger sibling and partner/friend are shown for mental attribute frequency in Table 8.6 and for mental attribute proportion in Table 8.7.

**Table 8.6.** Correlations between levels of representational mind-mindedness (mental attribute frequency) with older sibling, younger sibling and partner/friend at Time 1

Variable	Mental attrib (freq) (Older sibling)	Mental attrib (freq) (Younger sibling)	Mental attrib (freq) (Partner/friend)
Mental attrib (freq) (Older sibling)	–		
Mental attrib (freq) (Younger sibling)	.40*	–	
Mental attrib (freq) (Partner/friend)	.32	.36*	–

*P* < .05. Mental attrib (freq) = mental attribute frequency.

\* *p* < .05.

At Time 1, two significant positive correlations were found with a medium effect size. Mothers' mental attribute frequency with older siblings was significantly positively correlated with younger siblings ( $r = .40, p < .02$ ). Mothers' mental attribute frequency with younger siblings was significantly positively correlated with partners/friends ( $r = .36, p < .045$ ) but only with a marginal significance level. Therefore, this set of correlations showed a relationship between mothers' representational mind-mindedness indexed by the frequency of mental attributes given in their descriptions of older siblings and younger siblings, a marginal relationship with younger siblings and partners/friends, and no relationship with older siblings and partners/friends at Time 1.

**Table 8.7.** Correlations between levels of representational mind-mindedness (mental attribute proportion) with older sibling, younger sibling and partner/friend at Time 1

<b>Variable</b>	Mental attrib (prop) (Older sibling)	Mental attrib (prop) (Younger sibling)	Mental attrib (prop) (Partner/friend)
Mental attrib (prop) (Older sibling)	–		
Mental attrib (prop) (Younger sibling)	.06	–	
Mental attrib (prop) (Partner/friend)	-.24	.08	–

*p* < .05. Mental attrib (prop) = mental attribute proportion.

The mental attribute proportion score controls for mothers' verbosity by calculating the frequency of mental attributes as a proportion of total attributes produced in a description. No significant correlations were found between mothers' mental attribute proportion with older siblings, younger siblings and partners/friends. Therefore, when verbosity was controlled for, the relationships found using mental attribute frequency were not duplicated. No relationships were found between mothers' representational mind-mindedness indexed by the proportion of mental attributes given in their descriptions of older siblings, younger siblings, and partners/friends.

***Relations between mothers' levels of interactional mind-mindedness with older sibling and younger sibling at Time 1***

The purpose of the following analysis was to establish whether there was a relationship between mothers' levels of interactional mind-mindedness with their older child and their younger child at Time 1. Correlations between mothers' levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) with the older sibling and the younger sibling are shown in Table 8.8. Analyses were calculated using Pearson's correlations for both variables. The correlation table does not report correlations between frequency scores and proportion scores because these were not relevant to the specific research question being addressed.



**Table 8.8.** Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) with older sibling and younger sibling at Time 1

Variable	AMRC frequency (Older sibling)	AMRC proportion (Older sibling)
AMRC frequency (Younger sibling)	.63***	–
AMRC proportion (Younger sibling)	–	.61***

AMRC = appropriate mind-related comments.

\*\*\*  $p < .001$ .

At Time 1, mothers' interactional mind-mindedness, measured using the frequency of appropriate mind-related comments made by a mother in a play session with a child, showed a significant positive relationship between older siblings and younger siblings, with a large effect size ( $r = .63, p < .001$ ). The next correlational analysis concentrated on the variable which controlled for mothers' verbosity in a play session: the appropriate mind-related comment proportion score. This variable is the frequency of appropriate mind-related comments expressed as a proportion of the total number of comments made by a mother with a child during an interaction. Mothers' interactional mind-mindedness, measured using the proportion of appropriate mind-related comments, showed a significant positive relationship between older siblings and younger siblings, again with a large effect size ( $r = .61, p < .001$ ).

### **8.3.5 Emotional content of mothers' mind-mindedness**

The content of mothers' mind-mindedness was assessed for the quality of emotional valence. To each mental attribute (representational mind-mindedness) or appropriate mind-related comment (interactional mind-mindedness), one of three qualities of emotional valence was ascribed: positive, neutral or negative. Mothers were only scored for the emotional content of mind-mindedness if they gave a mental attribute in their description or if they made an appropriate mind-related comment in the play session; otherwise, they were excluded from analysis. The representational mind-mindedness variables of frequency of valence of mental attributes (frequency of positive, neutral or negative mental attributes) and proportion of the valence of mental attributes (frequency of valence of mental attributes expressed as a proportion of total mental attributes) were examined. The

interactional mind-mindedness variables of frequency of valence of appropriate mind-related comments (frequency of positive, neutral or negative appropriate mind-related comments) and proportion of the valence of appropriate mind-related comments (frequency of valence of appropriate mind-related comments expressed as a proportion of total appropriate mind-related comments) were examined. The variables were not normally distributed and so non-parametric analysis was employed.

**8.3.6 Descriptive statistics for emotional content of mind-mindedness at Time 1**

***Descriptive statistics for emotional content of representational mind-mindedness at Time 1***

The descriptive statistics for the emotional content of mothers' representational mind-mindedness for older and younger sibling can be seen for frequency and proportion scores in Table 8.9. Information is provided in this table on how many mothers gave a mental attribute and so were included in the calculation of the variable.

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**Table 8.9.** Descriptive statistics for emotional content of representational mind-mindedness (frequency and proportion of valence of mental attributes) at Time 1

Variable	Mothers using valence (%) (N = 32)	Mean	SD	Range
<i>U ã^!Áã ã *ÁÁHGDÁ</i>				
Positive mental attributes (freq)	26 (81.2)	2.06	2.02	0-10
Neutral mental attributes (freq)	28 (87.5)	3.66	3.42	0-15
Negative mental attributes (freq)	13 (40.6)	.69	.97	0-3
<i>Ÿ[ } *^!Áã ã *ÁÁGIDÁ</i>				
Positive mental attributes (freq)	19 (70.4)	2.04	2.12	0-8
Neutral mental attributes (freq)	24 (88.9)	3.15	2.76	0-12
Negative mental attributes (freq)	13 (48.1)	.59	.75	0-3
<i>Úãç ^!Eã} áÁÁGIDÁ</i>				
Positive mental attributes (freq)	25 (86.2)	2.24	1.48	0-6
Neutral mental attributes (freq)	21 (72.4)	1.97	1.59	0-5
Negative mental attributes (freq)	9 (31.0)	.52	.99	0-4
<i>U ã^!Áã ã *ÁÁHGDÁ</i>				
Positive mental attributes (prop)	26 (81.2)	.40	.32	0-1.00
Neutral mental attributes (prop)	28 (87.5)	.51	.28	0-1.00
Negative mental attributes (prop)	13 (40.6)	.10	.13	0-.40
<i>Ÿ[ } *^!Áã ã *ÁÁGIDÁ</i>				
Positive mental attributes (prop)	19 (70.4)	.34	.28	0-.83
Neutral mental attributes (prop)	24 (88.9)	.52	.32	0-1.00
Negative mental attributes (prop)	13 (48.1)	.14	.24	0-1.00
<i>Úãç ^!Eã} áÁÁGIDÁ</i>				
Positive mental attributes (prop)	25 (86.2)	.52	.32	0-1.00
Neutral mental attributes (prop)	21 (72.4)	.39	.30	0-1.00
Negative mental attributes (prop)	9 (31.0)	.10	.16	0-.57

*p[ çE*freq = frequency; Prop = proportion; } = number of mothers who gave at least one mental attribute in description.

The majority of mothers used positive mental attributes (ranged from 70.4% to 86.2% of mothers) and neutral mental attributes (ranged from 72.4% to 88.9% of mothers) in descriptions. However, less than half the mothers described their children and partner/friend using negative mental attributes (ranged from 31.0% to

48.1% of mothers). When mothers used a negative mental attribute, the frequency was lower than that of the other two mental attribute valences.

**Descriptive statistics for emotional content of interactional mind-mindedness at Time 1**

The descriptive statistics for the emotional content of mothers' interactional mind-mindedness for older sibling and younger sibling are shown for frequency and proportion scores in Table 8.10. All mothers gave an appropriate mind-related comment with both children and so were included in the calculation of each variable at Time 1.

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**Table 8.10.** Descriptive statistics for emotional content of interactional mind-mindedness (frequency and proportion of valence of appropriate mind-related comments) at Time 1

Variable	Mothers using valence (%) (N = 32)	Mean	SD	Range
<hr/>				
<i>U ã^!Áã ã * Á Á HGDÁ</i>				
Positive AMRC (freq)	11 (34.4)	.66	1.15	0-5
Neutral AMRC (freq)	32 (100)	11.66	7.11	3-31
Negative AMRC (freq)Á	1 (3.1)	.06	.35	0-2
<i>Ÿ[ ~ } * ^!Áã ã * Á Á HGDÁ</i>				
Positive AMRC (freq)	9 (28.1)	.81	1.80	0-8
Neutral AMRC (freq)	32 (100)	14.34	7.50	3-31
Negative AMRC (freq)	0 (0)	0	0	0
<hr/>				
<i>U ã^!Áã ã * Á Á HGDÁ</i>				
Positive AMRC (prop)	11 (34.4)	.04	.07	0-.25
Neutral AMRC (prop)	32 (100)	.95	.07	.75-1.00
Negative AMRC (prop)Á	1 (3.1)	0	.02	0-.11
<i>Ÿ[ ~ } * ^!Áã ã * Á Á HGDÁ</i>				
Positive AMRC (prop)	9 (28.1)	.05	.09	0-.29
Neutral AMRC (prop)	32 (100)	.95	.09	.71-1.00
Negative AMRC (prop)	0 (0)	0	0	0

*P[ e*ÁMRC = appropriate mind-related comments; freq = frequency; prop = proportion; } = number of mothers who gave at least one appropriate mind-related comment in play session.

All mothers used neutral appropriate mind-related comments at Time 1. Approximately a third of the mothers used positive appropriate mind-related comments (ranged from 28.1% to 34.4% of mothers) in interactions; with 21 mothers not making a positive appropriate mind-related comment with their older child and 23 mothers not making a positive appropriate mind-related comment with their younger child. Mothers used mainly neutral appropriate mind-related comments with older siblings ( $T = 11.66$ ) and with younger siblings ( $T = 14.34$ ) compared with the much smaller mean score for use of positive appropriate mind-related comments with older siblings ( $T = .66$ ) and with younger siblings ( $T = .81$ ). Only one mother used a negative appropriate mind-related comment; therefore, this category of valence was excluded from further analysis at Time 1.

Due to the high prevalence of the quality of neutral valence, the relationship between the frequency of appropriate mind-related comments and the frequency of neutral appropriate mind-related comments was investigated. These scores were highly positively correlated for older siblings ( $r = .995, p < .001$ ) and for younger siblings ( $r = .98, p < .001$ ).

### **8.3.7 Consistency of relationships for emotional content of mind-mindedness at Time 1**

#### ***Relations between emotional content of mothers' representational mind-mindedness with older sibling, younger sibling and partner/friend at Time 1***

Spearman's rho correlations were carried out to establish whether there was a relationship between the emotional content of mothers' representational mind-mindedness with their children and partner/friend. Only mothers who had given a mental attribute in a description were included in analysis: mothers with older siblings ( $n = 32$ ); mothers with younger siblings ( $n = 27$ ); and mothers with partners/friends ( $n = 29$ ).

There were no significant correlations between the frequency of mothers' positive mental attributes with older siblings, younger siblings and partners/friends and these all had small effect sizes: older siblings and younger siblings ( $r = .77$ ); older siblings and partners/friends ( $r = .96$ ); and, younger siblings and partners/friends ( $r = .30$ ). The frequency of mothers' neutral mental attributes was not related with older siblings and younger siblings, although there was a non-significant positive trend ( $r = .06$ ). However, the frequency of mothers' neutral mental attributes was significantly positively correlated with

medium to large effect sizes for older siblings and partners/friends ( $r = .41, p = .007$ ) and for younger siblings and partners/friends ( $r = .41, p = .01$ ). The frequency of mothers' negative mental attributes was significantly positively correlated across all relationships with medium to large effect sizes: older siblings and younger siblings ( $r = .41, p = .002$ ); older siblings and partners/friends ( $r = .41, p = .001$ ); and, younger siblings and partners/friends ( $r = .41, p = .03$ ).

After controlling for verbosity (using the proportional measure), correlations between mothers' positive mental attributes with older siblings, younger siblings and partners/friends still failed to reach significance. The proportion of mothers' neutral mental attributes was no longer significantly correlated with any of the relationships: older siblings and younger siblings ( $r = -.12, p = .54$ ); older siblings and partners/friends ( $r = .12, p = .53$ ); and, younger siblings and partners/friends ( $r = .12, p = .22$ ). However, two of the significant relationships remained with the proportion of mothers' negative mental attributes and both had large effect sizes: older siblings and younger siblings ( $r = .41, p = .005$ ); and, older siblings and partners/friends ( $r = .41, p < .001$ ). Although there was a trend towards a relationship between the proportion of mothers' negative mental attributes with younger siblings and partners/friends ( $r = .31, p = .08$ ), this failed to reach significance.

***Relations between emotional content of mothers' interactional mind-mindedness with older sibling and younger sibling at Time 1***

Spearman's rho correlations were carried out to establish whether there was a relationship between mothers' positive and neutral appropriate mind-related comments with their older child and their younger child. The frequency of mothers' positive appropriate mind-related comments with older and younger siblings was not significantly related ( $r = .17, p = .34$ ) nor was the proportion of mothers' positive appropriate mind-related comments with older and younger siblings ( $r = .13, p = .49$ ). However, only a third of mothers produced positive mind-related comments, and this led to an investigation into whether mothers who produced positive mind-related comments with the older sibling were also those who produced positive mind-related comments with the younger sibling.

**Table 8.11.** Relations between mothers who did or did not make positive mind-related comments with older and younger siblings at Time 1

		Positive AMRC with younger sibling		
		Yes	No	Total
Positive AMRC with older sibling	Yes	4	7	11
	No	5	16	21
	Total	9	23	32

AMRC = appropriate mind-related comments.

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Table 8.11 displays the overlap between mothers who did and did not make positive mind-related comments with older and younger siblings at Time 1. Only four mothers made positive mind-related comments with both children whilst 16 mothers did not make a positive mind-related comment with either child. Fisher's exact test is reported because one cell (25%) had an expected frequency of less than 5. This showed that there was no significant association between mothers who made positive mind-related comments with their older child and their younger child ( $J = .68$ ).

The frequency of mothers' neutral appropriate mind-related comments with older siblings was significantly positively correlated with younger siblings with a large effect size ( $r = .68, p < .001$ ). However, when the proportion of neutral appropriate mind-related comments was investigated, this relationship was no longer significant ( $r = .22, J = .22$ ).

### 8.3.8 Summary at Time 1

It was important to rule out relations between the socio-demographic characteristics of the sample and mothers' levels of mind-mindedness. The variables of mothers' age, education, SES, total number of children, and child's age were not related to mothers' levels of representational or interactional mind-mindedness with one exception. Mothers' age was related to the frequency of mental attributes provided for older siblings but this relationship was no longer significant when the scoring controlled for verbosity. Mothers' levels of representational mind-mindedness and interactional mind-mindedness did not vary by gender. Order effects were not found in mother's levels of mind-mindedness for the interviews nor for the play sessions.

The majority of mothers produced mental attributes in their descriptions. Mothers' levels of representational mind-mindedness indexed by mental attribute frequency,

was positively correlated, with a medium effect size, in two out of the three relationships: older siblings and younger siblings; and, younger siblings and partners/friends. There was no significant relationship with older siblings and partners/friends. However, mothers' levels of representational mind-mindedness indexed by mental attribute proportion showed no significant relationships between older siblings, younger siblings and partners/friends.

All mothers gave appropriate mind-related comments in interactions with each of their children. Mothers' levels of interactional mind-mindedness showed a strong positive correlation with both the frequency and the proportion of appropriate mind-related comments made by mothers in their play sessions with older siblings and younger siblings. Most mothers did not make non-attuned mind-related comments and when they did, only one to two comments were made. Analysis revealed mothers' use of non-attuned mind-related comments with one child was unrelated to their use of non-attuned mind-related comments with their other child.

The emotional content of mothers' representational mind-mindedness, measured using the valence of mental attributes, revealed that the majority of mothers produced positive and neutral mental attributes whilst less than half the mothers mentioned negative mental attributes. There were no significant correlations between mothers' use of positive valence for either the frequency or the proportion of mental attributes given in a description about an older sibling, younger sibling or partner/friend. Mothers' use of neutral valence in the frequency of mental attributes showed medium to large positive correlations for older siblings and partners/friends, and for younger siblings and partners/friends, but not for older siblings and younger siblings. However, there were no significant correlations with the proportion of neutral mental attributes. Mothers' use of negative valence in both the frequency and the proportion of mental attributes were significantly positively correlated, again with medium to large effect sizes, for older siblings and younger siblings and for older siblings and partners/friends. This pattern was almost repeated for younger siblings and partners/friends but only frequency was significantly related whilst with proportion, there was a trend towards a relationship.

The emotional content of mothers' interactional mind-mindedness, measured using the valence of appropriate mind-related comments, revealed that all mothers used mainly neutral appropriate mind-related comments and a third used positive appropriate mind-related comments. Negative appropriate mind-related comments



were so rare as to be dropped from analysis. The frequency and proportion of mothers' positive appropriate mind-related comments with older and younger siblings was unrelated while the frequency of mothers' neutral appropriate mind-related comments with older and younger siblings showed a strong positive correlation. However, no significant relationship was found with the proportion of neutral appropriate mind-related comments with older and younger siblings.

### 8.3.9 Preliminary analyses for Time 2

#### **Are levels of representational mind-mindedness related to mother and child socio-demographics at Time 2?**

The aim of the next set of correlations displayed in Table 8.12 was to establish whether there were any relationships approximately nine months later between mothers' levels of representational mind-mindedness and mother and child socio-demographics.

**Table 8.12.** Correlations between levels of representational mind-mindedness (mental attribute frequency and proportion) and demographic variables at Time 2

Variable	Mother's age	Education	SES	Child's age
<i>U ã^!Áã ã *KÁ</i>				
Mental attributes (freq)	.36*	.04	-.17	.03
Mental attributes (prop)	.16	-.01	.04	.22
<i>Ÿ[ ~ } *^!Áã ã *KÁ</i>				
Mental attributes (freq)	-.03	-.09	-.12	.18
Mental attributes (prop)	-.10	.07	-.01	.30
<i>Úãç ^!Dã} áKÁ</i>				
Mental attributes (freq)	.47**	.16	-.17	n/a
Mental attributes (prop)	.34	.20	-.09	n/a

*p* < .05. SES = socio-economic status; freq = frequency; prop = proportion.

*U|ã^!Áã|ã \*KÁ*

At Time 2, mothers' education and socio-economic status (measured by household occupation) and child's age were not correlated with mental attribute frequency and proportion. Mothers' age was not correlated with mental attribute frequency and proportion except for the positive correlations found between mothers' age and mental attribute frequency with older siblings ( $r = .36, p = .048$ ), and between mothers' age and mental attribute frequency with partners/close friends ( $r = .47, p =$

.009). However, the correlation between mothers' age and mothers' mental attribute frequency with older siblings was only marginally significant; and, once the total attributes produced by the mother had been taken into account, no significant correlation was found with the variable of mental attribute proportion.

Therefore, once verbosity had been controlled for, the characteristics of the sample were not found to be related to mothers' levels of representational mind-mindedness and so the variables of mothers' age, education, SES and child's age were not included in further analysis at Time 2. In addition, mothers' levels of representational mind-mindedness were not related to how many children they had.

***Are levels of interactional mind-mindedness related to mother and child socio-demographics at Time 2?***

Relations between mothers' levels of interactional mind-mindedness and the demographic characteristics of the sample were investigated at Time 2. Table 8.13 shows that levels of interactional mind-mindedness were unrelated to mothers' age, education and socio-economic status (measured by household occupation) and child's age. As with Time 1, these null findings meant that socio-demographic variables were excluded from subsequent analysis at Time 2. Mothers' levels of interactional mind-mindedness were again also unrelated to how many children they had.

**Table 8.13.** Correlations between levels of interactional mind-mindedness (appropriate mind-related comment frequency and proportion) and demographic variables at Time 2

<b>Variable</b>	<b>Mothers' age</b>	<b>Education</b>	<b>SES</b>	<b>Child's age</b>
<i>U ã^!Áã ã *KÁ</i>				
AMRC (freq)	-.05	.09	.19	.05
AMRC (prop)	.02	.16	.23	.23
<i>Ÿ[ ~} *^!Áã ã *KÁ</i>				
AMRC (freq)	.09	-.03	.26	-.20
AMRC (prop)	.07	-.01	.33	-.07

*p[ e*AMRC = appropriate mind-related comments; SES = socio-economic status; freq = frequency; prop = proportion.

### ***Do levels of mind-mindedness vary according to gender at Time 2?***

A set of correlations was carried out to investigate whether levels of maternal mind-mindedness varied according to the gender of the child. Representational mind-mindedness measured by the frequency of mothers' mental attributes did not significantly differ with gender for older siblings ( $W= 80.50, \lambda = -1.18, J = .25$ ) nor for younger siblings ( $W= 83.50, \lambda = -.91, J = .37$ ). Representational mind-mindedness measured by the proportion of mothers' mental attributes did not significantly differ with gender for older siblings ( $\chi(28) = 1.66, J = .11$ ) nor for younger siblings ( $\chi(28) = .72, J = .48$ ). Interactional mind-mindedness measured by the frequency of mothers' appropriate mind-related comments did not significantly differ with gender for older siblings ( $\chi(28) = -1.09, J = .29$ ) nor for younger siblings ( $\chi(28) = .38, J = .70$ ). Interactional mind-mindedness measured by the proportion of mothers' appropriate mind-related comments did not significantly differ with gender for older siblings ( $\chi(27.26) = -1.17, J = .25$ ) nor for younger siblings ( $\chi(28) = .44, J = .66$ ).

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To summarise, mothers' levels of representational mind-mindedness and their levels of interactional mind-mindedness did not show any gender differences for either older or younger siblings. Gender was therefore not included in any further analysis at Time 2.

### ***Do levels of mind-mindedness vary according to order of interview and play session at Time 2?***

Mental attribute frequency and proportion were analysed to investigate whether mothers' levels of representational mind-mindedness were influenced by the order of the interview at Time 2. Representational mind-mindedness measured by the frequency of mothers' mental attributes did not significantly differ with the order of the interview for older siblings ( $W= 97.00, \lambda = -.57, J = .58$ ) nor for younger siblings ( $W= 109.00, \lambda = -.06, J = .96$ ). Representational mind-mindedness measured by the proportion of mental attributes did not significantly differ with the order of the interview for older siblings (Time  $\chi(28) = 1.51, J = .14$ ) nor for younger siblings ( $\chi(28) = -.05, J = .96$ ).

Appropriate mind-related comment frequency and proportion were analysed to investigate whether mothers' levels of interactional mind-mindedness were influenced by the order of the play session at Time 2. Interactional mind-mindedness measured by frequency of appropriate mind-related comments did not

significantly differ with the order of the play session for older siblings ( $\alpha(28) = .82, J = .42$ ) or for younger siblings ( $\alpha(28) = .27, J = .79$ ). Interactional mind-mindedness measured by proportion of appropriate mind-related comments did not significantly differ with the order of the play session for older siblings ( $\alpha(28) = 1.24, J = .23$ ) or for younger siblings ( $\alpha(22.38) = .72, J = .48$ ). Therefore, an order effect on mothers' levels of mind-mindedness was not found for both the interviews and the play sessions and so order was not included in further analysis at Time 2.

### **8.3.10 Descriptive statistics for levels of mind-mindedness at Time 2**

The descriptive statistics for mothers' levels of representational mind-mindedness for older and younger sibling and partner/friend and for mothers' levels of interactional mind-mindedness for older and younger sibling at Time 2 are presented in Table 8.14.

**Table 8.14.** Descriptive statistics for levels of representational mind-mindedness (mental attribute frequency and proportion) and interactional mind-mindedness (appropriate/non-attuned mind-related comment frequency and proportion) at Time 2

Variable	Mothers using mental attributes or mind-related comments (N = 30)	Mean	SD	Range
<i>Ujã^!Áã ã *KÁ</i>				
Mental attributes (freq)	30	5.00	3.01	1-14
Mental attributes (prop)	30	.35	.13	.14-.63
<i>ÿ[ ~ } *^!Áã ã *KÁ</i>				
Mental attributes (freq)	29	4.23	2.22	0-9
Mental attributes (prop)	29	.32	.16	0-.75
<i>Úæç ^!Bã} áKÁ</i>				
Mental attributes (freq)	27	3.27	2.36	0-8
Mental attributes (prop)	27	.29	.20	0-.71
<i>Ujã^!Áã ã *KÁ</i>				
AMRC (freq)	30	9.50	5.22	1-19
AMRC (prop)	30	.06	.03	.01-.12
<i>ÿ[ ~ } *^!Áã ã *KÁ</i>				
AMRC (freq)	29	14.03	8.98	0-33
AMRC (prop)	29	.07	.04	0-.15
<i>Ujã^!Áã ã *KÁ</i>				
NAMRC (freq)	7	0.30	0.60	0-2
NAMRC (prop)	7	0	0	0-.02
<i>ÿ[ ~ } *^!Áã ã *KÁ</i>				
NAMRC (freq)	1	0.03	0.18	0-1
NAMRC (prop)	1	0	0	0-.00

*p[ ç Æ*freq = frequency; prop = proportion; AMRC = appropriate mind-related comments; NAMRC = non-attuned mind-related comments.

All mothers gave a mental attribute in descriptions of their older child, and only one mother did not do so for their younger child and three mothers did not do so for their partner/friend. All mothers gave an appropriate mind-related comment whilst interacting with their older child and only one mother did not do so with their younger child.

Mothers' mental attribute frequency and proportional scores were positively correlated for the older sibling ( $r = .66, p < .001$ ), younger sibling ( $r = .71, p < .001$ ), and partner/friend ( $r = .93, p < .001$ ). Mothers' appropriate mind-related comments frequency and proportional scores were positively correlated for the older sibling ( $r = .94, p < .001$ ), and younger sibling ( $r = .94, p < .001$ ).

***The distribution of non-attuned mind-related comments at Time 2***

Table 8.14 shows that the frequency and proportion of non-attuned mind-related comments made by mothers with both older and younger siblings were low. At Time 2, 23 mothers with older siblings and 29 mothers with younger siblings did not make any non-attuned mind-related comments. Further detail is provided in Table 8.15, which displays the frequency of non-attuned mind-related comments, and the percentage of mothers who did and did not make these comments with their children.

**Table 8.15.** Non-attuned mind related comments by percentage of mothers and frequency at Time 2

NAMRC frequency		% of mothers making NAMRC		
		0 NAMRC	1 NAMRC	2 NAMRC
Time 2	Older sibling	76.7	16.6	6.7
	Younger sibling	96.7	3.3	0

*p* = percentage of mothers making non-attuned mind-related comments with older or younger sibling at Time 2 ( $n = 30$ ).

A small percentage of mothers made one non-attuned mind-related comment and mothers who made two non-attuned mind-related comments were even rarer. Non-attuned mind-related comments were excluded from subsequent coding and analysis of the emotional content of mind-mindedness due to the rarity of this category of comment at Time 2.

***Do mothers who use non-attuned mind-related comments do so with both siblings at Time 2?***

Following the rationale provided for the treatment of this measure at Time 1, non-attuned mind-related comments were dichotomised into whether mothers did or did not make these types of mind-related comment at Time 2.

**Table 8.16.** Relations between mothers who did or did not make non-attuned mind-related comments with older and younger siblings at Time 2

		NAMRC with younger sibling		
		Yes	No	Total
NAMRC with older sibling	Yes	0	7	7
	No	1	22	23
	Total	1	29	30

*p* [  $\chi^2$  ] NAMRC = non-attuned mind-related comments.

Table 8.16 shows the overlap; no mother made a non-attuned mind-related comment with both children and 22 mothers did not make a non-attuned mind-related comment with either child. Fisher's exact test is reported because two cells (50%) had an expected frequency of less than 5. No significant association was found between mothers who made non-attuned mind-related comments with their older child and their younger child ( $J = 1.00$ ). Therefore, mothers who made this category of comment with one child were not more likely to make non-attuned mind-related comments with their other child.

### **8.3.11 Consistency of relationships for levels of mind-mindedness at Time 2** **Relations between mothers' levels of representational mind-mindedness with older sibling, younger sibling and partner/friend at Time 2**

Correlations between mothers' levels of representational mind-mindedness with older sibling, younger sibling and partner/friend are shown for mental attribute frequency in Table 8.17 and for mental attribute proportion in Table 8.18.

**Table 8.17.** Correlations between levels of representational mind-mindedness (mental attribute frequency) with older sibling, younger sibling and partner/friend at Time 2

<b>Variable</b>	Mental attrib (freq) (Older sibling)	Mental attrib (freq) (Younger sibling)	Mental attrib (freq) (Partner/friend)
Mental attrib (freq) (Older sibling)	–		
Mental attrib (freq) (Younger sibling)	.41*	–	
Mental attrib (freq) (Partner/friend)	.38*	.15	–

*p* [  $\chi^2$  ] Mental attrib (freq) = mental attribute frequency.

*p* [  $\chi^2$  ]

At Time 2, two significant positive correlations were found, both showing a medium effect size. Mothers' mental attribute frequency with older siblings was significantly positively correlated with younger siblings ( $r = .41, J = .03$ ). Mothers' mental attribute frequency with older siblings was also significantly positively correlated with partners/friends ( $r = .38, J = .04$ ). Therefore, this set of correlations showed a relationship between mothers' levels of representational mind-mindedness indexed by the frequency of mental attributes given in their descriptions of older siblings with younger siblings, and older siblings with partners/friends. However, no relationship was found between the frequency of mental attributes with younger siblings and partners/friends.

**Table 8.18.** Correlations between levels of representational mind-mindedness (mental attribute proportion) with older sibling, younger sibling and partner/friend at Time 2

Variable	Mental attrib (prop) (Older sibling)	Mental attrib (prop) (Younger sibling)	Mental attrib (prop) (Partner/friend)
Mental attrib (prop) (Older sibling)	–		
Mental attrib (prop) (Younger sibling)	.36*	–	
Mental attrib (prop) (Partner/friend)	.30	.48**	–

$p < .05$  Mental attrib (prop) = mental attributes proportion.

\*  $p < .05$  \*\*  $p < .001$

Mothers' mental attribute proportion showed two medium significant correlations at Time 2. Mothers' mental attribute proportion with older siblings was significantly positively correlated with younger siblings ( $r = .36, J = .049$ ) but only with a marginal significance level. Mothers' mental attribute proportion with younger siblings was significantly positively correlated with partners/friends ( $r = .48, J = .008$ ). When verbosity was controlled for, the significant relationships found with mental attribute frequency were not duplicated in their entirety. The positive relationship between mothers' levels of representational mind-mindedness measured by the frequency of mental attributes in their descriptions of older siblings and younger siblings remained significant with the proportion of mental attributes, but there was no longer a relationship between mothers' levels of representational mind-mindedness in descriptions of older siblings and partners/friends. Instead, a relationship was found with mental attribute proportion between mothers' levels of representational mind-



mindfulness with younger siblings and partners/friends which did not exist with mental attribute frequency.

**Relations between mothers' levels of interactional mind-mindedness with older sibling and younger sibling at Time 2**

Correlations between mothers' levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) with the older sibling and the younger sibling are presented in Table 8.19.

**Table 8.19.** Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) with older sibling and younger sibling at Time 2

Variable	AMRC frequency (Older sibling)	AMRC proportion (Older sibling)
AMRC frequency (Younger sibling)	.61***	–
AMRC proportion (Younger sibling)	–	.59**

AMRC = appropriate mind-related comments.

\*\*\* p < .001, \*\* p < .01.

At Time 2, mothers' interactional mind-mindedness, measured using the frequency of appropriate mind-related comments made by a mother in a play session with a child, showed a significant positive relationship between older siblings and younger siblings, with a large effect size ( $r = .61, p < .001$ ). Mothers' interactional mind-mindedness, measured using the proportion of appropriate mind-related comments made by a mother with a child, also showed a significant positive relationship between older siblings and younger siblings, again with a large effect size ( $r = .59, p = .001$ ).

**8.3.12 Descriptive statistics for emotional content of mind-mindedness at Time 2**

**Descriptive statistics for emotional content of representational mind-mindedness at Time 2**

The descriptive statistics for the emotional content of mothers' representational mind-mindedness for older and younger sibling can be seen for frequency and proportion scores in Table 8.20. This table shows the number of mothers who gave

a mental attribute in their description and so were included in the calculation of the variable.

**Table 8.20.** Descriptive statistics for emotional content of representational mind-mindedness (frequency and proportion of valence of mental attributes) at Time 2

Variable	Mothers using valence (%) (N = 30)	Mean	SD	Range
<i>U ǎ^!Áǎ ǎ *ÁǎÁÁEDA</i>				
Positive mental attributes (freq)	25 (83.3)	1.70	1.24	0-4
Neutral mental attributes (freq)	25 (83.3)	2.87	2.87	0-11
Negative mental attributes (freq)	9 (30.0)	.43	.73	0-2
<i>Ÿ[ ~} *^!Áǎ ǎ *ÁǎÁÁGDA</i>				
Positive mental attributes (freq)	19 (65.5)	1.17	1.20	0-5
Neutral mental attributes (freq)	28 (96.6)	2.83	1.81	0-7
Negative mental attributes (freq)	9 (31.0)	.38	.62	0-2
<i>Úǎǎ ^!Eǎ}ǎÁǎÁÁGDA</i>				
Positive mental attributes (freq)	20 (74.1)	1.56	1.40	0-5
Neutral mental attributes (freq)	20 (74.1)	1.93	1.77	0-6
Negative mental attributes (freq)	3 (11.1)	.15	.46	0-2
<i>U ǎ^!Áǎ ǎ *ÁǎÁÁEDA</i>				
Positive mental attributes (prop)	25 (83.3)	.41	.31	0-1.00
Neutral mental attributes (prop)	25 (83.3)	.51	.30	0-1.00
Negative mental attributes (prop)	9 (30.0)	.08	.14	0-.50
<i>Ÿ[ ~} *^!Áǎ ǎ *ÁǎÁÁGDA</i>				
Positive mental attributes (prop)	19 (65.5)	.26	.25	0-.75
Neutral mental attributes (prop)	28 (96.6)	.65	.27	0-1.00
Negative mental attributes (prop)	9 (31.0)	.09	.16	0-.67
<i>Úǎǎ ^!Eǎ}ǎÁǎÁÁGDA</i>				
Positive mental attributes (prop)	20 (74.1)	.46	.38	0-1.00
Neutral mental attributes (prop)	20 (74.1)	.50	.38	0-1.00
Negative mental attributes (prop)	3 (11.1)	.04	.11	0-.33

*P*[ǎǎFreq = frequency; Prop = proportion; } = number of mothers who gave at least one mental attribute in description.

Mothers using positive mental attributes in the descriptions ranged from 65.5% to 83.3% of mothers. Neutral mental attributes were used more than the other

categories of valence and ranged from 74.1% to 96.6% of mothers. Of the three valence measures, the smallest percentage of mothers described their children and partner/friend using negative mental attributes and this ranged from 11.1% to 31% of mothers.

**Descriptive statistics for emotional content of interactional mind-mindedness at Time 2**

The descriptive statistics for the emotional content of mothers' interactional mind-mindedness for older sibling and younger sibling are shown for frequency and proportion scores in Table 8.21. This table shows the number of mothers who gave an appropriate mind-related comment in the play session and so were included in the calculation of the variable.

**Table 8.21** Descriptive statistics for emotional content of interactional mind-mindedness (frequency and proportion of valence of appropriate mind-related comments) at Time 2

Variable	Mothers using valence (%) (N = 30)	Mean	SD	Range
<hr/>				
U á^!Áã ã * Á ÁMÉDÁ				
Positive AMRC (freq)	15 (50)	.87	1.20	0-5
Neutral AMRC (freq)	30 (100)	8.63	5.09	1-18
Negative AMRC (freq)Á	0 (0)	0	0	0
Ÿ[ } *^!Áã ã * Á ÁMÉDÁ				
Positive AMRC (freq)	15 (51.7)	.90	1.29	0-6
Neutral AMRC (freq)	29 (100)	13.55	8.30	1-32
Negative AMRC (freq)	0 (0)	0	0	0
<hr/>				
U á^!Áã ã * Á ÁMÉDÁ				
Positive AMRC (prop)	15 (50)	.10	.15	0-.50
Neutral AMRC (prop)	30 (100)	.90	.15	.50-1.00
Negative AMRC (prop)Á	0 (0)	0	0	0
Ÿ[ } *^!Áã ã * Á ÁMÉDÁ				
Positive AMRC (prop)	15 (51.7)	.06	.09	0-.29
Neutral AMRC (prop)	29 (100)	.92	.11	.63-1.00
Negative AMRC (prop)	0 (0)	0	0	0

p[ çÉAMRC = appropriate mind-related comments; freq = frequency; prop = proportion; } = number of mothers who gave at least one appropriate mind-related comment in play session.

At Time 2, of the mothers who used an appropriate mind-related comment in an interaction, all gave at least one neutral appropriate mind-related comment. Approximately half the mothers used positive appropriate mind-related comments (ranged from 50% to 51.7%) in interactions. The same number of mothers (15) made a positive mind-related comment with their older child as those who made a positive mind-related comment with their younger child. Mothers' positive appropriate mind-related comments made with older siblings ( $T = .87$ ) and with younger siblings ( $T = .90$ ) were far fewer than neutral appropriate mind-related comments made with older siblings ( $T = 8.63$ ) and with younger siblings ( $T = 13.55$ ). No mother used a negative mind-related comment with either child and so this measure was not included in subsequent analysis at Time 2.

All mothers used mainly neutral valence, and as with Time 1, this led to an investigation into the relationship between the frequency of appropriate mind-related comments and the frequency of neutral appropriate mind-related comments. The frequency of appropriate mind-related comments was highly positively correlated with the frequency of neutral appropriate mind-related comments for older siblings ( $r = .96, p < .001$ ) and for younger siblings ( $r = .99, p < .001$ ).

### **8.3.13 Consistency of relationships for emotional content of mind-mindedness at Time 2**

#### **Relations between emotional content of mothers' representational mind-mindedness with older sibling, younger sibling and partner/friend at Time 2**

There were no significant correlations between the frequency of mothers' positive mental attributes with older siblings, younger siblings and partners/friends and these all had small effect sizes: older siblings and younger siblings ( $r = .10$ ), older siblings and partners/friends ( $r = .43$ ) and, younger siblings and partners/friends ( $r = .10$ ). The frequency of mothers' neutral mental attributes was significantly positively correlated with older siblings and younger siblings ( $r = .48, p = .048$ ), although this only just reached significance; whilst no significant relationship was found for older siblings and partners/friends ( $r = .32$ ) nor for younger siblings and partners/friends ( $r = .70$ ). The frequency of mothers' negative mental attributes was not significantly correlated between relationships and these all had small effect sizes: older siblings and younger siblings ( $r = .33$ ); older siblings and partners/friends ( $r = .67$ ); and, younger siblings and partners/friends ( $r = .14$ ). Therefore, only one

significant correlation was found for the frequency of valence of mental attributes at Time 2.

With respect to the proportional measure, there were no significant correlations between the proportion of mothers' positive mental attributes, neutral mental attributes or negative mental attributes with older siblings, younger siblings and partners/friends. Therefore, the relationship between mothers' neutral mental attributes with older siblings and younger siblings, which was the only significant correlation found with frequency of valence of mental attributes at Time 2, was no longer significant once verbosity had been taken into account.

***Relations between emotional content of mothers' interactional mind-mindedness with older sibling and younger sibling at Time 2***

Neither the frequency ( $r = .32, J = .09$ ), nor the proportion ( $r = .29, J = .13$ ), of mothers' positive appropriate mind-related comments were significantly correlated in interactions with older and younger siblings. Strikingly, half the mothers made a positive mind-related comment with their older child and half the mothers made a positive mind-related comment with their younger child and as a result, the overlap between these mothers was explored.

**Table 8.22.** Relations between mothers who did or did not make positive mind-related comments with older and younger siblings at Time 2

		Positive AMRC with younger sibling		
		Yes	No	Total
Positive AMRC with older sibling	Yes	9	5	14
	No	6	9	15
	Total	15	14	29

AMRC = appropriate mind-related comments.

Table 8.22 shows that nine mothers made positive mind-related comments with both children whilst nine mothers did not make a positive mind-related comment with either child at Time 2. A chi-square test revealed that there was still no significant association between mothers who made positive mind-related comments with their older child and their younger child ( $X^2 (1) = 1.71, J = .19$ ). This meant that mothers who made positive mind-related comments with one child were not more likely to make positive mind-related comments with their other child, suggesting

there is no association between mothers' use of positive mind-related comments in interactions with two children in this sample.

The frequency of mothers' neutral appropriate mind-related comments with older siblings was significantly positively correlated with younger siblings ( $r = .58, p = .001$ ). This significant relationship did not remain when verbosity was controlled for, looking at the proportion of neutral appropriate mind-related comments ( $r = .18, p = .36$ ).

#### **8.3.14 Summary at Time 2**

There were no significant relationships between mothers' levels of representational or interactional mind-mindedness and mother's age, education, SES and child's age with two exceptions. These comprised the positive correlations between mothers' age and the frequency of mental attributes provided for partners/friends, and the marginally significant relationship between mothers' age and the frequency of mental attributes provided for older siblings. Neither of these relationships remained significant with the proportion of mental attributes. Mothers' levels of representational mind-mindedness and interactional mind-mindedness did not vary by gender and were not found to be affected by the order of the interview or play session.

Nearly all the mothers described their children using mental attributes. Mothers' levels of representational mind-mindedness indexed by the frequency of mental attributes, was positively correlated with a medium effect size, with older siblings and younger siblings, and with older siblings and partners/friends, but not with younger siblings and partners/friends. Mothers' levels of representational mind-mindedness indexed by mental attribute proportion revealed a different set of significant relationships. The positive correlation remained with older siblings and younger siblings but not with older siblings and partners/friends. Mothers' mental attribute proportion was now positively correlated with younger siblings and partners/friends.

All mothers gave appropriate mind-related comments in interactions with each of their children apart from one mother who did not do so with her younger child. Mothers' levels of interactional mind-mindedness, indexed by the frequency and the proportion of appropriate mind-related comments made by mothers in interactions, showed a strong positive correlation with older siblings and younger siblings. Very

few mothers made non-attuned mind-related comments and a maximum of only two of these comments was made in an interaction. Mothers' use of non-attuned mind-related comments with their older child was unrelated to their use of non-attuned mind-related comments with their younger child.

An investigation into the emotional content of mothers' representational mind-mindedness showed that positive and neutral mental attributes were often used by mothers whilst less than a third described a child or their partner/friend using a negative mental attribute. There were no significant correlations between mothers' use of valence for either the frequency or the proportion of mental attributes given in a description about an older sibling, younger sibling or partner/friend apart from one exception. The frequency of mothers' neutral mental attributes with older siblings and younger siblings was positively correlated albeit with a marginal significance level.

An assessment of the emotional content of mothers' interactional mind-mindedness revealed that of the mothers who had produced an appropriate mind-related comment in an interaction, approximately half used positive appropriate mind-related comments and all used neutral appropriate mind-related comments. No mother used a negative appropriate mind-related comment. The frequency and proportion of mothers' positive appropriate mind-related comments with older and younger siblings was unrelated. The frequency of mothers' neutral appropriate mind-related comments was positively and strongly correlated with older and younger siblings but the proportion of neutral appropriate mind-related comments with older and younger siblings was unrelated.

#### **8.4 Discussion**

The primary aim of the research reported here was to address whether maternal mind-mindedness was consistent across relationships. In doing so, both the levels and the emotional content of mind-mindedness were explored at Time 1 and Time 2. The strength of this design was to enable an investigation of variables between the same relationships at not just one but at two time points; thereby, results at Time 1 could be either supported by or contradicted by subsequent findings at Time 2.

Before discussing the main research question, findings regarding relations between mothers' levels of mind-mindedness and socio-demographic factors are of interest.

Mothers' levels of representational and interactional mind-mindedness were unrelated to mothers' educational level or to SES, supporting previous studies which did not find a significant relationship with one or both of these variables (Meins et al., 1998, 2002, 2011, 2013; Meins & Fernyhough, 1999; Schacht et al., 2013; Walker et al., 2011). It should be noted that the sample which took part in this study was predominantly highly educated and middle-class. The low variance in the sample's educational levels and SES means that it is unsurprising that mind-mindedness was unrelated to these background characteristics. However, mind-mindedness still varied with respect to both mothers' representations of their children and partner/friend, and mothers' mind-related comments in interactions in this consistently middle-class and highly educated sample; supporting the argument that mind-mindedness is not a product of SES or education.

There are a number of potential explanations for this lack of a relationship between mind-mindedness and SES and education. It has been argued that SES is a rather amorphous concept with the most common markers being parental education, occupational status and family income (Duncan & Magnuson, 2003). To more narrowly define maternal background characteristics, education was separated out from occupational status in the present study. Mothers' SES was measured solely on the highest household occupation of the mother or partner. The sample was skewed towards families with a high SES using this rating with 75% of households being in the top two occupational categories (managers and senior officials, and professional occupations). However, a relationship between mind-mindedness and SES cannot be entirely ruled out due to a previous study's findings. Meins et al. (2011) did find a positive, albeit small, relationship between appropriate mind-related comments and SES but in a sample with very different characteristics. This was a socially diverse sample, with half the mothers coming from low SES households, in particular from the lowest two Hollingshead categories (unskilled or menial and semi-skilled or manual). The study comprised not only a very different sample to the one discussed in this thesis but also used a different measure of SES, the Hollingshead scale (Hollingshead, 1975) which combines education, occupation, marital status and gender. Therefore, sample characteristics in terms of diversity and the way in which it is measured may have implications for an association between SES and mind-mindedness.

Assuming that more years spent in the education system would lead to an increased propensity for higher level thinking and a greater vocabulary, one might



have expected mind-mindedness to be related to education if it involved complex language. However, disparate weighting is not given when coding mental attributes or mind-related comments of varying levels of sophistication. In this way, simple mind-related comments involving words such as 'think' and 'remember' are treated the same as those which are more complex such as 'ruminate' or 'recollect'. In fact, most of the attributes and comments which were considered to be evidence of mind-mindedness fell into the category of ordinary or standard rather than sophisticated language. This supports the view proposed by Rosenblum et al. (2008) that mind-mindedness is not purely intellectual but instead may be suggestive of an emotional and psychological process.

In contrast to the clear cut lack of a relationship between mind-mindedness and maternal education and SES, an investigation into relations between mind-mindedness and mothers' age yielded somewhat inconsistent findings. With respect to levels of representational mind-mindedness, relations between mothers' age and the number of mental attributes mentioned by mothers about the older sibling and partner/friend were found, but only consistently for the older sibling. Not only that, but when one considers instead how many mental attributes a mother produced in a description as a proportion of total attributes mentioned, no relations were found with mothers' age at all. Adding further weight to mind-mindedness not being influenced by mothers' age, mothers' levels of interactional mind-mindedness with their older and their younger child were unrelated to mothers' age.

This lack of a relationship is unsurprising as it is unclear why a mother's age would be related to how mind-minded she was about her child. An argument in support of a relationship between mothers' age and mind-mindedness could be proposed if older mothers were thought to have more experience of motherhood than younger mothers. Age could then be associated with a greater exposure to, and knowledge of, children's internal states. Half the families which took part in the study had more than two children. The older mothers might have had more experience of motherhood than the younger mothers if they were those with more children. However, there was no difference in mothers' age in the families which had two children and those which had more than two children; and so it seems that age was not linked with experience of motherhood and was unlikely to be associated with levels of mind-mindedness. With respect to a possible positive link between mothers' mind-mindedness and greater experience of motherhood due to having more children, there was no correlation between mothers' levels of mind-

mindfulness and the number of children in the family. Taking these findings overall, the characteristics of the sample (predominantly educated and middle class, with an average age of 39), were not related to mothers' levels of representational or interactional mind-mindedness.

Two child factors, children's age and gender, were investigated to find out whether either were related to mothers' mind-mindedness. Children's age was unrelated to mothers' levels of both representational and interactional mind-mindedness. The age of the child was thus neither related to whether a mother was more or less likely to use mental attributes to describe them, nor to whether a mother was more or less likely to use appropriate mind-related comments while interacting with them. Given that the consistency of mothers' mind-mindedness with two children of different ages was being investigated (apart from two exceptions involving twins), the finding that mothers' levels of mind-mindedness with each of their children was independent of the child's age is critical as age could then be ruled out as a confounding factor.

This finding, that children's age was not associated with levels of mind-mindedness, is worthy of further comment given that the study aimed to extend the measurement of interactional mind-mindedness to older children. Maternal talk has been found to vary with the level of the understanding of the child, with an increased use of mental state language as children mature (Beeghly et al., 1986; Dunn, Bretherton, & Munn, 1987; Ruffman, Slade, & Crowe, 2002). For the data reported here, how can one explain the finding that mothers' appropriate mind-related comments do not increase when the child ages and consequently has more mental state vocabulary? One possible explanation returns to the issue of the very nature of maternal mind-mindedness and its use of relatively simple language. Other studies (e.g., Meins et al., 2001) reported that mothers made appropriate references to their children's mental states in interactions when they were as young as 6-months-old, for example, making references to their desires using words such as "want", and to events in the past using words such as "remember" (p. 641). Although the children taking part in the present study were older, the language used by mothers was very similar to that used with much younger children. The continuity in mind-related discourse will be further investigated in the longitudinal analysis reported in Chapter 10.

Gender did not impact on mothers' levels of representational and interactional mind-mindedness, consistent with previous research which did not find a gender effect (Demers et al., 2010a; Meins et al., 2011, 2013; Schacht et al., 2013; Walker et al., 2011). Therefore, whether a mother was talking about or interacting with a son or a daughter had no effect on their levels of mind-mindedness. This supports previous findings suggesting that mind-mindedness is not influenced by relational factors on the basis of gender.

To control for order effects, the mind-mindedness interviews and play sessions had been counterbalanced so that half the mothers described the older child first and half the mothers played with the older child first. It was important to rule out that mothers talked more or less depending on the order of the interview, or that maternal behaviour was affected by the order of the play session. Mothers might, for example, have produced more mental attributes at each time point in the second description of a child because they were more comfortable with the interviewer and the process of describing a child or they might have produced fewer mental attributes due to fatigue. However, no order effects were found which is reassuring but also unsurprising. If the tasks or research activities are truly "engaging" for the mothers and are seen by them as specific to each child, one would not expect order effects.

Turning now to the primary research question, whether mothers' mind-mindedness is consistent across relationships, a contrasting story emerged for levels of representational mind-mindedness to that which emerged for levels of interactional mind-mindedness. Relations between mothers' levels of representational mind-mindedness were explored for the three relationships (older sibling, younger sibling, and partner/friend). No systematic patterns of association were found in the way in which mothers represented their children and partner/friend. Mothers did not reveal a general tendency to display similar levels of mind-mindedness across all three relationships. The finding that mothers' levels of representational mind-mindedness were not consistent across relationships lends support to mothers' representational mind-mindedness being influenced by relational factors rather than predominantly stemming from a cognitive-behavioural trait.

Mothers' representational mind-mindedness with their partner warrants further discussion. It is noteworthy that when mothers were asked to describe their partner, it appeared to be a rather different experience to when they described their children.

This is not to say that mothers were less mind-minded about their partners because once quantified, there were limited actual differences between mothers' mind-mindedness for their children and their partner (only significant difference found was that mothers mentioned more mental attributes about older sibling than partner at Time 2). However, mothers did tend to be more self-conscious and reticent when describing their partner than their children. One possible reason for this is that, in the course of everyday life, mothers are more likely to talk about their children than their partner, and so describing their children may seem a more natural exercise, with more easily accessible answers. In addition, the rapid pace of development in childhood might facilitate access to representations more readily than those of an adult.

Meins and Fernyhough (2010) suggested an alternative mind-mindedness measure could be used to assess mind-minded representations about partners based on an adaptation by Meins et al. (2008). The authors adapted the mind-mindedness interview for a group of young adults who were asked to describe a close friend. A short written description was provided and the coding included two extra categories relating to self-referential comments and comments focusing on the relationship. However, this adaptation was not used in this study because their measure was constrained in length to seven lines and writing about a person could be considered different to speaking about them. The amended version would not have enabled a direct comparison with the verbal measure initially designed to assess representations of children. However, future research could investigate the consistency of mothers' mind-mindedness in different relationships through this amended measure.

Since completion of the current study, Meins et al. (2014) reported adults' mind-mindedness using a variety of formats – interview, paper and pen written format, and electronic written format – and argued that participants' mind-mindedness scores were unrelated to the mode of administration. However, the lack of relationship was based on no difference being found between mothers' mental descriptions of partners using interviews and undergraduates' mental descriptions of partners using a paper and pen written format. It was also based on no difference being found between mind-mindedness scores in one group using a paper and pen written format and one group using an electronic written format. This could be critiqued as addressing group differences rather than relationships between measures.

One of the current study's strengths was to use both frequency and proportional scores to allow a more comprehensive comparison of mind-minded relationships. Representational mind-mindedness was not only inconsistent across relationships but also across measures. Results for frequency and proportional measures differed. If variation in levels of maternal talk was not removed, specifically the total amount of attributes mentioned, then the consistency of findings looked rather different.

This inconsistency raises the issue of which measure should be considered the truest reflection of representational mind-mindedness. The frequency scores may be more important if one holds the view that it is the total number of mental attributes given in a mother's representation of another which would be most influential in their relationship, regardless of how characteristic they are of her talk. On the other hand, one may hold the view that it is the proportion of these types of comments which is more telling in the mother's representation of the child. However, it cannot be ruled out that the frequency of mental attributes may be primarily a feature of how much a mother says in general rather than how much she thinks of her child as an individual with their own internal states.

In contrast, clear-cut findings emerged regarding relations between mothers' levels of interactional mind-mindedness with the older sibling and the younger sibling. Mothers' appropriate mind-related comments were positively related for older siblings and younger siblings and this was true for both the amount and ratio of these comments. Mothers' verbal behaviour was very similar irrespective of which child was taking part in an interaction. The strength and consistency of this finding is further bolstered by the large and almost identical effect sizes found at each time point and because these associations were found at two time points, nine months apart. Therefore, mothers' levels of interactional mind-mindedness showed considerable consistency across relationships with each of their children, providing support for interactional mind-mindedness as a cognitive-behavioural trait in the mother rather than it being based primarily on the relationship in question. This suggests that mothers behave in very similar ways, in terms of their appropriate mind-minded language, with their children.

Strikingly, only a very small proportion of mothers produced non-attuned mind-related comments with their child. Very few mothers were observed to impose their own agenda or to misinterpret their child's internal states. This is in contrast to

appropriate mind-related comments which were made by mothers in all but one interaction. In other words, mothers' verbal behaviour was rarely observed as lacking attunement to their child's wishes and emotions in the play session. The marked dissimilarity between mothers' tendencies to be attuned or not to their child's internal states reflects previous studies which found mother's appropriate and non-attuned mind-related comments to be unrelated with infants (Arnott & Meins, 2007; Meins et al., 2002, 2011, 2012). This adds further weight to Meins et al.'s (2012) argument that mind-mindedness should best be characterised as a multidimensional construct.

A possible reason for the rarity of non-attuned comments is the age of the children who took part in the interactions reported here. The interactional measure was designed for use with infants and was adapted in the present study for use with older children. Mothers have been found to make a greater number of non-attuned mind-related comments than were observed in the present sample (Meins et al., 2011), including those with securely-attached infants (Meins et al., 2012). The children in this study were more likely to have transparent mental states than infants; an age where internal states are much more open to interpretation. Mothers and children were able to have two-way verbal conversations and so feedback from a child to their mother did not rely as heavily on their behaviour. In addition, mothers' knowledge of the children taking part in this study was likely to be higher than previous studies with infants due to the longer relationships and more experiences these dyads had been able to share. A combination of these factors may have resulted in mothers being less susceptible to misreading their children. At first sight, this appears not to be in line with the previous finding that mothers made more non-attuned mind-related comments with their infants at 7 months than at 3 months (Meins et al., 2011). However, an explanation for the discrepant findings might be because in the infancy study, mothers only had four months' more experience of their infants, possibly too short a time for mothers to learn about their child's internal states with this age group.

This finding, that mothers' interactional mind-mindedness demonstrates high consistency across relationships, is very important if one considers measurement of mind-mindedness during interaction may be the "gold-standard" measure of mind-mindedness. One of the key strengths of the interactional measure is that it assesses mothers' mind-related language as well as their behaviour and may be more accurate as a gauge of mind-mindedness than the representational measure.

This is because appropriate mind-related comments are a measure of how a mother behaves with a child. Importantly, the ability to assess whether a mother is in tune with her child is integral to how the measure is coded. In comparison, accessing a mother's representations of her child through an interview question does not allow one to assess attunement. A mother's representation might be at odds with how a child is in reality and there is no way of knowing whether she is attuned or not to the child's internal states.

Mothers showing similar or even identical levels of mind-mindedness may differ in the emotional content of their mind-mindedness. The measure of content used in this study explored valence, in particular whether mother's mental attributes or mind-related comments were positive, neutral or negative in nature. Focusing first on the emotional content of representational mind-mindedness, it is perhaps unsurprising that mothers were more likely to mention positive and neutral mental attributes than those which mentioned negative aspects of the child. This is in line with previous research by Demers et al. (2010b) who found that mothers produced few negative mental attributes and suggested this may have been due to the influence of social desirability. This may be true but it may equally be the case that the mothers in this present sample (and in Demers et al.) represent their children in a positive light whether what they say is heard by another or whether it remains a purely internal representation.

Demers and colleagues (2010b) developed the valence measure based on the rationale that the original representational measure might be more suitable to studying low-risk samples, whereas the valence measure might be more appropriate for use with mothers perceived to have a higher risk of caregiving difficulties. The prevalence of positive and neutral descriptors, rather than negative descriptors, in the current study may well be a function of the low risk of parenting difficulties in this sample. However, differences in low and high risk samples in previous research reveal contradictory findings. Demers et al. found that a group of adult mothers, and a group of adolescents considered to be at higher risk of having problems in parenting behaviour, did not differ in their use of positive and negative mental attributes. On the other hand, Walker et al. (2011) found that a community group used more positive mental attributes than a clinical group when describing their child but this was unsurprising given that they produced more attributes overall. A perhaps more telling result was that no difference was found between groups for

the proportion of positive mental attributes but the clinical group used a higher proportion of negative mental attributes.

The emotional content of mothers' representational mind-mindedness was explored to see whether the valence of mental attributes was consistent for the three relationships (older sibling, younger sibling, and partner/friend). There was little evidence of a general tendency in the mother to represent her children and partner/friend with positive, neutral or negative mental attributes. No association was found for mothers' positive mental attributes with different individuals. It seemed that if a mother described one child positively, she would not then be more likely to do so with her other child or her partner/friend. Findings were more disjointed when considering mothers' use of neutral and negative mental attributes in descriptions; all relationships were only significant at one time point for frequency scores but never at both time points, whilst no relationships at all were found for proportional scores.

One explanation for the fluctuating patterns found with the frequency scores for emotional content may be that these significant relationships were simply a function of the mothers' verbosity rather than being a product of her representations. This interpretation is strengthened when one considers that no relationships were revealed for positive, neutral or negative attributes when these are expressed as a proportion of all mental attributes produced by the mother. Perhaps what really matters is not how many mental attributes of a certain valence a mother produces but the relative proportion of these types of descriptors? Demers et al. (2010b) suggested that a combination of positive, neutral and negative mental attributes in a mother's description might reflect an evaluation of the child which is both realistic and balanced. Mothers representing their children using a variety of valence may be more in tune with their children's internal states than those, for example, who view their child using one particular valence. Overall, findings support the view that the emotional content of mothers' representational mind-mindedness is predominantly based on the particular relationship with an individual rather than an inherent trait in the mother to view others' internal states in a certain light.

Regarding the evidence of mind-mindedness taken from mother-child interactions, it is noteworthy that out of 124 play sessions, only one mother produced negative appropriate mind-related comments and that was only in one of her interactions. The findings did not lend support to Demers et al.'s (2010a) proposal that when



infants age and increasingly have their own agenda, low-minded parents might interpret this autonomy as contrary to their own wishes, leading to negative comments being made more frequently than non-attuned comments. Although non-attuned mind-related comments were infrequent, negative mind-related comments were even rarer with this sample of mothers and preschool and primary school children. One could argue that it is unsurprising that negative appropriate mind-related comments were extremely uncommon whereas negative mental attributes in interviews were not. Representing your child's mental states as negative and saying this to an interviewer could be viewed as very different to saying negative comments to your child. The scarcity of negative appropriate mind-related comments meant that this category of valence was excluded from analysis investigating consistency of relationships.

Approximately 30-50% of mothers made positive appropriate mind-related comments with a child in an interaction. It is interesting that in play interactions, something close to everyday experience, many mothers made none of these positive comments and when they did, these only amounted to between 4-10% of all appropriate mind-related comments. Notably, the proportion is only slightly higher than that found in the previous study using this measure, where positive comments amounted to 2.8% with adult mothers and 3% with adolescent mothers (Demers et al., 2010a). This leaves open the possibility that mothers' approval, support and encouragement is not expressed through the verbal channel; words may not play a major role in this context. Instead, maternal behaviour, specifically remaining attuned to the child in play activities and not being non-verbally rejecting, may be a more powerful way of expressing valence. In fact, this non-verbal channel is already rolled into the interactional measure through the requirement that mothers' mind-related comments are only coded as appropriate if mothers are observed to be in tune with their children. This view is consistent with the finding by Demers et al. that mothers' positive comments with 18-month-old infants were not significantly associated with maternal sensitivity or infant attachment.

In contrast, of the mothers who gave an appropriate mind-related comment in an interaction, all gave neutral comments. The vast majority of appropriate mind-related comments were considered to be neutral (90-95%). This percentage is remarkably similar to that reported by Demers et al. (2010a) who found that 92.1% of comments made by adult mothers and 89.3% of comments made by adolescent mothers were neutral. This abundance of neutral comments may mean that it is less

salient whether mothers make positive comments or not with their children when considering correlates of mind-mindedness and its role in child development. Alternatively, one could argue that the generality of neutral comments might lead the few positive comments to be very important if they are highlighted by their neutral background. The prevalence of mothers' neutral comments when referring to a child's mental states in the play sessions was by no means unexpected with comments such as "what do you want to play with now?" and "do you remember when you went on the swings?" far outweighing positive comments such as "you're so clever" and "good thinking". In fact, to have found otherwise would suggest the validity of this measurement of mind-mindedness using play sessions was reduced and raise suspicions of maternal behaviour being driven by the need to present themselves in a particular way, i.e., as positively rewarding parents. Instead, it appears to reflect the emotional content one is likely to witness in everyday maternal speech.

The consistency of relations between the emotional content of mothers' interactional mind-mindedness with their two children was next investigated. Focusing firstly on whether mothers tended to use positive comments across relationships, mothers' positive appropriate mind-related comments were unrelated in their interactions with their older and younger child. In other words, no association was found between mothers who used mind-related comments whilst providing positive reinforcement and validating one child's mental states and the likelihood that they would do so with another child. This supports mothers' use of positive comments about a child's mind as being something to do with that particular relationship rather than it being a general tendency, or trait, in the mother.

Mothers' use of neutral appropriate mind-related comments provides a less clear answer to whether mothers use these types of comment consistently across relationships. Evidence supports mothers having a general tendency to use neutral appropriate mind-related comments in interactions with each of their children but not when the ratio of these comments is considered. The amount of neutral appropriate mind-related comments made by mothers with one child was positively related to those made with the other child, with a similarly strong effect size as was found with the frequency of appropriate mind-related comments (excluding valence). However, as mentioned, the vast majority of appropriate mind-related comments made were in this category and so this resemblance is unsurprising. It suggests that in this community sample, mothers' neutral appropriate mind-related comments could be

considered a reflection of their general levels of interactional mind-mindedness as well as indexing the relative evenness of the emotional content of their maternal speech.

In contrast, the proportion of mothers' neutral appropriate mind-related comments in interactions with their two children was unrelated, unlike the strong correlations found with the proportion of appropriate mind-related comments made by mothers with older siblings and younger siblings when investigating levels of mind-mindedness. This divergence is likely to be due to the different ways in which the two proportional measures are calculated: the valence measure is expressed as a ratio of mothers' neutral appropriate mind-related comments made as opposed to the measure focusing on levels of mind-mindedness which is expressed as a ratio of mothers' appropriate mind-related comments in an interaction. Neutral mind-related comments are thus only considered in the context of mind-related comments rather than in the context of a mother's verbosity regardless of the type of comment. Given the associations found between levels of mind-mindedness and children's social and emotional development, it would be interesting to compare the predictive validity of both the frequency and the proportion of neutral appropriate mind-related comments with that already found for general levels of interactional mind-mindedness.

## 8.5 Conclusion

Mothers' levels of representational mind-mindedness were inconsistent across the three relationships investigated in this study. It suggests that mothers' representations varied in terms of how much they thought about their children and their partner/friend with reference to their minds. This supports the notion that mind-minded representations are influenced by the relationship rather than purely being a tendency in the mother. In contrast, mothers displayed a great deal of consistency in their mind-minded verbal behaviour while interacting with both their children in the play sessions. The tendency to be in tune with the older child's mental states was highly associated with the tendency to be attuned with the younger child. This offers clear support for mothers' interactional mind-mindedness being predominantly or at the least, highly influenced by a cognitive-behavioural trait. Mothers represented their children and partner/friend without a consistent focus on mental attributes whilst they paid similar attention to the mental states of their children in interactions.

The emotional content of mothers' representational mind-mindedness demonstrated an inconsistent pattern across relationships of associations for neutral and negative

mental attributes used in mothers' descriptions. This inconsistency, coupled with the fact that positive mental attributes across relationships were entirely unrelated in mothers' descriptions, points towards the emotional content of representational mind-mindedness being influenced by the relationship. There did not appear to be any general tendency to think about others in a positive, neutral or negative way. The emotional content of mothers' interactional mind-mindedness told a somewhat different story. There was inconsistency in mothers' positive appropriate mind-related comments made with different children which supports the use of emotional content being relational. However, mothers did display a general tendency to use neutral appropriate mind-related comments in interactions with each of their children but this tendency was only seen when frequency and not proportion scores are considered.

# 9

## **Maternal mind-mindedness and relations with mother and child factors**

### **9.1 Introduction**

It may be the case that mother and child characteristics influence mothers' mind-mindedness. The potential contribution of both mother and child factors have been investigated in relation to maternal mind-mindedness but evidence has been mixed. The findings presented in Chapter 8, supported a lack of relationship between maternal mind-mindedness and certain mother factors (mothers' age, education and SES) and child factors (child's age and gender).

This chapter explores whether maternal mind-mindedness is a relatively stable characteristic of the mother by looking at relationships with mothers' psychological mindedness. Evidence is presented on whether maternal mind-mindedness could be part of a mother's general tendency to think about other people with reference to their internal states. An inclination to consider others' internal states, if found to be related to maternal mind-mindedness, would support the view that maternal mind-mindedness is more rooted in the mother as opposed to being specific to mother-child relationships. A new measure of mothers' psychological mindedness was developed for this study, which focuses on a mother's inclination to consider psychological factors when explaining events and other people's behaviour. The full description of this measure can be found in Chapter 6.

The specific child factors to be investigated as possible determinants of maternal mind-mindedness are child temperament and behaviour; both might feed into maternal mind-mindedness as a facet of the mother-child relationship. Previous research into the potential relationship between levels and emotional content of mind-mindedness with maternal reports of child temperament and behaviour has yielded equivocal results (Demers et al., 2010b; Meins et al., 2011, 2013; Walker et al., 2011). Evidence is presented in this chapter on whether child characteristics, specifically child temperament and behaviour, are associated with mothers' mind-

mindedness. Given the variety of ways in which temperament has been measured in the literature, both maternal report and observational ratings of temperament were included in this study to give a more balanced view of temperament and to provide representational and observational measures of assessment. The proposition to be tested rests on the assumption that if maternal mind-mindedness is a relational construct influenced by children's temperament and behaviour, one or more of the mind-mindedness measures will be related to one or more of the measures investigating children's temperament and behaviour. Existing measures of maternal report of temperament and behaviour and a new observational assessment were used in this study. Details of the measures of child temperament and behaviour and previous research investigating links with mind-mindedness can be found in Chapter 7.

The first aim of this chapter was to address the following hypothesis:

1. Maternal mind-mindedness reflects a general tendency in the mother to consider psychological factors when explaining events and behaviour.

If this hypothesis is supported, the measure of maternal psychological mindedness would be found to:

- a. positively relate to levels of maternal mind-mindedness in one or both of the mind-mindedness measures
- b. show stability across time.

The maternal psychological mindedness measure was scored in two ways:

- i. Frequency of mental state comments for two stories summed at each time point
- ii. Proportion of mental state comments (total frequency of mental state comments as a proportion of total comments) for two stories at each time point.

The second aim of this chapter was to address the following research question:

2. Is maternal mind-mindedness related to child temperament and behaviour?

This included an investigation into both levels and emotional content of mind-mindedness and relations with child temperament and behaviour to answer the questions:

- a. Are levels of maternal mind-mindedness related to child temperament and behaviour?
- b. Is the emotional content of maternal mind-mindedness related to child temperament and behaviour?

Child temperament and behaviour were assessed by:

- i. Maternal report (two questionnaires: SDQ and SF-CBQ)
- ii. Observer rating (during play session)

The design allows for an assessment of the relative strength of association for maternal report and observational measures if these are related to maternal mind-mindedness.

Assessments took place at both Time 1 and Time 2. Relations between maternal mind-mindedness and mothers' psychological mindedness, and between maternal mind-mindedness and the younger siblings' temperament and behaviour were investigated at each time point. The stability of mothers' psychological mindedness and child temperament and behaviour were assessed across the two time points.

## **9.2 Method**

### **9.2.1 Participants**

The full cohort, 32 mothers at Time 1 and 30 mothers at Time 2, were included in analysis involving the observational assessment of temperament with their younger children. However, one mother did not complete the temperament/behaviour questionnaires or the psychological mindedness measure at both time points, and as a result 31 mothers at Time 1 and 29 mothers at Time 2 were included in analysis involving these measures.

### **9.2.2 Measures**

The representational and interactional measures of mind-mindedness were used in the analysis.

One measure was used to collect data on mothers' tendency to make mental state attributions, referred to as psychological mindedness:

- Psychological mindedness measure

Information on the procedure, coding and scoring of this measure is provided in Chapter 4 and Chapter 6.

Two maternal report measures and one observational measure were used to collect data on child temperament and behaviour:

- Short form of the Children's Behavior Questionnaire (SF-CBQ; Putnam & Rothbart, 2006)
- Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997, 2001)
- Observational measure of child temperament

Information on the procedure, coding and scoring of these measures is provided in Chapter 4 and Chapter 7.

### **9.3 Results**

This section is presented in two parts. The first considers mother's psychological mindedness at Time 1 and Time 2; the second considers child temperament and behaviour at Time 1 and Time 2. Descriptive statistics for mind-mindedness can be found in Chapter 8. Relations between mind-mindedness and psychological mindedness, and relations between mind-mindedness and child temperament and behaviour were examined using correlational analyses.

#### **9.3.1 Mothers' psychological mindedness**

Table 9.1 presents the descriptive statistics for mothers' psychological mindedness at Time 1 and Time 2. The frequency of mental state comments was not normally distributed so non-parametric analysis was employed with this variable, whilst the proportion of mental state comments was normally distributed allowing for parametric analysis. The frequency and proportion of mental state comments was very similar at the different time points, with only slightly higher scores at Time 1 than Time 2. However, a Wilcoxon signed-rank test revealed that the difference was not significant for frequency scores ( $z = -1.46, J = .15$ ) and a paired samples  $t$ -test revealed that the difference was not significant for proportion scores ( $t(28) = .38, J = .70$ ). The range of scores indicated considerable variability in mothers' responses to the stories, from a complete absence of mental state comment to a maximum of 20 mental state comments being provided about protagonists at one time point.



**Table 9.1.** Descriptive statistics for mothers' psychological mindedness (frequency and proportion of mental state comments) at Time 1 and Time 2

Variable	Mean	SD	Range
<del>Vā ^ ĀP ĀM ĀD Ā</del>			
Mental state comment (freq)	6.16	4.55	0-20
Mental state comment (prop)	.23	.13	0-.58
<del>Vā ^ ĀP ĀM ĀD Ā</del>			
Mental state comment (freq)	5.03	3.50	0-16
Mental state comment (prop)	.22	.09	0-.36

*p* [ Ā Āfreq = frequency; prop = proportion

### **9.3.2 Relations between mother's levels of mind-mindedness and mothers' psychological mindedness**

#### **Relations between mothers' levels of representational mind-mindedness and psychological mindedness at Time 1**

The relationship between mothers' levels of representational mind-mindedness and their psychological mindedness at Time 1 was examined. Both measures were developed to examine a tendency to represent others' mental states and so analysis was expected more likely to reveal a relationship between the two representational measures than later analysis involving the online measure of interactional mind-mindedness. Spearman's rho correlations investigated relations with frequency variables and Pearson's correlations investigated relations with proportion variables. Correlations between frequency and proportional scores were not investigated and this is represented by a dash in tables. One-tailed correlations were calculated based on a priori predictions from the literature.

**Table 9.2.** Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and psychological mindedness (frequency and proportion of mental state comments) at Time 1

<b>Variable</b>	Mental state comment (freq)	Mental state comment (prop)
Mental attribute (freq) (Older sibling)	.09	–
Mental attribute (freq) (Younger sibling)	.19	–
Mental attribute (freq) (Partner/friend)	.39*	–
Mental attribute (prop) (Older sibling)	–	-.27
Mental attribute (prop) (Younger sibling)	–	-.00
Mental attribute (prop) (Partner/friend)	–	.32*

*r* = correlation; freq = frequency; prop = proportion.

\*  $p < .05$  (one-tailed).

Table 9.2 shows that the only significant correlations between mothers' levels of representational mind-mindedness and mothers' psychological mindedness at Time 1 involved mothers' mind-mindedness with their partner/friend. Positive (medium strength) correlations were found between the frequency of mental attributes in mothers' descriptions of partner/friend and the frequency of mental state comments in mothers' stories ( $r = .39, p = .01$ ), and between the corresponding proportion of mental attributes and proportion of mental state comments ( $r = .32, p = .04$ ).

***Relations between mothers' levels of interactional mind-mindedness and psychological mindedness at Time 1***

The aim of the next set of one-tailed correlations, displayed in Table 9.3, was to investigate relations between mothers' levels of interactional mind-mindedness and their psychological mindedness at Time 1. Mothers' levels of interactional mind-mindedness were unrelated to their psychological mindedness at Time 1 for both frequency and proportion variables.

**Table 9.3.** Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and psychological mindedness (frequency and proportion of mental state comments) at Time 1

<b>Variable</b>	Mental state comment (freq)	Mental state comment (prop)
AMRC frequency (Older sibling)	.01	–
AMRC frequency (Younger sibling)	-.03	–
AMRC proportion (Older sibling)	–	.06
AMRC proportion (Younger sibling)	–	-.11

*P* [  $\hat{r}$  ] AMRC = appropriate mind-related comments; freq = frequency; prop = proportion.

***Relations between mothers' levels of representational mind-mindedness and psychological mindedness at Time 2***

A similar set of analyses for mothers' levels of representational mind-mindedness and psychological mindedness were carried out at Time 2. Table 9.4 shows that there were no significant relationships between mothers' levels of representational mind-mindedness and their psychological mindedness at Time 2. A trend was found for a negative relationship between the proportion of mental state comments and the proportion of mental attributes for the younger sibling but it failed to reach significance ( $r = -.31, p = .054$ ).

**Table 9.4.** Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and psychological mindedness (frequency and proportion of mental state comments) at Time 2

<b>Variable</b>	Mental state comment (freq)	Mental state comment (prop)
Mental attribute (freq) (Older sibling)	.23	–
Mental attribute (freq) (Younger sibling)	.03	–
Mental attribute (freq) (Partner/friend)	.14	–
Mental attribute (prop) (Older sibling)	–	-.27
Mental attribute (prop) (Younger sibling)	–	-.31
Mental attribute (prop) (Partner/friend)	–	-.13

*r* = correlation; freq = frequency; prop = proportion.

***Relations between mothers' levels of interactional mind-mindedness and psychological mindedness at Time 2***

Table 9.5 presents a similar set of analyses for mothers' levels of interactional mind-mindedness and psychological mindedness at Time 2. No significant relationships were found between mothers' levels of interactional mind-mindedness and their psychological mindedness at Time 2. A non-significant trend was found for a positive relationship between the proportion of appropriate mind-related comments for the older sibling and the proportion of mental state comments ( $r = .31, p = .052$ ).

**Table 9.5.** Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and psychological mindedness (frequency and proportion of mental state comments) at Time 2

Variable	Mental state comment (freq)	Mental state comment (prop)
AMRC frequency (Older sibling)	.11	–
AMRC frequency (Younger sibling)	.04	–
AMRC proportion (Older sibling)	–	.31
AMRC proportion (Younger sibling)	–	.27

*MRC* = appropriate mind-related comments; freq = frequency; prop = proportion.

### 9.3.3 *Is mothers' psychological mindedness stable over time?*

The measure of psychological mindedness was designed to tap into a trait, or a tendency, in the mother to consider psychological factors when thinking about other people. This meant that it was next important to assess the consistency of this construct over time to see if it met the trait criterion of stability. Considerable longitudinal stability was demonstrated by mothers' psychological mindedness between Time 1 and Time 2 in terms of the frequency of mental state comments ( $r = .51, p = .004$ ) and yet not for the proportion of mental state comments ( $r = .04, p = .85$ ). To establish whether mothers were consistent in how much they said about protagonists regardless of whether the content was mental or non-mental, the longitudinal stability of the total number of comments made by mothers was considered. Again, the total number of comments at Time 1 was strongly positively correlated with those at Time 2 ( $r = .62, p < .001$ ). The findings support a tendency in individuals to deliver a consistent amount of mental state comments for the two stories at each time point as well as consistency in their verbosity. However, no support was obtained for consistency in the proportion of mental state comments in individuals' speech over time.

### **9.3.4 Summary of relations between mind-mindedness and mothers' psychological mindedness**

Mothers' levels of representational mind-mindedness with their older child and with their younger child were unrelated to their psychological mindedness at both time points. Conversely, limited support was found for a relationship between levels of representational mind-mindedness with partner/friend and mothers' psychological mindedness but this association was only significant at Time 1 and not at Time 2. No support was found for a relationship between mothers' levels of interactional mind-mindedness and their psychological mindedness.

### **9.3.5 Child temperament and behaviour**

The younger siblings' temperament and behaviour, including descriptives and analyses, are presented in the next section. Relations with mothers' levels of maternal mind-mindedness with the younger sibling are shown first, followed by relations with the emotional content of maternal mind-mindedness with the younger sibling. The SDQ variable of Total Difficulties was normally distributed but not the subscale of Prosocial Behaviour. The three SF-CBQ factors of Surgency, Negative Affectivity and Effortful Control were normally distributed when based on maternal report; when based on observational ratings, this was only so with Surgency and Effortful Control and not Negative Affectivity. The observational factor of Negative Affectivity was positively skewed at Time 1, with 50% of children at Time 1 and 43% at Time 2 rated with the lowest possible score (1 out of 7). These low scores may be said to reflect the activities involved in a play session because the children were likely to demonstrate low levels of anger/frustration and sadness in this context. As a result, non-parametric statistics were employed with all three observational variables. Table 9.6 displays the descriptives for maternal report of the younger siblings' temperament at each time point; Table 9.7 displays the descriptives for observational ratings of the younger siblings' temperament at each time point.

**Table 9.6.** Descriptive statistics for maternal report measures of child temperament and behaviour (SDQ and SF-CBQ) at Time 1 and Time 2

Variable	Mean	SD	Range
<b>Time 1</b>			
Prosocial Behaviour	8.03	1.84	4-10
Total Difficulties <sup>1</sup>	7.68	3.60	1-17
Total Difficulties <sup>2</sup>	7.68	3.59	1-17
<b>Time 2</b>			
Surgency	4.72	.90	2.55-6.22
Negative Affectivity	3.66	.53	2.67-4.61
Effortful Control	5.29	.61	4.17-6.23
<b>Time 1</b>			
Prosocial Behaviour	7.59	1.86	3-10
Total Difficulties <sup>1</sup>	7.83	4.69	0-19
Total Difficulties <sup>2</sup>	7.66	4.53	0-19
<b>Time 2</b>			
Surgency	4.65	.85	3.32-6.34
Negative Affectivity	3.78	.68	2.36-5.03
Effortful Control	5.35	.64	3.78-6.63

SDQ = Strengths and Difficulties Questionnaire; SF-CBQ = Short form of Children's Behavior Questionnaire; Total Difficulties <sup>1</sup> = Score includes two items on antisocial behaviour in Conduct Problems scale, in version for 3- to 4-year-olds but asked about all children; Total Difficulties <sup>2</sup> = Score includes two items on oppositionality (replacing antisocial behaviour items) for children above 4 years.

To establish whether differences in scores for Total Difficulties in the SDQ may have been obtained at each time point due to different versions of the questionnaire being used depending on the age of the child, mothers with children over 4 years were given both versions of the Conduct Problems scale (two of these items designed for use with children 3-4 years; and two of these items designed for use with children 4-16 years). Only two mothers at Time 1 and four mothers at Time 2 with children above 4 years had different scores for Conduct Problems (and consequently different scores for Total Difficulties) depending on whether the older version or the younger version of the items were scored. As can be seen from Table 9.6, the means for Total Difficulties was identical at Time 1 and almost identical at Time 2.

This meant that scores from the age-appropriate version were selected for use in subsequent correlational analysis.

On average, children were rated as fairly high on the SDQ's Prosocial Behaviour scale at Time 1 ( $T = 8.03$ ) and at Time 2 ( $T = 7.59$ ). Higher scores represent a positive assessment and are indicative of greater prosocial behaviour than lower scores (maximum score of 10), with scores of 6-10 being within the band considered normal. Children's average total difficulties were rated as fairly low at Time 1 ( $T = 7.68$ ) and at Time 2 ( $T = 7.66$ ). Higher scores are indicative of greater difficulties (maximum score of 40), with scores of 0-11 being classed as normal. A wide range of scores for both prosocial behaviour and total difficulties were found at each time point. The scores shown are in line with normative data for parental report of the SDQ taken from a large survey carried out in Britain with 5-10-year-old children ( $N = 5855$ ) for prosocial behaviour ( $T = 8.6$ ,  $SD = 1.6$ ) and for total difficulties ( $T = 8.6$ ,  $SD = 5.7$ ) ([www.sdqinfo.org](http://www.sdqinfo.org)).

Higher scores in the SF-CBQ factors indicate that the child has been rated with greater surgency, effortful control and negative affectivity than lower scores (maximum score of 7). Of the three factors, children were rated highest in Effortful Control (Time 1:  $T = 5.29$ ; Time 2:  $T = 5.35$ ), followed by Surgency (Time 1:  $T = 4.72$ ; Time 2:  $T = 4.65$ ), with the lowest scores being given for Negative Affectivity (Time 1:  $T = 3.66$ ; Time 2:  $T = 3.78$ ).



**Table 9.7.** Descriptive statistics for observational ratings of child temperament at Time 1 and Time 2

Variable	Mean	SD	Range
<i>Ua</i> ^ ^ <i>FAP</i> <i>MA</i> <i>GM</i>			
<i>Ua</i> • ^ <i>caea</i> } <i>a</i> <i>Aaea</i> * <i>KA</i>			
Surgency	4.20	.53	3.00-5.33
Negative Affectivity	1.70	1.06	1.00-5.00
Effortful Control	4.73	.84	2.33-6.00
<i>Ua</i> ^ ^ <i>GP</i> <i>MA</i> <i>ED</i>			
<i>Ua</i> • ^ <i>caea</i> } <i>a</i> <i>Aaea</i> * <i>KA</i>			
Surgency	4.26	.46	3.33-5.33
Negative Affectivity	1.62	.68	1.00-3.00
Effortful Control	4.92	.58	3.67-6.00

Higher scores in the observational assessment of temperament correspond with children demonstrating higher levels of surgency, effortful control and negative affectivity (maximum score of 7) in the play session and tidy-up task. Some behaviours assessed by the SF-CBQ were not considered measurable in the observational context. Therefore, the observational assessment factors were made up of a different combination of scales than the maternal report factors (see Table 7.1 and Table 7.2). However, the rank order for the size of the factor means was the same across both measures. Children were rated highest in Effortful Control (Time 1:  $T = 4.73$ ; Time 2:  $T = 4.92$ ), then Surgency (Time 1:  $T = 4.20$ ; Time 2:  $T = 4.26$ ), with the lowest ratings being given for Negative Affectivity (Time 1:  $T = 1.70$ ; Time 2:  $T = 1.62$ ). This similarity between rank order of the two measures helps to validate the new observational assessment of temperament.

### **9.3.6 Relations between mothers' mind-mindedness and child temperament and behaviour at Time 1**

#### **Relations between mothers' levels of representational mind-mindedness and child temperament and behaviour at Time 1**

The first analysis to include child temperament and behaviour aimed to identify whether mothers' levels of representational mind-mindedness correlated with maternal report or observational ratings. Spearman's rho correlations investigated relations involving mental attribute frequency, Prosocial Behaviour and observational ratings. Pearson's correlations investigated all the remaining relations involving mental attribute proportion. Table 9.8 shows that mothers' levels of

representational mind-mindedness with their younger child were not significantly correlated with any of the temperament or behaviour variables taken from either of the maternal report measures or from observational ratings at Time 1. The only relationship which approached significance was that between the proportion of mental attributes and the factor of Surgency measured in the SF-CBQ ( $r = -.35, p = .053$ ).

**Table 9.8.** Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 1

Variable	Mental attribute	Mental attribute
	(freq)	(prop)
SDQ	.04	.20
Prosocial Behaviour		
SDQ	-.10	-.22
Total Difficulties		
SF-CBQ	-.25	-.35
Surgency		
SF-CBQ	.13	.14
Negative Affectivity		
SF-CBQ	-.04	.07
Effortful Control		
Observer rating	-.07	.15
Surgency		
Observer rating	-.08	-.23
Negative Affectivity		
Observer rating	.13	.26
Effortful Control		

*SDQ* = Strengths and Difficulties Questionnaire; *SF-CBQ* = Short form of Children's Behavior Questionnaire; *freq* = frequency; *prop* = (proportion).

***Relations between mothers' levels of interactional mind-mindedness and child temperament and behaviour at Time 1***

The focus now turns towards relations between interactional mind-mindedness and child temperament and behaviour at Time 1. Table 9.9 displays the correlations for mothers' levels of interactional mind-mindedness and both maternal report and

observational ratings of child temperament and behaviour. Pearson's  $r$  was calculated for all relationships except those involving Prosocial Behaviour and observational ratings which were analysed using Spearman's rho. The two measures based on observations were unrelated with no significant correlations revealed between mothers' levels of interactional mind-mindedness with their younger child and observational ratings of temperament. No significant relationships were found between mothers' levels of interactional mind-mindedness and maternal report of temperament using either the SDQ or the SF-CBQ.

**Table 9.9.** Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 1

Variable	AMRC frequency	AMRC proportion
SDQ	-.22	-.09
Prosocial Behaviour		
SDQ	.07	-.08
Total Difficulties		
SF-CBQ	.05	.07
Surgency		
SF-CBQ	-.09	-.11
Negative Affectivity		
SF-CBQ	-.21	-.12
Effortful Control		
Observer rating	-.22	-.19
Surgency		
Observer rating	.13	.04
Negative Affectivity		
Observer rating	-.19	-.16
Effortful Control		

*p* < .05. AMRC = appropriate mind-related comments; SDQ = Strengths and Difficulties Questionnaire; SF-CBQ = Short form of Children's Behavior Questionnaire.

### ***Relations between emotional content of representational mind-mindedness and child temperament and behaviour at Time 1***

While there was no relationship between levels of mind-mindedness and child temperament and behaviour at Time 1, this did not mean that there could not be a relationship between the emotional content of mind-mindedness and temperament and behaviour measures. Accordingly, this section presents findings on relations between the emotional content of representational mind-mindedness (frequency and proportion of valence of mental attributes) and child temperament and behaviour. At Time 1, no significant relationships were found between the frequency and proportion of positive, neutral or negative mental attributes in mothers' descriptions of their younger child and any of the temperament and behaviour variables assessed by maternal report using either the SDQ or the SF-CBQ. Analyses focusing on relations between the emotional content of representational mind-mindedness and observational ratings of child temperament revealed a significant negative correlation between the frequency of neutral mental attributes ( $r = -.39, p = .04$ ) and the proportion of neutral mental attributes ( $r = -.42, p = .03$ ) in mothers' descriptions of their younger child and Negative Affectivity observed in interactions. No other significant correlations were found.

### ***Relations between emotional content of interactional mind-mindedness and child temperament and behaviour at Time 1***

The next analyses aimed at identifying whether the emotional content of interactional mind-mindedness (frequency and proportion of valence of appropriate mind-related comments) was related to child temperament and behaviour. A complete set of non-significant correlations were revealed at Time 1 between the frequency and proportion of positive and neutral appropriate mind-related comments made by mothers in interactions with their younger child and both maternal report and observer ratings of child temperament and behaviour. As noted in Chapter 8, negative appropriate mind-related comments had previously been excluded from analysis due to mothers not using this category of valence.

### ***9.3.7 Relations between mothers' mind-mindedness and child temperament and behaviour at Time 2***

#### ***Relations between mothers' levels of representational mind-mindedness and child temperament and behaviour at Time 2***

To check whether the same pattern was found nine months later, a similar set of analyses was carried out at Time 2 concerning relations between maternal mind-

mindfulness and the younger siblings' temperament and behaviour. Intercorrelations between mothers' levels of representational mind-mindedness and measures of child temperament and behaviour appear in Table 9.10.

**Table 9.10.** Correlations between levels of representational mind-mindedness (frequency and proportion of mental attributes) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 2

Variable	Mental attribute (freq)	Mental attribute (prop)
SDQ	.17	.03
Prosocial Behaviour		
SDQ	-.37	-.17
Total Difficulties		
SF-CBQ	-.20	-.13
Surgency		
SF-CBQ	.31	.29
Negative Affectivity		
SF-CBQ	.01	.00
Effortful Control		
Observer rating	-.10	-.02
Surgency		
Observer rating	.11	-.10
Negative Affectivity		
Observer rating	-.01	.07
Effortful Control		

SDQ = Strengths and Difficulties Questionnaire; SF-CBQ = Short form of Children's Behavior Questionnaire; freq = frequency; prop = proportion.

At Time 2, mothers' levels of representational mind-mindedness with their younger child were not significantly correlated with their assessment of this child's temperament using either the SDQ or the SF-CBQ. There was a trend for a negative relationship between mental attribute frequency and Total Difficulties measured by the SDQ, but this medium correlation failed to reach significance ( $r = -.37, p = .051$ ). Mothers' levels of representational mind-mindedness were not significantly associated with the observational ratings of the younger siblings' temperament for any of the variables.

***Relations between mothers' levels of interactional mind-mindedness and child temperament and behaviour at Time 2***

Relations between mothers' levels of interactional mind-mindedness and child temperament and behaviour were investigated next at Time 2. Table 9.11 reveals two significant negative correlations between the frequency of appropriate mind-related comments and observational ratings of Effortful Control ( $r = -.45, p = .01$ ), and between the proportion of appropriate mind-related comments and observational ratings of Effortful Control ( $r = -.42, p = .02$ ). This suggests that mothers were less likely to comment appropriately on their younger child's mental states, the greater the child's effortful control, with a medium effect size found for this relationship. The link between effortful control and interactional mind-mindedness was strengthened because it was consistently found for both frequency and proportion measures of mind-mindedness at Time 2. The other two temperament variables of Surgency and Negative Affectivity were not significantly related to mothers' levels of interactional mind-mindedness. No significant relationships were revealed between mothers' levels of interactional mind-mindedness with their younger child and maternal report of temperament for any of the SDQ or the SF-CBQ variables.

**Table 9.11.** Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) and measures of child temperament and behaviour (SDQ, SF-CBQ and observer rating) at Time 2

Variable	AMRC frequency	AMRC proportion
SDQ	.03	.15
Prosocial Behaviour		
SDQ	-.02	-.02
Total Difficulties		
SF-CBQ	.22	.20
Surgency		
SF-CBQ	.15	.08
Negative Affectivity		
SF-CBQ	.12	.18
Effortful Control		
Observer rating	-.21	-.21
Surgency		
Observer rating	.23	.14
Negative Affectivity		
Observer rating	-.45*	-.42*
Effortful Control		

*p* < .05 AMRC = appropriate mind-related comments; SDQ = Strengths and Difficulties Questionnaire; SF-CBQ = Short form of Children's Behavior Questionnaire.

*p* < .05

***Relations between emotional content of representational mind-mindedness and child temperament and behaviour at Time 2***

An equivalent set of analyses was carried out at Time 2 looking into the relations between the emotional content of representational mind-mindedness and child temperament and behaviour. None of the temperament and behaviour variables measured by maternal report (SDQ and SF-CBQ) were significantly related to the emotional valence of mental attributes in mothers' descriptions of their younger child. Neither were any of the temperament variables assessed by observational ratings of child temperament related to the emotional content of representational mind-mindedness.

### ***Relations between emotional content of interactional mind-mindedness and child temperament and behaviour at Time 2***

Next, relations between the emotional content of interactional mind-mindedness and child temperament and behaviour were investigated at Time 2. Firstly, looking at assessment by maternal report, two significant correlations emerged with the emotional content of interactional mind-mindedness but only with the proportion of neutral appropriate mind-related comments. A significant positive correlation was revealed between Total Difficulties in the SDQ and the proportion of neutral appropriate mind-related comments made by mothers in interactions with their younger child ( $r = .42, p = .03$ ). A significant negative correlation was found between Effortful Control assessed using the SF-CBQ and the proportion of neutral appropriate mind-related comments ( $r = -.40, p = .04$ ).

A couple of trends were found for the frequency of positive appropriate mind-related comments including a non-significant negative relationship with Total Difficulties in the SDQ ( $r = -.36, p = .059$ ) and a non-significant positive relationship with Effortful Control assessed using the SF-CBQ ( $r = .37, p = .056$ ). In addition, a non-significant positive trend was found for the frequency of neutral appropriate mind-related comments and Surgency assessed using the SF-CBQ ( $r = .36, p = .059$ ).

Secondly, looking at assessment by observational ratings, only one significant relationship emerged. A significant negative correlation was found between Effortful Control and the frequency of neutral appropriate mind-related comments ( $r = -.43, p = .02$ ).

### ***9.3.8 Are temperament and behaviour in the younger siblings stable over time?***

Temperament, defined as a basic disposition for a child to behave in a certain way, should show stability between measurement at Time 1 and Time 2 if meeting this criterion. Indeed, this was found to be the case for all temperament and behaviour variables. Maternal report of child temperament and behaviour, assessed using both measures, showed considerable stability. Analysis of the SDQ showed that Prosocial Behaviour was strongly positively correlated ( $r = .79, p < .001$ ), as were children's Total Difficulties ( $r = .74, p < .001$ ) between time points. The SF-CBQ showed strong positive correlations between time points for Surgency ( $r = .84, p < .001$ ), Effortful Control ( $r = .74, p < .001$ ) and Negative Affectivity ( $r = .53, p = .003$ ). An important finding, given that the observational rating of child temperament was



based on a new measure, is that this also demonstrated good stability between time points. Strong positive correlations were revealed for Effortful Control ( $r = .71, p < .001$ ), and for Negative Affectivity ( $r = .68, p < .001$ ), and a medium positive correlation was revealed for Surgency ( $r = .37, p = .04$ ).

### **9.3.9 Summary of relations between mind-mindedness and child temperament and behaviour**

Levels of representational and interactional maternal mind-mindedness with the younger sibling were unrelated to maternal report of the younger siblings' temperament and behaviour assessed by the SDQ and the SF-CBQ at both Time 1 and at Time 2. A slightly different story emerges when observational ratings of child temperament are considered. Levels of representational maternal mind-mindedness with the younger sibling were unrelated to observational ratings of the younger siblings' temperament at both time points. However, levels of interactional maternal mind-mindedness with the younger sibling were unrelated to observational ratings of the younger siblings' temperament only at Time 1. Instead, at Time 2, levels of interactional mindedness with the younger sibling, including both frequency and proportion of appropriate mind-related comments, were found to negatively relate to observer ratings of Effortful Control. These were the only significant relationships found between levels of mind-mindedness and child temperament.

The emotional content of representational mind-mindedness in mothers' descriptions of the younger siblings was unrelated to maternal report of the younger siblings' temperament using either the SDQ or the SF-CBQ at both time points. The emotional content of representational mind-mindedness in mothers' descriptions of the younger siblings and observational ratings of the younger siblings' temperament were unrelated at both time points apart from the exception of Negative Affectivity. The frequency and proportion of neutral mental attributes in mothers' descriptions of their younger child were negatively related to Negative Affectivity observed in interactions but only at Time 1.

The emotional content of interactional mind-mindedness in mothers' play sessions with their younger child and maternal report of the child's temperament and behaviour revealed mixed findings. There were no significant relationships at either time point apart from a couple of exceptions involving neutral appropriate mind-related comments. At Time 2, the proportion of neutral appropriate mind-related comments made by mothers in interactions with their younger child was positively

related to Total Difficulties in the SDQ and negatively related to Effortful Control assessed using the SF-CBQ. The emotional content of interactional mind-mindedness with the younger sibling was unrelated to observer ratings of child temperament at both time points apart from one exception again involving neutral appropriate mind-related comments. The frequency of neutral appropriate mind-related comments was negatively related to observer ratings of Effortful Control at Time 2.

#### **9.4 Discussion**

Two major questions were addressed in this chapter, focusing on relations between mothers' mind-mindedness and their psychological mindedness, and relations between mothers' mind-mindedness and children's temperament and behaviour. Investigating relationships between these variables at two time points once more enabled significant findings at one time point to be either confirmed or not by findings at the other. Measurement at intervals also enabled an evaluation of stability of mothers' psychological mindedness and children's temperament; an important area to be addressed if one views psychological mindedness and temperament as traits or tendencies in individuals.

The first aim was to investigate the prediction that maternal mind-mindedness is part of a general tendency to consider psychological factors when explaining events and behaviour. No strong support emerged for this hypothesis given that mothers' levels of representational mind-mindedness with their older child and with their younger child were unrelated to their psychological mindedness measured using a storytelling task at each time point. On the other hand, a positive relationship was found between mothers' levels of representational mind-mindedness with partner/friend and mothers' psychological mindedness at Time 1. Mothers who tended to mention mental attributes about partners in descriptions were also likely to mention mental state comments about protagonists in a story. Not only that, but when all the attributes and comments mentioned by mothers were taken into account, the ratio of these types of attributes in descriptions was related to the ratio of these types of comments in stories. However, support for the hypothesis was weakened when mothers' levels of representational mind-mindedness with partner/friend were found to be unrelated to mothers' psychological mindedness at Time 2.

The findings regarding relations between mothers' levels of representational mind-mindedness and their psychological mindedness are worthy of further comment. These suggest that the storytelling measure tapped something style-like in mothers' mental state attributions but only in relation to mothers' representations of another adult. The association may, in part, be explained by the observation that there was an increased tendency for mothers to appear self-conscious when they described their partner/friend and when they narrated the stories. This self-consciousness was not apparent when mothers described their children, possibly because it is likely that mothers are far more familiar with the process of talking about their children than their partner in everyday life. Given that mothers tended to read stories to their children, rather than make these up, many of the mothers initially struggled with telling a story. Often mothers needed reassurance that these stories did not need to be creative and prize-winning before beginning their tales. In addition, levels of self-consciousness may have been higher because the representational measures were completed at the start of the home visit possibly before mothers could become more relaxed, and the researcher was also unknown to the mother at the first time point. The similarity between the impact of these measures on mothers' sense of ease may help to account for associations being found in the two representational measures they found difficult: in representations of a known adult and representations of unknown protagonists in a story at the first time point. In contrast, mothers knew the researcher and had been through the process involved in both measures before at the second time point, and as such levels of self-consciousness may well have lessened, contributing to the two representational measures being found to be unrelated. Due to the lack of supporting evidence apparent across all relationships apart from the association with partners/friends at only one time point, it would appear that mothers' levels of representational mind-mindedness are not related to their psychological mindedness using this particular measure.

Furthermore, no support was found for a relationship between mothers' levels of interactional mind-mindedness with either child and their psychological mindedness at both Time 1 and Time 2. Mothers who demonstrated high levels of mind-mindedness by producing many appropriate mind-related comments in interactions with their children, were no more likely to produce mental state comments when talking about protagonists in a story, than mothers who demonstrated low levels of interactional mind-mindedness. Given that the two representational measures as discussed above were found to be largely unrelated, it is unsurprising that mothers' psychological mindedness was unrelated to the interactional measure of mind-

mindedness because this is based not only on representations but also on behaviour.

Overall, the findings do not replicate the link reported by Meins et al. (2006) in a study carried out with children, between mental state talk in a book narration task and mental attributes in a mind-mindedness interview. However, the tasks were not exactly equivalent because Meins and colleagues used tasks designed to be completed by children and not mothers. It cannot be ruled out that little support was found in favour of the predicted link due in part to the nature of the measure designed to tap into mothers' psychological mindedness. This was an open task whereby mothers told a story based on one photograph shown to them. This is in contrast to the Meins et al. study where children told a story about a wordless picture book but were introduced to the main storyline and characters before narrating the story picture by picture. It is possible that the cognitive demands of the task for the mothers inhibited the likelihood that they would think about the internal states of the people in the photographs. Instead, cognitive resources may have been devoted to the actual narrative of the tale and the people's actions rather than their inner lives. The cognitive demands of narration map onto the observation expressed previously that mothers tended to find this task difficult. Another point to note is that the photographs shown were ambiguous in nature so the task required projection of mental states onto the protagonists, which could then be influenced by personal propensities. This contrasts again with the Meins et al. task where the story depicted the protagonists' emotional reactions to events and so it could be argued that stronger prompts were given to guide children's responses towards internal state comments.

The new measure was designed to address a tendency in the mother to consider psychological factors and it was therefore important to measure the consistency of this construct over time. Results suggest that there was stability between Time 1 and Time 2 with frequency but not proportional measures; therefore, findings regarding stability are equivocal. The very small effect size for the relation between the proportion of mental state comments between time points contrasts with the strong association for the relation between the frequency of mental state comments between time points. However, the total number of comments made about protagonists, regardless of whether these comments were mental or non-mental, was also strongly positively correlated across time. The robust longitudinal relationship shown by the frequency of mental state comments may therefore have

been a function of the amount mothers speak rather than a predilection to focus on the internal states of other people. One could argue that evidence points towards a consistent tendency in mothers' verbosity rather than the temporal continuity of the construct of psychological mindedness as measured in this study.

Analysis of both frequency and proportion measures enabled the complexities of mothers' tendency to attribute mental states to others to be comprehensively addressed. A different story regarding stability would have emerged if only one of these had been measured. The following question arises from the discrepancy in results for the two psychological mindedness measures: Is the total frequency or the relative frequency of mental state attributions more representative of mothers' psychological mindedness? The fact that stability was found with one but not both measures means that the essential conceptual difference between what frequency counts show and what proportions of total output show about mothers' psychological mindedness needs to be addressed. If frequency of mental state comments alone had been measured, then mothers' psychological mindedness would have been viewed as stable; though this could be interpreted as really more to do with how much they speak in general. This temporal continuity is similar to the finding that mothers' talkativeness is a stable characteristic of their conversational style (Olsen-Fulero, 1982). On the other hand, how much an individual attributes mental states to others in relation to all attributions regardless of content (e.g., behavioural or physical attributions) may be just as or more influential in how they think about and perceive other people. It appears that mothers are inconsistent in how much they do this at different times. Temporal continuity in the tendency to think about others with respect to all aspects of a person may require knowledge of the individual, and this could be an explanation for why stability was not found when measurement focused on protagonists in a story.

The second aim of this chapter addressed whether maternal mind-mindedness was related to child temperament and behaviour. All analysis focused on mothers and their younger children. Before discussing the findings in relation to mind-mindedness, it is important to point out the clear longitudinal stability shown by child temperament and behaviour measured by maternal report and observation. This offers support for the temperament factors in question stemming from stable traits in the child. Furthermore, it meant that if significant relationships with mind-mindedness were found to vary at the two points of measurement, this was not

simply due to differences in the way the child's temperament or behaviour was perceived or observed.

So how does the longitudinal stability found compare with the literature? For the SF-CBQ measure, longitudinal comparisons with previous findings are hampered by the fact that studies have used different versions of the CBQ questionnaire and varying combinations of the scales (e.g., fear, shyness) to make up the three factors under investigation (Surgency, Negative Affectivity and Effortful Control). Despite these caveats, comparison with other longitudinal studies proved promising. Based on the very-short-form CBQ scales, Putnam and Rothbart (2006) found similar levels of stability over a year, though using rank order stability correlations, in maternal ratings of Surgency ( $r_s = .73$ ), Negative Affectivity ( $r_s = .70$ ) and Effortful Control ( $r_s = .63$ ). Majdandzic and van den Boom (2007) assessed temperament with 4-year-olds using the full version of the CBQ on two occasions, 7 months apart. The authors found stability for mothers' ratings of all three factors: Surgency ( $r = .80$ ), Negative Affectivity ( $r = .83$ ), and Effortful Control ( $r = .80$ ). Encouragingly, this is consistent with the stability shown in the present study for Surgency and Effortful Control though not for Negative Affectivity which appeared to be more susceptible to change in this sample. Closer investigation of the particular temperament scales making up the factor of Negative Affectivity showed that mothers' ratings of Discomfort, Fear, and Sadness in the present study showed lower stability than in Majdandzic and van den Boom's findings. This suggests that these particular characteristics of the children may have contributed towards the reduced level of stability for Negative Affectivity.

The longitudinal stability found with the observational assessment of temperament contributed towards the validation of this new measure. The children's effortful control and negative affectivity were shown to have good stability across the two play sessions. The factor of Surgency showed the least stability, although it should be noted that this should still be considered as demonstrating moderate consistency across time. Surgency shares much with the personality construct of extraversion and combines children's positive affect and rapid approach tendencies (Rothbart & Derryberry, 2000). High levels of surgency were demonstrated, for example, if a child hurried from playing with one set of toys to another and showed a great deal of pleasure when playing with the toys. One possible reason for lower levels of stability being found is that the novelty of the mother-child interaction might have influenced varying levels of surgency across the two play sessions. It could be argued that

some children may have been more inhibited in their enjoyment of the toys in the first play session due to the novelty of the situation leading to lower levels of surgency than subsequent ratings. Alternatively, some children may have shown less enthusiasm while playing during the second visit because the repetition may have meant the toys were no longer new to them and so these were less exciting, leading to lower levels of surgency than previous ratings.

Addressing relations between child temperament and behaviour and levels of maternal mind-mindedness, both levels of representational and interactional maternal mind-mindedness with the younger sibling were unrelated to maternal report of the younger siblings' temperament assessed by the SDQ and the SF-CBQ at both Time 1 and at Time 2. The lack of relations between levels of interactional mind-mindedness and maternal report of child temperament is consistent with previous findings (Meins et al., 2011). The authors found that none of the six temperament dimensions taken from the IBQ related to mothers' appropriate mind-related comments with their infants. Although the Meins et al. study was with mothers and their infants, therefore a younger age group than the children involved in this study, and with a different temperament measure, continuity of results has been demonstrated. The SF-CBQ used in the current study shares a similarity with the IBQ because both stem from the same theoretical perspective and the SF-CBQ is the questionnaire designed to be used upwards in age from the IBQ. Therefore, the lack of a relationship between levels of mind-mindedness and maternal report of child temperament found in existing literature was further consolidated by the findings of this study. This suggests that how mothers perceive their children's temperament is not linked to their levels of maternal mind-mindedness, not only in how they represent their children's internal states offline but also in how attuned they are to these internal states in interactions.

On the other hand, when considering mothers' reports of child difficulties, the results only partially replicate those studies which have importantly included the SDQ, one of the same measures reported in this study (Meins et al., 2013; Walker et al., 2011). The present study failed to find a relationship between levels of mind-mindedness and total difficulties assessed by the SDQ in a sample of mothers from a high SES background. This is in line with the failure to find an association between mothers' interactional mind-mindedness with 8-month-olds and later maternal report of child difficulties with a high SES group (Meins et al., 2013). Contrasting results came from the same study when a relationship was found in a

low SES group so that early mind-mindedness reduced mothers' later tendency to rate their child as difficult. Therefore, the current study supports the finding that mind-mindedness is not linked to mothers' perceptions of behavioural difficulties specifically in higher SES families.

The lack of an association mirrored Walker and colleagues' (2011) finding that levels of parental representational mind-mindedness were unrelated to children's behavioural and emotional difficulties, but only in their case when considering a clinical group. In contrast, a strong negative association emerged in their study between levels of representational mind-mindedness and total difficulties in a community group, which had rated their children's difficulties as significantly lower than the clinical group. The current study reported here focused solely on a sample of women drawn from the general population, including mothers who had tended to rate their children low in behavioural and emotional difficulties. Therefore, the lack of a relationship between mind-mindedness and maternal report of child difficulties does not support Walker et al.'s argument that mind-mindedness may only be associated with lower rather than higher levels of child difficulties. However, it is possible that differences between the two community groups may have contributed to whether a relationship was found. Walker and colleagues included an educationally diverse sample and excluded parents with very high educational attainment in order to match their clinical group. This contrasts with the mothers in the current study who tended to be highly educated. In addition, 24% of mothers were single parents, compared with 6% in the current study.

This study investigated relations between mind-mindedness and observational ratings of child temperament for the first time. No support was found for a link between levels of representational mind-mindedness and child temperament using this method of assessment as levels of representational maternal mind-mindedness with the younger sibling were unrelated to observational ratings of all three temperament factors. Furthermore, evidence for representational mind-mindedness being independent of children's temperament traits was strengthened due to the emergence of non-significant relations at not just one, but at two time points.

In contrast, an investigation into relations between levels of interactional maternal mind-mindedness and observational ratings of temperament revealed a somewhat different tale. Here, levels of interactional maternal mind-mindedness with the younger sibling were unrelated to observational ratings of temperament for the



factors of Surgency and Negative Affectivity at each time point; whilst a negative relationship was found with observational ratings of Effortful Control at the second time point. The findings suggest that at Time 2, mothers who tended to comment appropriately on their children's internal states were those who had children exhibiting lower levels of effortful control. According to Rothbart and Derryberry (2000), effortful control systems relate to the voluntary deployment of individuals' attention; allowing individuals to regulate their reactive tendencies and to suppress a dominant response so that a subdominant response can be carried out.

Why were observational ratings and not maternal report of Effortful Control related to levels of interactional mind-mindedness? A couple of possible explanations stem from differences between the temperament measures themselves. The observational rating of Effortful Control included the scales of Attentional Focusing, Inhibitory Control and Low Intensity Pleasure whereas maternal report included these three and the Perceptual Sensitivity scale. The Perceptual Sensitivity scale was not included in the observational ratings because it could not be adequately rated in the play session so it is possible that its absence may have contributed to relations only emerging between observational ratings of Effortful Control and levels of interactional mind-mindedness. However, this appears unlikely when considering that Perceptual Sensitivity refers to children's detection of low-intensity stimuli from the external environment, for example noticing when parents are wearing new clothes.

In answering why maternal report of temperament was unrelated whilst observational ratings of temperament were partially related, it should be borne in mind that the former was based on children's reactions within the last six months whereas the latter was based on one play session; a snapshot in time. Perhaps the nature of the mother-child interaction – where children were likely to focus on playing with exciting new toys and to follow mothers' suggestions regarding the play activity, thereby demonstrating high levels of effortful control – meant that mothers were correspondingly less likely to focus on the mental states of the child. That said, relations between Effortful Control and mind-mindedness taken from the observational measures should be interpreted with caution. Mind-mindedness was only assessed in the context of 15 minutes of free play. Mothers' mind-minded language in the tidy-up task was not coded partly because of the huge variety in the time taken to complete the exercise. However, this task was designed to tap into children's inhibitory control, a facet of Effortful Control. This meant that, for example,

children may have been given a lower rating for effortful control because they protested when asked to tidy up the toys but the mothers' mind-minded language was not being assessed in tandem. This discrepancy compromises the validity of this finding.

Overall, an investigation into whether levels of mind-mindedness would be associated with child temperament revealed no significant relationships other than that found between children's Effortful Control assessed by observation and mothers' levels of interactional mind-mindedness at only one time point. The prevalent pattern of null findings offers rather more support for the premise that levels of maternal mind-mindedness are not influenced by child temperament. The findings do not provide support for Meins et al's (2011) proposal that maternal report of temperament, albeit with infants, might be more strongly associated with mothers' mind-mindedness than an assessment of temperament based on observation given that no relations were found with either of the maternal report measures.

The question of whether the emotional content of mind-mindedness was related to child temperament revealed clear-cut findings when associations between both representational measures are considered. No support was found for mothers' positive, neutral or negative representations of the internal states of their child being influenced by their perceptions of the child's temperament. The emotional content of representational mind-mindedness in mothers' descriptions of the younger siblings (positive, neutral and negative valence of mental attributes) was unrelated to maternal report of the younger siblings' temperament at each time point.

The lack of a relation between the emotional content of representational mind-mindedness and total difficulties assessed by the SDQ is in contrast to a previous study by Demers et al. (2010b). In that, mothers' positive mind-mindedness, specifically the frequency of positive mental attributes, was negatively correlated with mothers' perceptions of their child as being difficult. However, a number of differences between the two studies should be noted. Firstly, the Demers et al. study was not directly comparable to the present one because it used a different measure, the ICQ, with a rather different interpretation of what constitutes a difficult child. Taking responses from the ICQ, mothers perceive a difficult infant to be "fussy, hard-to-soothe, labile" (Bates et al., 1979, p. 74). The SDQ in comparison includes, for example, items relating to conduct problems such as "often fights with other children or bullies them", or peer problems such as "generally liked by other

children". In this way, the SDQ could be considered to be a broader assessment of difficulty than the ICQ's narrower focus on an infant's fussiness. Secondly, the Demers et al. study involved longitudinal correlations with temperament being measured at 6 and 10 months and mind-mindedness being measured at 18-months. This contrasts with the concurrent relations investigated in the present study and it is not possible to say whether the associations found by Demers and colleagues would also have existed if both measures had been completed at the same time. Lastly, mothers with infants took part rather than mothers with preschool and primary school children as in the present study. Maybe an infant considered as easy allows a mother time to develop a positive representation of her infant as an individual being separate to themselves with their own internal states. In contrast, a mother might be more likely to focus on an infant's behaviour if they perceive them to be fussy/difficult, and this may be associated with a reduced tendency to mention positive mental attributes at a later date.

The pattern of null findings was almost replicated with the emotional content of representational mind-mindedness and observational ratings of temperament. No relations were found apart from the exception which emerged with the factor of Negative Affectivity. This factor comprised two scales in the observational assessment: one rating the child's anger/frustration, for example when the child did not get what they wanted; and one rating sadness, for example when the child was no longer able to play with the toys. One possibility is that mothers who described their child's mental states negatively might have been more likely to have a child who had temper tantrums if their wishes were thwarted. Alternatively, positive descriptions might have been more likely if a child rarely showed opposition.

Instead, it was neutral descriptions of the younger child's internal states which were negatively associated with children's displays of negative affectivity. Mothers were more likely to use neutral mental attributes in their descriptions of children who exhibited little negative affect in the play sessions than those who displayed greater anger/frustration or sadness when their goals were blocked. However, relations were only found at Time 1, with support for the consistency of this relationship being considerably weakened at Time 2; despite correlations being in the same direction as Time 1, these negative relations were weak and non-significant.

This study was the first to investigate relations between the emotional content of interactional mind-mindedness (positive and neutral appropriate mind-related

comments) and child temperament. No relationships were revealed between positive and neutral appropriate mind-related comments made by mothers in interactions and either measure of maternal report at Time 1. Yet Time 2 revealed two significant relationships with the proportion of neutral appropriate mind-related comments. The first finding to be considered is the positive relationship which emerged with Total Difficulties as measured by the SDQ. One possibility is that mothers who perceive their children's difficulties as greater may be more careful, or neutral with their comments, when paying attention to their children's mental states in an interaction. This may be evidenced by the mothers' references to their child's internal states containing a certain proportion of neutral emotional content. It should be noted that many of the neutral appropriate mind-related comments took the form of questions. Mothers who rated their children's difficulties as higher may have been more aware of their children's emotions as a consequence and, given that, asked neutral appropriate mind-related questions to try to keep them on task and contented. Neutral questions included those such as "What do you think that's for?" and "Do you like this toy?". This tendency may have been exacerbated by the fact that the play session was being recorded to be viewed by a researcher. However, the validity of this result is weakened by the fact that it was only found at one time point.

The second finding to be considered is the negative relationship between the proportion of neutral appropriate mind-related comments and Effortful Control as measured by the SF-CBQ. This finding needs to be considered in conjunction with relations between the two observational measures. Effortful Control was the only temperament factor rated by observation to be related to the emotional content of interactional mind-mindedness. A negative relationship with the frequency of neutral appropriate mind-related comments emerged at Time 2. Given that the vast majority of appropriate mind-related comments were neutral and that the frequency of appropriate mind-related comments (excluding valence) had previously been found to be related to Effortful Control, the fact that the relationship emerged as significant was unsurprising. When considering all the findings, Effortful Control was related to the levels and the emotional content of interactional mind-mindedness with both methods of temperament assessment at Time 2: mothers' neutral appropriate mind-related comments were negatively related to children's effortful control assessed by maternal report; and both levels of appropriate mind-related comments and neutral appropriate mind-related comments were negatively related to children's effortful control assessed by observation.

Why would mothers demonstrate more mind-mindedness when their children were perceived by them to have lower levels of effortful control or were rated with lower levels by an observer? It could have been proposed that the opposite was more likely: that mothers who were more attuned to their child's mental states may have been more likely to have children who were better able to regulate their reactions and to suppress a response. One possible explanation is that mothers focus on their child's internal states when they know that the child has difficulties in concentrating on the task at hand and in regulating their behaviour. Perhaps talking about the child's thoughts and wishes in the past has helped to encourage the child to focus and to increase the possibility that the child will follow their instructions. However, it is hard to interpret why these findings only emerged at the second time point and yet not when data were first collected.

### **9.5 Conclusion**

Little support was forthcoming for maternal mind-mindedness being part of a cognitive-behavioural trait in the mother to consider psychological factors. However, it cannot be ruled out that this may have been partly due to the nature of the task designed to capture mothers' psychological mindedness. It could be speculated that this storytelling task may not have fully tapped into an individual's general tendency to speak about or refer to others' internal states and it is too soon to rule out mind-mindedness being part of a mothers' psychological mindedness.

Relations between mind-mindedness and child temperament, measured by maternal report and observation, did not clearly point towards mind-mindedness being predominantly a relational construct influenced by child characteristics. This was true not only when levels of mind-mindedness were investigated but also when the emotional content of mind-mindedness was considered. Importantly, due to the novelty of using observational ratings of temperament whilst investigating relations with mind-mindedness, observational ratings of temperament demonstrated more significant relationships with mind-mindedness than maternal report of temperament; although it should be noted that these relationships were few and inconsistent when findings at each time point are taken into account. However, one might have expected the opposite: that maternal ratings of temperament and behaviour were more likely to be related to mind-mindedness as both involve mothers' representations of their children and interpretation of their characteristics. Instead, mind-mindedness appeared to be largely independent of mothers' perceptions of their children.

# 10

## **Maternal mind-mindedness as a construct: temporal stability and consistency across measures**

### **10.1 Introduction**

If mind-mindedness is a trait – a disposition to focus on internal states while thinking about and interacting with others – then an individual's mind-mindedness would generally be expected to show some longitudinal consistency (whilst acknowledging that some change is possible even in a trait). Therefore, in order to meet the basic criteria to be considered primarily a trait, maternal mind-mindedness should demonstrate relative stability across time in one or both of the measures. The limitations of existing longitudinal research in addressing the question of temporal stability in mind-mindedness, as discussed in Chapter 3, included assessment of different mind-mindedness measures across time (Arnott & Meins, 2008; Meins et al., 2003; Meins & Fernyhough, 1999) and assessment over a short time period (Meins et al., 2011). This study overcame some of the methodological issues by using the same mind-mindedness measures at two time points, approximately nine months apart.

The first aim of this chapter was to investigate the following research question:

1. Is maternal mind-mindedness stable across time?

Mothers' representations of others and their verbal behaviour in interactions were assessed twice to address both quantitative and qualitative measures of mind-mindedness and to answer the following questions:

- a. Are levels of maternal mind-mindedness (representational and interactional) stable across time?
- b. Is the emotional content of mind-mindedness (representational and interactional) stable across time?

Before addressing these questions with longitudinal analysis, findings regarding the consistency of mind-mindedness previously presented in this thesis need to be kept in mind. Mothers' levels of representational mind-mindedness have been found to be inconsistent across relationships. In Chapter 8, this was put forward as evidence that mind-minded representations should best be viewed as associated with a particular relationship rather than primarily stemming from a trait in the mother. Therefore, an explanation for any longitudinal consistency found in the current study could be interpreted as being due to the stability of the relationship rather than a stable trait in the mother. However, as presented in Chapter 8 there was strong evidence for consistency in mothers' levels of interactional mind-mindedness across relationships and as a consequence, any temporal continuity identified for this measure in the current study would strengthen the view that levels of interactional mind-mindedness are suggestive of a trait.

Moving on to the second focus of this chapter, mind-mindedness has been treated in the existing literature as an overarching construct encompassing both representations of others' mental states and maternal speech directed towards others' mental states in interactions. Accordingly, mind-mindedness has been assessed using a representational (offline) measure and an interactional (online) measure. However, as discussed in Chapter 2, there is little confirmatory evidence that these two measures are convergent because studies have predominantly included one rather than both of the measures. Therefore, this study included both measures in order to address the following question:

2. Are levels of representational and interactional mind-mindedness related?

If maternal mind-mindedness, operationalised in different ways, is examining the same overarching construct, representational and interactional measures should be related within time points. Therefore, mothers' levels of representational mind-mindedness with one child should be related to their levels of interactional mind-mindedness with the same child. The convergent validity of mind-mindedness would be further strengthened if longitudinal associations between measures were found. Support for this would emerge if, for example, mothers were found more likely to mention mental attributes about their children if they had previously tended to comment appropriately on their children's mental states at an earlier stage of data collection. Therefore, as well as addressing concurrent relations, the longitudinal

relationship between these two operationalisations was explored to answer the following questions:

- a. Are mothers' levels of representational mind-mindedness related to their levels of interactional mind-mindedness with each child at each time point?
- b. Are mothers' levels of representational mind-mindedness at Time 1 related to their levels of interactional mind-mindedness with each child at Time 2?
- c. Are mothers' levels of interactional mind-mindedness at Time 1 related to their levels of representational mind-mindedness with each child at Time 2?

The direction of relationships will be explored: whether the evidence supports maternal representations influencing interactive behaviour or interactive behaviour influencing maternal representations.

In line with previous analysis concerning the consistency of mind-mindedness across relationships, because the study was exploratory, no predictions were made regarding the temporal stability of mind-mindedness or whether the representational measure and interactional measure would be related.

## **10.2 Method**

The participants and the mind-mindedness measures are the same as those shown in Chapters 4 and 5 and in section 8.2.

## **10.3 Results**

The descriptive statistics for the mind-mindedness measures are displayed in Chapter 8. Results are presented first for the longitudinal stability of mind-mindedness followed by relations between the representational and interactional measures. Tables only display correlations which address the research question; correlations which are not pertinent are not reported and this is shown using a dash.

### ***10.3.1 Are levels of representational mind-mindedness stable across time?***

The stability of mothers' levels of representational mind-mindedness with the older sibling, younger sibling, and partner/friend were investigated using correlational analysis across Time 1 and Time 2. Spearman's rho correlations for mental attribute



frequency are displayed in Table 10.1 and Pearson's correlations for mental attribute proportion are displayed in Table 10.2.

**Table 10.1.** Correlations between levels of representational mind-mindedness (mental attribute frequency) for older sibling, younger sibling and partner/friend across time

Variable	T2	T2	T2
	Mental attrib (freq) (Older sibling)	Mental attrib (freq) (Younger sibling)	Mental attrib (freq) (Partner/friend)
T1 Mental attrib (freq) (Older sibling)	.47**		
T1 Mental attrib (freq) (Younger sibling)	–	.22	
T1 Mental attrib (freq) (Partner/friend)	–	–	.59**

*p* < .05. T1 = Time 1; T2 = Time 2; Mental attrib (freq) = mental attribute frequency.

\*\*\* *p* < .001

Mothers' levels of representational mind-mindedness measured using mental attribute frequency were strongly correlated for the older sibling ( $r = .47, J = .008$ ) and for the partner/friend ( $r = .59, J = .001$ ) across Time 1 and Time 2. No significant longitudinal relationship was found for the frequency of mental attributes produced in mothers' descriptions of younger siblings ( $r = .22, J = .25$ ).

**Table 10.2.** Correlations between levels of representational mind-mindedness (mental attribute proportion) for older sibling, younger sibling and partner/friend across time

Variable	T2	T2	T2
	Mental attrib (prop) (Older sibling)	Mental attrib (prop) (Younger sibling)	Mental attrib (prop) (Partner/friend)
T1 Mental attrib (prop) (Older sibling)	.47**		
T1 Mental attrib (prop) (Younger sibling)	–	.36	
T1 Mental attrib (prop) (Partner/friend)	–	–	.47**

*p* < .05. T1 = Time 1; T2 = Time 2; Mental attrib (prop) = mental attribute proportion.

\*\*\* *p* < .001

Turning to the measure of mental attribute proportion, significant positive correlations mirrored those relationships previously found with mental attribute frequency. Strong correlations were found with mother's mind-mindedness for the older sibling ( $r = .47, p = .009$ ) and for the partner/friend ( $r = .47, p = .009$ ) across Time 1 and Time 2. Although there was a trend for temporal continuity with mothers' mental attribute proportion with younger siblings, this failed to reach significance ( $r = .36, p = .051$ ). Therefore, mothers' mind-mindedness showed considerable stability across time when considering representations of older siblings and partners/friends but not representations of younger siblings.

### 10.3.2 Are levels of interactional mind-mindedness stable across time?

The temporal stability of mothers' levels of interactional mind-mindedness with their older child and with their younger child was investigated using Pearson's correlations.

**Table 10.3.** Correlations between levels of interactional mind-mindedness (frequency and proportion of appropriate mind-related comments) for older sibling and younger sibling across time

Variable	T2	T2	T2	T2
	AMRC (freq) (Older sib)	AMRC (prop) (Older sib)	AMRC (freq) (Younger sib)	AMRC (prop) (Younger sib)
T1 AMRC (freq) (Older sib)	.59**			
T1 AMRC (prop) (Older sib)	–	.49**		
T1 AMRC (freq) (Younger sib)	–	–	.73***	
T1 AMRC (prop) (Younger sib)	–	–	–	.61***

*p* [ <math>T1 = Time 1; T2 = Time 2; AMRC (freq) = appropriate mind-related comments frequency; AMRC (prop) = appropriate mind-related comments proportion; sib = sibling.</math>

~~Table 10.3~~

Table 10.3 shows consistently strong correlations for the two measures of interactional mind-mindedness with both older and younger siblings across Time 1 and Time 2. The frequency of appropriate mind-related comments with older siblings was robustly positively correlated across time ( $r = .59, p = .001$ ), as was the

proportion of appropriate mind-related comments with older siblings ( $r = .49, J = .007$ ). The frequency of appropriate mind-related comments produced with younger siblings demonstrated even stronger positive correlations across time ( $r = .73, J < .001$ ), as did the proportion of appropriate mind-related comments produced with younger siblings ( $r = .61, J < .001$ ).

### **10.3.3 Is the emotional content of representational mind-mindedness stable across time?**

Even though mothers' levels of representational mind-mindedness showed stability across time for two of the relationships, the emotional content of what was mentioned about these individuals might have changed. Therefore, the longitudinal stability of the emotional content of representational mind-mindedness was addressed. Mothers' use of positive, neutral and negative mental attributes were assessed using Spearman's rho correlations. With respect to mental attribute frequency, only a few significant positive correlations were found across Time 1 and Time 2. The frequency of both mothers' positive mental attributes ( $r = .41, J = .02$ ) and negative mental attributes ( $r = .43, J = .02$ ) were related across the two time points with older siblings. The frequency of mothers' neutral mental attributes with partners/friends was related ( $r = .64, J = .001$ ). No significant correlations were found for the emotional content of mothers' representations of the younger sibling across time when considering the frequency measure.

After controlling for the number of mental attributes given by mothers regardless of emotional content, an inconsistent pattern of significant positive correlations across time emerged. The proportion of mothers' negative mental attributes with older siblings was related ( $r = .48, J = .007$ ), as was the proportion of mothers' positive mental attributes with partners/friends ( $r = .52, J = .008$ ) and the proportion of mothers' neutral mental attributes with partners/friends ( $r = .47, J = .02$ ). The only significant correlation for the emotional content of representational mind-mindedness with the younger sibling was revealed for the proportion of mothers' positive mental attributes ( $r = .47, J = .02$ ).

### **10.3.4 Is the emotional content of interactional mind-mindedness stable across time?**

The longitudinal stability of the emotional content of mothers' interactional mind-mindedness was explored, specifically relations between positive and neutral appropriate mind-related comments across time. Here, only the frequency of

mothers' neutral appropriate mind-related comments was found to be significantly related, with strong positive correlations emerging for older siblings ( $r = .61, p < .001$ ) and for younger siblings ( $r = .77, p < .001$ ). No significant relationships were found for the frequency of positive appropriate mind-related comments across time and for either of the proportional measures of emotional content.

### ***10.3.5 Relations between levels of representational and interactional mind-mindedness measures***

The convergent validity of the two operationalisations of maternal mind-mindedness was next investigated through concurrent and longitudinal analysis.

#### ***Concurrent relations***

Correlations were run to establish whether mothers' levels of representational mind-mindedness were related to their levels of interactional mind-mindedness with each child at each time point. Spearman's rho correlations were conducted for frequency scores whilst Pearson's correlations were conducted for proportional scores. Table 10.4 displays correlations at Time 1 and Table 10.5 displays correlations at Time 2.

**Table 10.4.** Correlations between levels of representational and interactional mind-mindedness for older sibling and younger sibling at Time 1

		<b>Interactional mind-mindedness</b>			
<b>Variable</b>		AMRC (freq)	AMRC (prop)	AMRC (freq)	AMRC (prop)
		(Older sib)	(Older sib)	(Younger sib)	(Younger sib)
<b>Representational mind-mindedness</b>	Mental attrib (freq) (Older sib)	-.16			
	Mental attrib (prop) (Older sib)	–	.01		
	Mental attrib (freq) (Younger sib)	–	–	-.08	
	Mental attrib (prop) (Younger sib)	–	–	–	-.15

*P* < .05 Mental attrib (freq) = mental attribute frequency; Mental attrib (prop) = mental attribute proportion; AMRC (freq) = appropriate mind-related comments frequency; AMRC (prop) = appropriate mind-related comments proportion; sib = sibling.

**Table 10.5.** Correlations between levels of representational and interactional mind-mindedness for older sibling and younger sibling at Time 2

		<b>Interactional mind-mindedness</b>			
<b>Variable</b>		AMRC (freq)	AMRC (prop)	AMRC (freq)	AMRC (prop)
		(Older sib)	(Older sib)	(Younger sib)	(Younger sib)
<b>Representational mind-mindedness</b>	Mental attrib (freq) (Older sib)	-.35			
	Mental attrib (prop) (Older sib)	–	-.25		
	Mental attrib (freq) (Younger sib)	–	–	-.10	
	Mental attrib (prop) (Younger sib)	–	–	–	-.12

*P* < .05 Mental attrib (freq) = mental attribute frequency; Mental attrib (prop) = mental attribute proportion; AMRC (freq) = appropriate mind-related comments frequency; AMRC (prop) = appropriate mind-related comments proportion; sib = sibling.

No significant relations were found between mothers' levels of representational mind-mindedness and their levels of interactional mind-mindedness for either child at Time 1 and at Time 2. The frequency of mental attributes was unrelated to the frequency of appropriate mind-related comments. The only relationship which approached significance was between the frequency of mental attributes and the frequency of appropriate mind-related comments with older siblings ( $r = -.35$ ,  $J = .062$ ). Not only that, but when verbosity was taken into account in both measures, the proportion of mental attributes was unrelated to the proportion of appropriate mind-related comments. This suggests, for example, that mothers were not more likely to be highly mind-minded in an interaction with a child if they had been so in their descriptions of that child.

### **Longitudinal relations**

Having established that the measures were concurrently unrelated, longitudinal relations between the measures were still possible. Representational and interactional measures of mind-mindedness might be found to predict each other

over time. Table 10.6 presents correlations between early levels of representational mind-mindedness and later levels of interactional mind-mindedness, whilst Table 10.7 presents correlations between early levels of interactional mind-mindedness and later levels of representational mind-mindedness.

**Table 10.6.** Correlations between levels of representational mind-mindedness at Time 1 and interactional mind-mindedness at Time 2 for older sibling and younger sibling

		<b>Time 2: Interactional mind-mindedness</b>			
<b>Variable</b>		T2	T2	T2	T2
		AMRC (freq)	AMRC (prop)	AMRC (freq)	AMRC (prop)
		(Older sib)	(Older sib)	(Younger sib)	(Younger sib)
<b>Time 1: Representational mind-mindedness</b>	T1 Mental attrib (freq) (Older sib)	-.37*			
	T1 Mental attrib (prop) (Older sib)	–	-.21		
	T1 Mental attrib (freq) (Younger sib)	–	–	-.13	
	T1 Mental attrib (prop) (Younger sib)	–	–	–	-.20

$\hat{P}[\hat{c}\hat{E}T1 = \text{Time 1}; T2 = \text{Time 2}; \text{Mental attrib (freq)} = \text{mental attribute frequency};$   
 $\text{Mental attrib (prop)} = \text{mental attribute proportion}; \text{AMRC (freq)} = \text{appropriate mind-}$   
 $\text{related comments frequency}; \text{AMRC (prop)} = \text{appropriate mind-related comments}$   
 $\text{proportion}; \text{sib} = \text{sibling}.$

**Table 10.7.** Correlations between levels of interactional mind-mindedness at Time 1 and representational mind-mindedness at Time 2 for older sibling and younger sibling

		<b>Time 1: Interactional mind-mindedness</b>			
<b>Variable</b>		T1	T1	T1	T1
		AMRC (freq) (Older sib)	AMRC (prop) (Older sib)	AMRC (freq) (Younger sib)	AMRC (prop) (Younger sib)
<b>Time 2: Representational mind-mindedness</b>	T2 Mental attrib (freq) (Older sib)	-.37*			
	T2 Mental attrib (prop) (Older sib)	–	-.14		
	T2 Mental attrib (freq) (Younger sib)	–	–	-.11	
	T2 Mental attrib (prop) (Younger sib)	–	–	–	-.20

*r* [ *r* = Time 1; T2 = Time 2; Mental attrib (freq) = mental attribute frequency; Mental attrib (prop) = mental attribute proportion; AMRC (freq) = appropriate mind-related comments frequency; AMRC (prop) = appropriate mind-related comments proportion; sib = sibling.

Mothers' levels of representational mind-mindedness were not significantly related to their levels of interactional mind-mindedness apart from the negative correlations found between the frequency of mothers' mental attributes at Time 1 and the frequency of appropriate mind-related comments at Time 2 with older siblings ( $r = -.37, p = .045$ ) and between the frequency of mothers' appropriate mind-related comments at Time 1 and the frequency of mothers' mental attributes at Time 2 with older siblings ( $r = -.37, p = .043$ ). Both these correlations, although showing medium effect sizes, were only marginally significant. Once verbosity was taken into account in mothers' mind-mindedness for the older siblings, the relationships were no longer significant.



#### 10.4 Discussion

The first aim of this chapter was to establish whether maternal mind-mindedness showed stability across time, focusing on both levels and the emotional content of representational and interactional mind-mindedness. The longitudinal results offer support for stability in mothers' levels of representational mind-mindedness but only when considering two out of the three relationships under investigation. Strong evidence was provided for stability in mothers' levels of representational mind-mindedness for the older sibling and for the partner/friend, with medium to large correlations found for both the number of mental attributes and the proportion of mental attributes mentioned. By way of contrast, mothers' levels of representational mind-mindedness for the younger sibling were unrelated across time in both mental attribute measures.

Before moving on to possible explanations for this finding, it should be reiterated that mothers' levels of representational mind-mindedness were shown to be inconsistent across relationships when concurrent relations with the older sibling, younger sibling and partner/friend were explored in Chapter 8. The lack of consistency was interpreted as evidence that levels of representational mind-mindedness may be influenced by the mother's relationship with an individual rather than stemming from a trait in the mother. This, coupled with the fact that mothers' levels of mind-mindedness appear to have changed only in their representations of the younger siblings and yet not for older siblings and partners/friends, lends support for representational mind-mindedness as a facet of the relationship.

So why did mothers have stable mind-minded representations for the older sibling and for the partner/friend but not for the younger sibling? A number of reasons can be proposed for stable representations only being found for the older siblings and not for the younger siblings. When data on mind-mindedness were first collected in this study, the average age of the younger siblings was 4 years. One possible explanation may stem from developmental factors; the younger siblings may well have experienced more age-related changes than the older siblings across the nine-month period between data collection points. As a consequence, it seems likely that this might have affected mothers' representations of these children. For example, children are thought to develop a theory of mind at around the age of 4 years (Gopnik & Astington, 1988; Wimmer & Perner, 1983); in other words, they are able to understand that other people have minds separate to their own. It is possible that this developmental shift in some children but not others may have influenced

mothers' levels of mind-mindedness. However, contrary to this argument, no significant difference was found for the frequency or the proportion of mothers' mental attributes with younger siblings between Time 1 and Time 2, which suggests that more children in possession of theory of mind at Time 2 probably cannot explain the failure to find stable representations for these children. In addition, novel environmental factors may have played a part in changing representations. Many of the younger siblings had begun attending nursery or were in the early years of primary school and as such, mothers' representations may have been more likely to vary when they were asked to describe these children at two time points.

The likelihood that the younger sibling would experience change over the study contrasts starkly with the likelihood that little would be expected to change for the mother-partner relationship. The partners who were described were all biological fathers of the children included in the study. Therefore, mothers had known their partners for longer than their children so it may well be the case that mothers' views of their partners would be less flexible than representations concerning their younger children. The temporal continuity in representations points towards a consistency in partners' ways of being; for example, their preferences, interests, cognitions and emotions. This is consistent with the longitudinal stability of adult traits proposed by trait theory (Funder, 1991; McRae & Costa, 2003). In line with this approach, the partners' personalities may well have been more "fixed", contributing to an association between mothers' representations over time.

One of the most important findings of the study was that mothers' levels of interactional mind-mindedness were robustly correlated across time for both older siblings and younger siblings, suggesting an impressive stability in mothers' appropriate references to their children's internal states in interactions. This result is consistent with the temporal stability found in mothers' interactional mind-mindedness with their infants over a 4-month period (Meins et al., 2011) but extends findings of continuity over time to an older age group and a longer period of time. It supports the prediction by Meins et al. (2003) that measuring interactional mind-mindedness across time might result in stronger continuity between early and later mind-mindedness than if representational mind-mindedness was included in analysis.

Mind-minded stability was demonstrated with an older age range in the present study than the young infants who took part in the study by Meins and colleagues

(2011). The interactional measure was adapted for use with a new and older age range in this study and so the finding of temporal continuity in interactional mind-mindedness can be taken as validation of this measure. However, the present study provided more compelling evidence for continuity across time than previously found. Firstly, mothers' interactional mind-mindedness was found to be stable with not just one, but with two children. Secondly, the timescale involved was longer, with the difference in time between measurement of mind-mindedness being nine months as opposed to four months; consequently more confidence can be placed in the evidence from this study for stability across time than that provided by the previous study of infants.

Interactional mind-mindedness has thus demonstrated consistency not only across relationships with different children within time points (as discussed in Chapter 8), but also across time with the same children. This provides strong support for the view that interactional maternal mind-mindedness reflects a trait, or tendency, in the mother. An alternative explanation to this might be that mothers have similar relationships with different children and that these relationships have not changed over time. Evidence from observational measures investigating infants' attachment security would argue against this interpretation of similar relationships. The attachment bond has been found to reflect the quality of infant-mother interaction and to be particular to that relationship (Ainsworth, 1971, 1974; Ainsworth et al., 1978).

In exploring the homogeneity of relationships, siblings' attachments relationships with their mothers in the context of shared and non-shared environments have been investigated. Results from three separate studies were pooled to investigate the similarity of siblings' attachment to the mother (van IJzendoorn, Moran, Belsky, Pederson, Bakermans-Kranenburg, & Kneppers, 2000). This revealed that the attachment security of siblings was modestly concordant (62%) and that for many siblings, the quality of the attachment relationship diverged. When both children experienced maternal insensitivity, this was associated with increased concordance of attachment non-security. In other words, they shared a child-rearing environment. The authors argued that contrasting developmental environments of siblings – non-shared environments – may increase the likelihood that they will develop distinct attachment relationships with the same mother. For example, the birth of a second child may change parental sensitivity so their experience is different to that of the

firstborn child. In addition, maternal interactive behaviour may vary if maternal attachment representations change between the birth of the siblings.

Accordingly, given each child's unique experience within a family environment, for the group of mothers in this present study to have such similar relationships with two of their children, leading to such robust correlations between the two relationships, seems unlikely. Correspondingly, a uniqueness to each mother-child relationship is more likely than a similarity, when explaining why consistency was found for mothers' levels of interactional mind-mindedness with their two children. It is noteworthy that although mothers' representations of the younger siblings changed across time, one specific aspect of their verbal behaviour in interactions with these children, whether they made comments attuned to their child's internal states, did not. This discrepancy further highlights the case for mothers' mind-minded representations best being viewed as primarily relational in contrast to mothers' mind-minded behaviour best being viewed as a tendency or trait.

Next, the stability of the emotional content of mothers' mind-mindedness was addressed. While mothers' references to internal states in the form of mental attributes were associated across time in two out of the three relationships, the value judgements implied by these references were variable. Only limited support emerged for temporal continuity in mothers' positive, neutral or negative mental attributes across their descriptions of the three individuals. Notably, mothers' did not consistently mention positive and negative mental attributes for all relationships over time. As an example, the proportion of mothers' positive remarks was found to be stable about the partners' and the younger siblings' internal states and yet not when mothers described the older siblings. In addition, the proportion of mothers' negative mental descriptors only showed stability across time for the older siblings. One could argue that negative mental descriptors might be psychologically more relevant than positive references about a child's internal states and that these may prove to be of more interest to mother-child relationships and child outcomes. The failure to find temporal continuity across the board may encouragingly be interpreted as evidence that mothers' representations were not constrained in this instance by a societal pressure to say good things, and to refrain from making negative comments about other people in front of a researcher.

The discrepancy in temporal continuity of the quality of valence across relationships is hard to explain and to do so, it is necessary to look at particular relationships in

more detail. Given that mothers' levels of representational mind-mindedness with the younger siblings did not display temporal continuity, it is unsurprising that the emotional content of mothers' representations for these children showed minimal stability. In fact, only the proportion of mothers' positive mental attributes showed continuity across time. As previously discussed in this chapter, there is a possibility that developmental and environmental change affected the younger siblings more than the others. Perhaps some children shifted being from slightly difficult 3-year-olds to being easier 4-year-olds. It could be that when older, these children were easier to reason with and to persuade. This in turn may have impacted upon mothers' thoughts about these children, corresponding with a shift in the emotional content of mothers' representations.

As discussed earlier, mothers exhibited greater self-consciousness when talking about partners in comparison with when they were talking about a child. This reticence may have contributed towards only nine mothers at Time 1 and three mothers at Time 2 mentioning negative mental attributes about their partners/friends. In contrast, a far greater percentage of mothers gave positive and neutral mental attributes than those who gave negative mental attributes about partners/friends. These positive and neutral representations were related across time, unlike negative representations, and this may be due to mothers consistently desiring to represent the partner in a positive or neutral light. On the other hand, it is reasonable to suppose that mothers chose their partners based on certain aspects of their behaviour which may have fed into mothers' representations of their partners. Although measures concerning relationship satisfaction were not taken, the parental relationships could be considered positive: they were long-standing, with no evidence of partnership discord because none of the mothers who described their partner had separated from the fathers of their children. This could explain why consistency was shown across time for the positive and neutral mental attributes mentioned about partners in this study. Conversely, mothers do not choose their children and this may be why more variability was found with the emotional content of maternal mind-minded representations.

The impressive temporal stability shown in mothers' levels of interactional mind-mindedness does not extend to the emotional content of what was said to the children. Scant evidence was found in favour of the temporal stability of the emotional content of mothers' interactional mind-mindedness. Only the frequency of mothers' neutral appropriate mind-related comments was found to be significantly

related for both older siblings and younger siblings across time. However, this particular association was to be expected given that, as discussed in Chapter 8, nearly all of the emotional content of interactional mind-mindedness was coded as neutral. Therefore, the strength of the correlations for neutral appropriate mind-related comments with each child across time, and appropriate mind-related comments (regardless of valence) with each child across time, were virtually identical.

Mothers were no more likely to have made positive appropriate mind-related comments about one child at one time point, if they did so at the other time point. The lack of a longitudinal relationship mirrors the failure to find consistency in mothers' positive appropriate mind-related comments with the older sibling and the younger sibling at each time point. Overall analyses of mothers' positive mind-related comments in interactions suggests these are subject to change over time and between relationships. Perhaps this is due to the nature of the positive mind-related comments which were made by the mothers. Most comments related to praise for the children, with the vast majority constituting positive reinforcement for something said by the child or action completed by the child. Examples of these types of comment include "that's a good idea" and "good thinking". One might argue that these would be expected to be somewhat dependent on the particular relationship and the particular interaction taking place rather than being a consistent feature with different individuals and at different times. That is not to say that mothers' tendency to be generally positive about others does not play a part in the likelihood that praise will be given but that the behaviour of the child plays an influential and additional role.

Striking results were revealed for the next question to be addressed in this chapter: whether representational and interactional measures of mind-mindedness are related. Focusing first on concurrent relations, mothers' levels of representational mind-mindedness were unrelated to their levels of interactional mind-mindedness for each child. At first glance, this appears to contradict the finding by Lundy (2013) that mothers' representational and interactional mind-mindedness were positively related for their 4-year-old children. However, one of the mind-mindedness measures used by Lundy was based on a proxy for the standard interactional measure, a puzzle construction task, and could be considered as an assessment of how appropriately the mothers intervened rather than a measure of mothers' appropriate mind-related comments in a free-play situation. The measure, in being

goal-directed, also contrasts with the free play observed in the standard interactional measure.

The results addressing the temporal continuity of maternal mind-mindedness provided further evidence that these two measures are unrelated. Early levels of one measure were unrelated to later levels of the other measure except for mothers' mind-mindedness with frequency scores for older siblings. It is notable that these correlations were negative and so not in the direction which would support these two measurements as convergent. These findings suggest there is little predictive validity for the two measures. In this way, a mother who represents her child in a mind-minded way whilst describing them, is not likely to have an increased tendency to interact with them in a mind-minded way at a later date. Likewise, observing a mother interacting with her child using very few appropriate mind-related comments would not allow one to predict that she would use limited references to her child's internal states when they were older.

These results are consistent with the findings of Arnott and Meins (2008) who did not find a relationship between mental attributes mentioned by mothers about their unborn children and their appropriate mind-related comments in interactions with these children at 6 months. However, there is an important difference between the present study and that of Arnott and Meins because they assessed representational mind-mindedness antenatally using a modified measure. This means it is difficult to know whether the adapted measure fully accessed mothers' tendencies to focus on mental characteristics given that the children were mental constructions in one sense, having not yet been born, and that this difference may be linked to the failure to find a relationship between the two measures. Furthermore, the present results do not correspond with the previous finding that mothers' appropriate mind-related comments at 6 months positively predicted mothers' mentalistic descriptions at 4 years (Meins et al., 2003). Given the contradictory findings, it may be too soon to rule out a relationship between early interactional mind-mindedness and later representational mind-mindedness. It may be that other factors, such as the child's age, might affect whether the measures are related over time. Arguably, a mother faces a greater challenge to be in tune with a young infant's internal states. For a mother to be mind-minded in interactions with her infant, more "mind-reading" might be required than with an older child with language and more transparent thoughts and emotions. This variability in the level of difficulty in being attuned to a child

might influence whether a link between a mother's early interactional mind-mindedness, and later mental representations about this child emerges.

The implications of these findings are important because mind-mindedness has been treated in the literature as an overarching construct, measured in two different ways. Yet this failure to find an association suggests that perhaps these operationalisations are not measuring exactly the same construct. The lack of a relationship at first appears to also somewhat contradict what has been described as the process underlying a mother's demonstration of mind-mindedness in interactions. Meins et al. (2012) state that for a caregiver to be mind-minded, they must first form a representation of the child's internal states and then use this representation to shape their behaviour whilst interacting with the child. In addition, Meins et al. (2011) argue that to comment appropriately on a child's internal states involves caregivers representing the child's thoughts or feelings to inform interactions. So why were mothers' representations of a child's internal states not related to their verbal references to the child's mind in the play sessions?

One possible explanation is that, as argued by Arnott and Meins (2007), the representations which inform mothers' mind-related comments in interactions are themselves grounded in online, real life interactions; in other words, representations and behaviour inform each other. As such, representational mind-mindedness is an off-line and retrospective measure. It may be that retrospective representations are not identical to current representations and this may have contributed to the failure to find a relationship between the two operationalisations.

A clear difference between representational and interactional mind-mindedness is that the former is measured through linguistics alone whereas the latter includes behaviour. The mind-mindedness interview prompts a purely representational response through a mother's description of a child. In contrast, the observational assessment draws on both representational and behavioural facets of the mother's relationship with a child. It is not just the language which the mother uses but also the interplay between two individuals which affects interactional mind-mindedness and this may well mean that associations between the two are not found. One might conjecture that interactional mind-mindedness, as an observational assessment, would involve a greater degree of interpretation by the researcher. However, this was not found to be the case. Instead, representational mind-mindedness presented more of a coding challenge with a greater variety of language used than in the



interactional measure. This led to much discussion on whether certain attributes contained a clear reference to an internal state and the development of an enhanced coding system to aid reliability, presented earlier in Section 5.3.3.

Another possible reason for the failure to find a relationship stems from the advantage of the interactional measure over the representational measure of mind-mindedness. Interactional mind-mindedness takes into account the attunement of a mother to her child's mental states through her appropriate mind-related comments. One could argue that observer judgement of mothers' attunement in interactions means that the interactional mind-mindedness measure is rooted in reality. Conversely, representational mind-mindedness does not index whether mothers' representations are a valid interpretation of the child's internal states. Therefore, the qualitative aspect inherent in interactional mind-mindedness is entirely lacking in representational mind-mindedness and may help account for the two measures being unrelated.

## **10.5 Conclusion**

The study demonstrated crucial differences in the stability of the two operationalisations of mind-mindedness. Mothers' levels of representational mind-mindedness failed to show longitudinal stability for all of the relationships. Previously, mothers' concurrent levels of representational mind-mindedness were shown to be inconsistent across relationships; taken together these findings suggest that levels of representational mind-mindedness appear to be influenced by the mother's relationship with an individual. In contrast, mothers' levels of interactional mind-mindedness showed a great deal of stability, providing further strong support for interactional maternal mind-mindedness as a tendency in the mother.

Very little evidence supported the stability of the emotional content of mothers' representations of the three individuals and the emotional content of mothers' appropriate mind-related comments in interactions. Thus, the emotional content of mind-mindedness appears to be determined by relationships or the specific social interaction and susceptible to change over time.

An important finding was that mothers' levels of representational maternal mind-mindedness were unrelated to their levels of interactional maternal mind-mindedness for each child not only concurrently but also longitudinally. Yet, mind-mindedness has been treated as an overarching construct operationalised in two

ways. The implications of this failure to find relations between the two measures, as well as suggestions for future research, will be discussed in the following chapter.

# 11

## General Discussion

### 11.1 Introduction

The overall aim of this thesis was to add to our understanding of the nature of maternal mind-mindedness. This involved an investigation into the extent to which the construct should be viewed as a cognitive-behavioural trait related to mothers' psychological mindedness, or a relational construct, dependent upon the particular mother-child relationship. This final chapter brings together the key findings discussed previously before presenting the issues and implications arising from this research.

### 11.2 Overall findings

Mothers with two children of preschool and primary school age participated in the study at two time points, approximately nine months apart. This design enabled both the consistency of mind-mindedness across relationships and the stability of mind-mindedness across time to be examined.

Mothers' levels of representational mind-mindedness were found to be inconsistent across their descriptions of an older sibling, younger sibling and a partner/friend. It appeared that how much a mother focused on an individual's mental attributes rather than other characteristics varied as a function of the relationship. This suggests that mind-minded representations are influenced by the specific relationship rather than primarily arising from a tendency in the mother. Conversely, mothers' interactional mind-mindedness was found to be highly consistent across relationships with two children. A mother who was attuned to one child's mind while interacting with them, was likely to be similarly attuned when interacting with their other child. This provides a great deal of support for mothers' interactional mind-mindedness predominantly stemming from a cognitive-behavioural trait, or general tendency.

The emotional content of mothers' mind-mindedness – as measured by the quality of valence – demonstrated little consistency across relationships. Mother's mind-

mindful descriptions did not reveal a general tendency to represent others in a positive, neutral or negative fashion, suggesting that the emotional content of representational mind-mindedness is influenced instead by the relationship. Findings regarding the emotional content of mothers' interactional mind-mindedness were somewhat more complicated. Mothers were inconsistent in their use of positive appropriate mind-related comments with their two children; being positive towards your child may well depend on the relationship itself and on the particular interaction. Mothers' use of neutral appropriate mind-related comments was associated across interactions with their two children but only when considering the total amount and not the ratio of this quality of valence. However, virtually all appropriate mind-related comments made by mothers were in this category and hence this general tendency for consistency with neutral valence is suggested to reflect the finding that mothers' levels of interactional mind-mindedness were highly correlated.

Evidence on the whole did not support maternal mind-mindedness as stemming from a cognitive-behavioural trait in the mother and so being a tendency to consider psychological factors. It is proposed that this failure to find a conclusive relationship between measures of mind-mindedness and mothers' psychological mindedness might in part be attributed to the complexities and requirements of the storytelling task developed for this study (and which was used to assess psychological mindedness). Therefore, this finding is by no means definitive and mind-mindedness may still be a facet of an individual's general tendency to consider others' internal states.

Few and inconsistent significant relations were found between maternal mind-mindedness and child temperament and behaviour, suggesting that mind-mindedness should not be viewed as primarily a relational construct influenced by child characteristics. Mothers' levels of mind-mindedness and the emotional content of mind-mindedness were not consistently related to the same child factors at each time point. To further bolster the finding that child characteristics were predominantly unrelated to mind-mindedness, neither maternal report of temperament and behaviour, nor observational ratings of temperament, were clearly associated with mind-mindedness. More supporting evidence was found for a relationship between observational ratings of temperament and mind-mindedness than maternal report of temperament and mind-mindedness, but any association

found at one time point was weakened by the lack of an association at the other time point.

While both representational and interactional mind-mindedness showed temporal stability, this was manifested in rather different patterns with respect to individuals. Mothers' levels of representational mind-mindedness demonstrated longitudinal stability for the older sibling and the partner/friend but not for the younger sibling (although a non-significant trend emerged). When one considers this finding in conjunction with the lack of consistency shown in mothers' concurrent levels of representational mind-mindedness across relationships, it suggests that a mother's relationship with an individual appears to influence her accessible mind-minded representations. Mothers' levels of interactional mind-mindedness showed a great deal of stability for the older sibling and the younger sibling across time. In light of the fact that strong concurrent relations were found for mothers' mind-mindedness with their two children in interactions at each time point, support emerged for interactional maternal mind-mindedness as a tendency or trait in the mother.

The emotional content of mind-mindedness demonstrated little temporal stability for both representational and interactional mind-mindedness. Mothers did not demonstrate a consistent tendency over time to represent others either positively, negatively or with neutrality across the three relationships of interest. With respect to what mothers said in interactions, only the frequency of neutral appropriate mind-related comments showed temporal stability. However, again it should be noted that most comments were neutral and hence this finding was unsurprising given that mothers' levels of interactional mind-mindedness showed such robust stability. Overall, these findings suggest that the emotional content of mind-mindedness is determined by the relationship, likely to be influenced by the specific social interaction, and susceptible to change over time.

Regarding relations between operationalisations, mothers' levels of representational maternal mind-mindedness were found to be unrelated to their levels of interactional maternal mind-mindedness. Firstly, no relations between the measures were found concurrently at each time point. Secondly, no relations were found longitudinally across the time points, apart from one exception. However, the negative associations between mothers' levels of representational and interactional mind-mindedness over time with the older siblings were only marginally significant and in the opposite direction to that which would support convergent validity.

### **11.3 Advances in our understanding of mind-mindedness**

This thesis has contributed to our knowledge of the nature of the construct of mind-mindedness in a number of areas. Previous research into maternal mind-mindedness had investigated mothers' mind-mindedness with one child. A major difference of this study was the inclusion of mothers with two children. This enabled mothers' mind-mindedness in different relationships to be examined in order to address the trait or tendency question central to this thesis.

Mothers were not consistently found to represent their children and partner/friend with reference to their internal states yet they showed remarkable consistency in how much they appropriately referred to their child's minds while interacting with them. Representational mind-mindedness appears to be primarily a relational construct dependent on specific mother-child relationships. Importantly, findings suggest that representational mind-mindedness is not influenced by child temperament and behaviour. However, if one accepts the theoretical relationship-specific position, this does not rule out that factors other than child temperament and behaviour might influence mothers' mind-mindedness in each relationship. In contrast, much support was garnered for interactional mind-mindedness as a cognitive-behavioural trait on the basis that it generalised across relationships, showed stability across time and was largely independent of children's temperament and behaviour. However, interactional mind-mindedness did not appear to be part of a mother's psychological mindedness measured by a general tendency to attribute internal states to other people.

As well as providing a greater understanding of the nature of mind-mindedness, the present findings contribute to our knowledge concerning relations between mothers' representational and interactional mind-mindedness. Previous research had, with few exceptions, included measures investigating either representational or interactional mind-mindedness but not both. The present study included representational and interactional mind-mindedness measures with analysis at two time points, and so it was possible to investigate concurrent and longitudinal relations between the measures. Findings do not support a relationship between mothers' levels of representational and interactional mind-mindedness either concurrently or longitudinally. Regarding the failure to find concurrent relations, this appears not to be in line with a study by Lundy (2013). However, the adaptation of the interactional measure to include appropriate levels of intervention in that study means that it could be argued that this limited the ability to conclusively report an

association between the measures. Focusing on longitudinal relations, the present findings are not in line with the longitudinal relationship found by Meins et al. (2003) but it could be argued as consistent with the failure to find a relationship between mothers' use of mentalistic characteristics in prenatal descriptions and post-partum interactional mind-mindedness (Arnott & Meins, 2008).

Interactional mind-mindedness in the context of free play had previously been assessed with mothers and infants. This study extended our knowledge by addressing mothers' interactional mind-mindedness with an older age group, including mothers with preschool and primary school children. This made it possible to assess mothers' mind-mindedness beyond their speech produced in response to signals given by infants in order to encompass their attunement to children at a later stage of development; children in possession of more complex mental states and language abilities. A notable difference between mothers with older children and those with infants was the very small number of non-attuned mind-related comments produced by mothers with preschool and primary school children in interactions. It appears that mothers are less likely to misread older children's mental states than is the case with infants.

Research had investigated child temperament and behaviour assessed solely through a single method, questionnaires, and its relations with mind-mindedness (Demers et al., 2010b; Meins et al., 2011, 2013; Walker et al., 2011). An observational assessment of temperament was developed for this study to allow relations between maternal mind-mindedness and observational ratings to be considered in addition to maternal report. The failure to find consistent concurrent relations using more than one method of temperament assessment provided further support for the proposal that mind-mindedness is independent of temperament traits.

#### **11.4 Theoretical and methodological implications**

A simple test to distinguish between a trait and a relationship-specific quality in this domain is not possible. However, as has been argued, a trait should show some stability while still being open to change while a relationship-specific quality could be considered as dynamic and yet also showing some stability. Despite this problem, the thesis put forward here is that there is now more support for concurrent consistency and temporal continuity of mothers' interactional mind-mindedness for two children supporting interactional mind-mindedness as stemming from a general

tendency in the mother. How much of this consistency is due to mothers' representations and how much is the result of mother-child behaviour is open to interpretation. Mothers' interactional mind-mindedness theoretically involves the process of representations and behaviour informing each other. Although, it may not necessarily follow that mind-mindedness stems from representations of the child; instead it may be driven by the interactive process. It is not possible to rule out that a mother's mind-mindedness is strongly influenced by established patterns of interaction with her children, regardless of the assumed underlying representations. Each interaction will be informed by a previous interaction and this may account for consistency across time. However, mothers do appear to have a shared pattern of relating to each of their children's internal states and so it appears unlikely that consistency in mind-mindedness is largely driven by child behaviour.

It should be noted that the measure of interactional mind-mindedness was developed for use with mothers with infants. It cannot be ruled out that adapting the measure for use with older children may have had an impact on these findings. This may be why, contrary to current findings, a relationship was found between the measures when interactional mind-mindedness in mothers with infants and later representational mind-mindedness with 4-year-old children was investigated (Meins et al., 2003). As previously discussed, mind-mindedness with infants involves a greater requirement for mind-reading than mind-mindedness with pre-school and primary school children. It is easier to work out what an older child is thinking or feeling than a young infant and as such, findings should be considered within the context of the child's development. Mothers who explicitly represent their infants' mental states in interactions, with an increased demand on mind-reading skills than with older children, might then be more likely to represent those children as possessing internal states later on. Alternatively, if addressed concurrently, it is possible that offline representations may be associated with online behaviour in relationships with infants. However, this may require an adaptation of the representational measure to take into account the age-appropriateness of the description (Bernier & Dozier, 2003).

This thesis used both frequency and proportion measures of mind-mindedness in order to provide a more complete understanding of the construct and to comprehensively take into account the exploratory nature of the research questions addressed. This is in line with the recommendation to include absolute and relative speech production when examining maternal speech style (Flynn & Masur, 2007).



Most studies investigating levels of mind-mindedness have reported one but not both of these measures with the majority choosing to use proportional scores in analyses to control for differences in maternal verbosity (e.g., Meins et al., 1998, 2001, 2002, 2011). However, with respect to interactional mind-mindedness, although only proportional scores were reported, an identical pattern of findings has emerged for frequency and proportional scores regardless of which measure was used (Meins et al., 2003, 2012) and frequency and proportional scores have been reported as highly positively correlated (Meins et al., 2013); these findings were largely replicated in the current study.

It is noteworthy that different conclusions about associations between levels of representational mind-mindedness across relationships but not levels of interactional mind-mindedness across relationships would have been reached if only frequency or proportional scores had been reported. This is consistent with the finding that mothers' levels of interactional mind-mindedness for each child generally showed higher positive correlations between frequency and proportional scores for each relationship than was the case with mothers' levels of representational mind-mindedness for each child and partner/friend. Accordingly, significant associations differed for mothers' levels of representational mind-mindedness across relations but not for mothers' levels of interactional mind-mindedness whether analysis controlled for the amount a mother spoke or not. However, significant relations between mothers' levels of representational and interactional mind-mindedness and child temperament and behaviour, and relations between mothers' levels of representational and interactional mind-mindedness and mothers' psychological mindedness did not vary across the two scoring measures. This suggests that controlling for verbosity only impacts on mothers' offline mind-minded representations across relationships.

Maternal mind-mindedness has been treated as an overarching construct, operationalised in different ways. Importantly, the present findings point towards a rather less cohesive picture. In addressing why representational and interactional measures were found to be unrelated, it is informative to look at the rationale for the development of the construct. Mind-mindedness was developed to refine and complement the concept of maternal sensitivity. Meins stated, "we have sought to use the core features of Ainsworth's original concept of sensitivity as our guiding principle, with the aim of defining specific interactional behaviors that best fit the criteria for appropriate interpretation of the infant's cues" (2013, p. 540).

It is important to keep in mind the differences between how mind-mindedness is demonstrated in each measure. If mind-mindedness truly encompasses maternal attunement to children's internal states, then measurement of interactional mind-mindedness alone can meet this demand. Meins and colleagues argued that the requirement of maternal mind-mindedness to comment appropriately on a child's mind, rather than a general proclivity to treat an infant as an individual with a mind, was "a refinement of the definition of maternal mind-mindedness" (2002, p. 1717). Despite the fact that there was very little evidence of mothers' non-attunement in the current sample, interactional mind-mindedness has a qualitative aspect – whether mind-related comments are appropriate or non-attuned – which is lacking from representational mind-mindedness. Mothers' representational mind-mindedness does not inform about subtleties of attunement when mothers recall aspects of their child's mind. A mother could be scored as highly mind-minded and yet these representations might not be in tune with her child's internal states. She might represent her daughter as likely to become "angry" when her wishes were not met, whereas a more attuned mother might reflect that her daughter was in fact likely to become "frustrated" with herself for not being able to do something. Representational mind-mindedness does not necessitate the mother taking on the child's perspective which is a requirement of mind-mindedness in interactions.

Mind-mindedness has been referred to as a multidimensional construct with the finding that appropriate and non-attuned mind-related comments make independent contributions to attachment (Meins et al., 2012). It is possible that representational and interactional mind-mindedness further demonstrate the complexities of this construct. It may be beneficial to think of the two as indexing different processes in the mother. Interactional mind-mindedness may involve a more demanding process, given that mothers must initially represent their child's internal states and then use this representation to inform their appropriate responses to that child evidenced by their mind-related language. Offline representations are explicit and conscious or at least self-conscious, which might contrast with the behaviour recorded by the interactional measure. A mother may be mind-minded in her offline representations of her child but at the same time may not be mind-minded in online interactions with that child.

This implies that representational and interactional mind-mindedness should not be treated interchangeably. It is important to note that a great deal of evidence has been found in support of early interactional mind-mindedness as a precursor of child

development associated with positive outcomes, for example, secure attachment relationships (Arnott & Meins, 2007; Lundy, 2003; Meins et al., 2001), children's superior mentalising abilities (Laranjo et al., 2010; Meins et al., 2002, 2003), and a reduced tendency to later rate their child's behaviour as difficult in low SES families (Meins et al., 2013). On the other hand, the beneficial influence of representational mind-mindedness for a mother-child relationship is less well documented. The lack of longitudinal research has meant that the causal role of representational mind-mindedness remains largely speculative. Instead, concurrent links have been found between mothers' representational mind-mindedness and children's mental state understanding in mothers with BPD (Schacht et al., 2013), and differences in mothers' representational mind-mindedness with 3-year-old children have been found between secure and insecure group mothers rated as such two years previously, therefore after the formation of the attachment relationship (Meins et al., 1998).

A key finding in this thesis, that mothers' representational and interactional mind-mindedness were unrelated, leads to the proposal that these are in fact two different constructs. This has major implications for future research as it suggests that maternal mind-mindedness should not be treated as one construct but instead needs to be distinguished as either representational maternal mind-mindedness (MMr) or interactional maternal mind-mindedness (MMi). Focusing on this distinction is important as MMr and MMi are not interchangeable and may well have different implications for children's development.

A further refinement of the definition of maternal mind-mindedness, differentiating between the two, is therefore required. Representational maternal mind-mindedness involves a mother's offline, retrospective representations of her child though these are not necessarily in tune with the child's internal states. A mother's level of representational mind-mindedness is primarily influenced by the specific mother-child relationship. In contrast, interactional maternal mind-mindedness involves a mother's online, current representations of her child, where both representations and behaviour inform each other, and which differentiates between whether a mother is in tune or not with her child's internal states. A mother's level of interactional mind-mindedness primarily stems from a cognitive-behavioural trait, or general tendency to interact in this way.

### **11.5 Practical implications**

A number of practical implications arise from the findings of this thesis. Previously, mothers with higher levels of representational mind-mindedness have been found to report lower parenting stress and to show less hostility in interactions with their 4-year-old children (McMahon & Meins, 2012). The authors argued that a mother's propensity to think of her child as a psychological agent may help to protect the mother from difficulties faced in parenthood. However, the findings of the current study suggest that mothers may retrospectively represent their child as an individual with a mind of their own, understanding that the child's thoughts and emotions may dictate their behaviour, and yet, this may not be related to mothers' levels of mind-mindedness when interacting with that child and responding to their behaviour. Therefore, mothers' interactional mind-mindedness may be compromised in relation to their representational mind-mindedness. Whilst advising on an intervention model is outside the remit of this thesis, findings do have implications for the design of an intervention aimed at increasing mothers' mind-mindedness and for how outcome should be assessed.

Interactional mind-mindedness, with high levels shown by the mother being in tune with a child, and its links with positive outcomes for child social and emotional development (unlike representational mind-mindedness), may prove to be a promising focus for interventions. This suggests that future work might do well to focus on discourse-based interventions within the context of interactions rather than on mind-minded representations alone. Interventions focusing on mothers' reflective functioning are already in use which might be important for some clinical populations where gaining a stable representation of the child is important. "Watch, Wait and Wonder" is an infant-led intervention, centring on the parent-infant relationship, which has been developed and researched for use in clinical populations (Muir, 1992; Cohen, Muir, Lojkasek, Muir, Parker, Barwick, & Brown, 1999). Cohen and colleagues propose that the intervention works at both the behavioural level, through mothers following the infant's lead, and at the representational level, through mothers discussing their experience. "Minding the baby" (Sadler, Slade, & Mayes, 2006; Slade, Sadler, & Mayes, 2005) is an intervention which targets the development of parental mentalising capacities. Mentalisation is viewed as providing the mechanism through which representations and behaviour are altered. Likewise, mother-child relationships may also be improved through an intervention based on observations of mind-mindedness in

mother-child interactions. This intervention could utilise both representational and behavioural work in order to facilitate mothers' efforts to be in tune with their child.

As previously discussed, mothers' interactional mind-mindedness has been shown to be consistent across relationships and to remain consistent across time in this sample of mothers from the general population. However, the finding that interactional mind-mindedness is a general tendency in the mother has implications for interventions aimed at increasing mothers' mind-mindedness in at-risk groups or in clinical populations. It could be conjectured that if the aim of an intervention is to help a mother make appropriate references to a child's mind in interactions with one child, you would expect concomitant benefits with her other children. In this way, the success of an intervention may not be determined by which child a mother interacts with during the intervention because mind-mindedness would be generalisable across her interactions with any of her children. It is encouraging that because mind-mindedness has been found not to vary over time, one might expect that once a mother learnt to be more mind-minded and the change was well-established, it might be durable.

The findings suggest that mothers' mind-mindedness is largely independent of concurrent child temperament and behaviour. It appears that a mother is not more or less likely to treat her child as an individual with a mind and to be attuned to the child's internal states if the child possesses particular temperament traits or is viewed as having behavioural difficulties. This was evidenced not only through mothers' general perceptions of their child's temperament and behaviour but also by observer ratings in a specific interaction. This null finding is encouraging in that it suggests that mothers' mind-mindedness is not driven by child difficulties. However, the families which took part were from high SES backgrounds and the level of child behavioural difficulty reported by the mothers was classed as normal. Findings of an association between mind-mindedness and child difficulties assessed by questionnaire have varied depending on mothers' SES (Meins et al., 2013) and level of child difficulty (Walker et al., 2011). An implication for researchers investigating a relationship between mind-mindedness and child behaviour is that observational data, whilst a more expensive and time-consuming assessment than maternal report, could more comprehensively help to find relations where they exist. In addition, research should include families from different SES backgrounds and clinical and non-clinical groups.

### **11.6 Limitations of the study**

It is important to acknowledge the limitations of this research. The finding of temporal continuity in interactional mind-mindedness has been interpreted in this thesis as strengthening the view that interactional mind-mindedness is suggestive of a trait or tendency in the mother. However, an alternative explanation could be that the mother-child relationship remains the same and it is the relationship that drives interactional mind-mindedness. The study design cannot fully rule out this suggestion. While null results relating to the same child over time would have weakened the trait argument, positive results leave it open to interpretation. However, this alternative seems unlikely because the findings were discovered with not one but two relationships for each mother.

The finding that mothers made very few non-attuned mind-related comments in interactions with their children is worthy of further discussion. It is unsurprising that mothers tended not to make these types of comments with older children given their more transparent mental states and the mothers' greater experience of interacting with these children than when mind-mindedness is assessed in mother-infant interactions. It should be noted that the mothers who took part in this study comprised an opportunity sample of mothers. It could be speculated that mothers who had more challenging relations with their children were less likely to volunteer in a study looking at mother-child relationships. This may limit the generalisability of this finding to other populations. Evidence based on this community sample does not allow one to address whether non-attuned mind-related comments may be more common in mothers with older children if there are significant problems concerning the mother, the child's behaviour, or the mother-child relationship. If this finding was replicated in a sample of mothers from a clinical or at-risk group, this would help support the rarity of this type of comment as a feature of mothers' mind-mindedness with an older age group.

It is necessary to address a sampling issue relating to lack of social diversity. The mothers who took part were predominantly from high socio-economic backgrounds. The families tended to have at least one parent in the highest two categories of household occupation, most mothers were graduates or postgraduates, and all but four mothers spoke English as a first-language. It could be proposed that the lack of diversity in the sample reduces the generalisability of the findings and the ability to detect a relationship between SES and mind-mindedness. However, mind-

mindedness has been found not to relate to SES and mothers' education (Meins & Fernyhough, 1999; Meins et al., 1998, 2002, 2011, 2013; Walker et al., 2011).

The psychological mindedness measure was developed for use in this study. As previously discussed, the task requirements may have meant that a mother's tendency to consider others' internal states could have been hindered by the challenge of narrating a story and their feelings of self-consciousness. Concerning the validity of the new measure to address a trait-like construct, considerable continuity was found for the amount of mental state comments over time but not for this type of comment as a proportion of all comments mentioned about protagonists. It is possible that any stability found was due to a consistent tendency in mothers' verbosity and the design means that it is impossible to rule out that the lack of stability in the proportional measure was due to the different stimuli presented at the two time points.

The failure to find a relationship between mind-mindedness and mental state comments about protagonists taken from stories about photographs could be considered to support a very recent finding that adults' descriptions of a close friend were unrelated to those of two paintings (Meins et al., 2014). It could be proposed that the failure to find consistent relations between mind-mindedness and the measure of mothers' psychological mindedness may instead be viewed as evidence that mind-mindedness is a characteristic of personal relationships so that mothers are more likely to be mind-minded when they have knowledge of an individual. However, there were important differences between measures used in the current study and those used by Meins and colleagues; the latter asked participants to describe the picture rather than tell a story, and only one of the paintings depicted people, whilst the other was an abstract painting. It is possible that the inclusion of paintings, particularly when one was abstract, may have meant that the focus of the task was on art appreciation, reducing the likelihood that participants would mention mental attributes. Mothers had personal relationships with all three individuals described in the current study and yet their representational mind-mindedness was inconsistent across relationships. This suggests that representational mind-mindedness is not necessarily a characteristic of close relationships.

### **11.7 Suggestions for future research**

There are several possibilities for future research, some of which are outlined below. In order to extend the findings of the study, it would be important to

investigate whether or not the temporal stability of mind-mindedness holds true for a longer period than that examined here. Longitudinal relations between mothers' interactional mind-mindedness firstly with their young infants and secondly when these same children have reached preschool age should be investigated. This would extend findings regarding the issue of temporal continuity in mind-mindedness by examining whether mothers who demonstrate high levels of mind-mindedness in infants with arguably less complex and more opaque internal states than older children, do so later on when the children's thoughts and emotions are likely to be easier to read. It would shed light on whether mothers' interactional mind-mindedness is a general tendency regardless of the age of the child.

In a further extension of the study, research should investigate both representational and interactional measures of mind-mindedness, over three phases of measurement across time, to establish whether there is a direction of influence between these very different measures. This would provide an opportunity to examine associations and possible cause and effects on representational and interactional mind-mindedness and whether these are different for the two measures. For example, difficult life events may be associated with change in a mother's levels of representational mind-mindedness and not in her levels of interactional mind-mindedness. Furthermore, research should include diverse groups to investigate whether the longitudinal stability found with the current community sample holds true with at-risk or disadvantaged populations.

A further exploration into the difference between representational and interactional mind-mindedness should examine whether associations with child outcomes vary. Concurrent assessment using representational and interactional measures with younger children and later measurement of child outcomes would enable any implications for development to be explored. This would distinguish between child outcomes associated with mothers' representational mind-mindedness and those associated with mothers' interactional mind-mindedness.

How mothers' early representational and interactional mind-mindedness feeds into later mental state talk of their children would be an important focus for research as mental state talk enhances everyday interactions and so may beneficially influence family and peer relations. Future research should explore whether mothers' levels of representational and interactional mind-mindedness are reflected in their child's tendency to use mental state language or mind-minded speech in interactions.



Research investigating relations between mind-mindedness and children's understanding of other minds has concentrated on children's performance in theory of mind tasks (Meins et al., 1998, 2002, 2003) or performance on a stream of consciousness task (Meins et al., 2003). These tests focus on a child's ability or accomplishment in a task, rather than their tendency to refer to the mental states of other people in everyday life which matters for developing peer relationships. Instead, our knowledge of the influence of mothers' mind-mindedness on child socio-emotional development could be furthered through a mixed methods design, using linguistic analysis of both mother and child. This could investigate mother-child conversation within a more naturalistic setting, such as a play session. Analysis could, for example, differentiate between reciprocal mind-related comments – whether initiated by the mother or the child – and unprompted mind-related comments.

The importance of knowledge of another individual to mothers' levels of mind-mindedness could be explored in greater depth. An individual's tendency to focus on mental characteristics when describing somebody known (friend) and unknown (famous person) has been found to be unrelated (Meins et al., 2014). Mothers' mind-mindedness may also vary depending on their knowledge of the child taking part in the interaction. Mothers' interactional mind-mindedness could be investigated both with a child of their own and with another child from outside the family, for example, a friend's child. This would enable the question of how much maternal mind-mindedness is influenced by knowledge of the child, if at all, and whether a mother's relationship with their own child increases attunement to a child's internal states.

A further avenue of research would be to address the correlates of the emotional content of interactional mind-mindedness in relation to child behavioural difficulties. Mothers' levels of interactional mind-mindedness with 8-month-old infants have been found to relate to fewer behavioural difficulties in the child later on in a low SES group (Meins et al., 2013). However, this research did not include an analysis of the emotional content of mind-mindedness. Mothers were found to predominantly make neutral mind-related comments while responding appropriately to their children in the current sample. This overwhelming tendency towards neutrality hampered the ability to address the possible role of the emotional content of mothers' mind-mindedness on their child within the context of positive and negative mind-related comments. Future research could investigate whether the emotional

content of interactional mind-mindedness (whether positive, neutral or negative valence is used) related to concurrent and subsequent ratings of child difficulties in at-risk and clinical populations. It may be that mothers who later tend to rate their children's behavioural difficulties as low might also interact with their children using positive mind-related comments whilst refraining from saying negative mind-related comments.

Research to date has not investigated mind-mindedness across a variety of social contexts. Mothers' interactional maternal mind-mindedness has been investigated in the laboratory within the contexts of play sessions with infants (e.g., Arnott & Meins, 2008; Meins et al., 2003, 2011, 2012) and in a problem-solving task with 4-year-olds (Lundy, 2013). The present study moved observations of mind-mindedness to within the home, arguably a more naturalistic setting, but still measured interactional mind-mindedness through mother-child play sessions. It would be interesting to explore the extent to which mothers demonstrate consistency of interactional mind-mindedness across different situational contexts; in other words, to assess the ubiquity of mothers' interactional mind-mindedness across contexts. It has been shown that maternal speech may be influenced by the context with their child, such as toy play, book reading and bathtime (Flynn & Masur, 2007; Yont, Snow, & Vernon-Feagans, 2003). Addressing mind-mindedness across a variety of contexts would not only add to the current findings of consistency in interactional mind-mindedness across relationships and across time but would also have practical implications. It would begin to tease out which contexts are most important for mother-child relationships – where mothers' mind-mindedness is most influential for child outcomes – and this knowledge could be put to use in developing and refining interventions.

Finally, the cultural implications regarding maternal mind-mindedness have not been addressed. Mind-mindedness research has predominantly been carried out in the United Kingdom, the United States, Canada and Australia and findings could therefore be considered ethnocentric in nature. It would be interesting to investigate mind-mindedness in non-Western societies and to investigate cross-cultural differences where they exist. The focus on the individual in Western societies might be seen as contrary to the interests of the community in collectivist societies. One might expect representational mind-mindedness to have a different significance depending on its cultural context, for example, in cultures where reference to psychological explanations for behaviour are less salient. The possibility that

representational and interactional maternal mind-mindedness are universal in a cultural sense requires considerable exploration if these have implications for child development.

### **11.8 Final conclusions**

This thesis argues that mothers' representational mind-mindedness is a relational construct and mothers' interactional mind-mindedness is a trait or tendency. However, mind-mindedness was not found to be a relational construct influenced by child temperament and behaviour nor did it reflect a general tendency in the mother to consider psychological factors. Representational and interactional mind-mindedness were not related in this sample of mothers with preschool and primary school children, suggesting that mind-mindedness should not be treated as an overarching construct. Instead, representational mind-mindedness (MMr) and interactional mind-mindedness (MMi) are discrete and should formally be recognised as different constructs.

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## **Appendix A: UREC approval letter**

### **University Research Ethics Committee**

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**Dr Luci Wiggs, Director of Studies  
Morag MacLean, Second Supervisor  
Department of Psychology  
School of Social Sciences and Law  
Oxford Brookes University  
Gipsy Lane Campus  
Headington**

**14th March 2011**

**Dear Dr Luci Wiggs and Morag MacLean**

**UREC Registration No: 110538: “Maternal mind-mindedness as a cognitive-behavioural trait: a longitudinal study”**

Thank you for your email of the 10th March 2011 outlining your response to the points raised in my previous letter about the PhD study of your research student **Gaby Illingworth**, and attaching the revised documents.

**I am pleased to inform you that, on this basis, I have given Chair’s Approval for the study to begin.**

The UREC approval period for this study is two years from the date of this letter, so the 14th March 2013. If you need the approval to be extended please do contact me nearer the time of expiry.

In order to monitor studies approved by the University Research Ethics Committee, we will ask you to provide a (very brief) report on the conduct and conclusions of the study in a year’s time. If the study is completed in less than a year, could you please contact me and I will send you the appropriate guidelines for the report.

**Yours sincerely**

**Dr Elizabeth T Hurren  
Chair of the University Research Ethics Committee**

**cc Gaby Illingworth, Research Student  
Jill Organ, Graduate Office  
Louise Wood, UREC administrator**

## **Appendix B: List of mental and behavioural attributes**

### **Mental attributes**

Academic (as adjective)  
Ambitious  
Angry  
Anxious  
Argumentative  
Aware of other people's feelings  
Bad-tempered  
Bored  
Bright  
Caring  
Cautious  
Clever  
Committed  
Concentrates  
Confident  
Conscientious  
Conscious of him/herself  
Considerate  
Content  
Creative  
Curious  
Dedicated  
Deep-thinker  
Determined  
Drama queen  
Easy-going (depending on context)  
Emotional  
Empathic  
Enjoys reading stories with me  
Enjoys school  
Excited  
Fearful  
Fearless  
Focused  
Frustrated  
Good sense of humour  
Grumpy  
Happily play on his own  
Happy  
Has a mind of their own  
Has ideas  
He/she will do it when he/she wants to  
If he needs to do it, then he'll do it, but if he doesn't see the need then he won't bother  
Imaginative  
Intelligent  
Interested  
Keen to share  
Knows [something]  
Knows what he/she wants  
Learning the right ways of relating to people  
Likes telling me that he loves me

Likes to do things in order to get attention  
Likes to look after other children  
Loves caring about other people  
Loves cuddles  
Loves other children  
Loves stories  
Loving  
Loyal  
Manipulative  
Mind of his/her own  
Miserable  
Moody  
Opinionated  
Optimist  
Quick learner  
Rational  
Red mist issue  
Refuses  
Sad  
Scared  
Self-centred  
Self-conscious  
Sensitive  
Serious  
Shows respect for other people  
Shy  
Solemn  
Strong-willed  
Stroppy  
Stubborn  
Sulky  
Wants [something/to do something]  
Well-organised  
Wilful  
Witty  
Worried

**Behavioural attributes**

Ability to switch  
Artistic  
Affectionate  
Aggressive  
Always looking out for them  
Articulate  
Assertive  
Attentive  
Boisterous  
Bossy  
Bubbly  
Calm  
Came out of himself  
Capable  
Charming  
Chatterbox  
Cheerful

Competitive  
Compliant  
Defensive of other person  
Doesn't have patience to sit and read  
Eccentric  
Encouraging  
Energetic  
Enthusiastic  
Excitable about things  
Extrovert  
Feisty  
Fiery  
Friendly  
Fun/funny (depending on context)  
Gets in big tantrums  
Helpful (if used in isolation)  
Honest  
Independent  
Kind  
Learning to read  
Level headed  
Light-hearted  
Likes being outside  
Likes to read a book  
Lively  
Loud  
Loves making things  
Loves spending time with the kids  
Mischievous  
Naughty  
Needs attention  
Needs to fight for attention  
Needy  
Nice  
Outgoing  
Patient  
Passive  
Picks up on things quickly  
Placid  
Polite  
Protective of other person  
Quite into the rough and tumble  
Quite ready for school  
Really into sports  
Relaxed  
Reserved  
Restrained  
Sensible  
She usually gets things right when she tries anything  
Sociable  
Sporty  
Strong personality  
Supportive  
Talkative  
Technical

Thrown (as in “doesn’t seem thrown by the group”/“gets a bit thrown if things are not as they should be”)

Timid

Tired

Tolerant

Very into soldiers and the military

Very much into computers

Vibrant

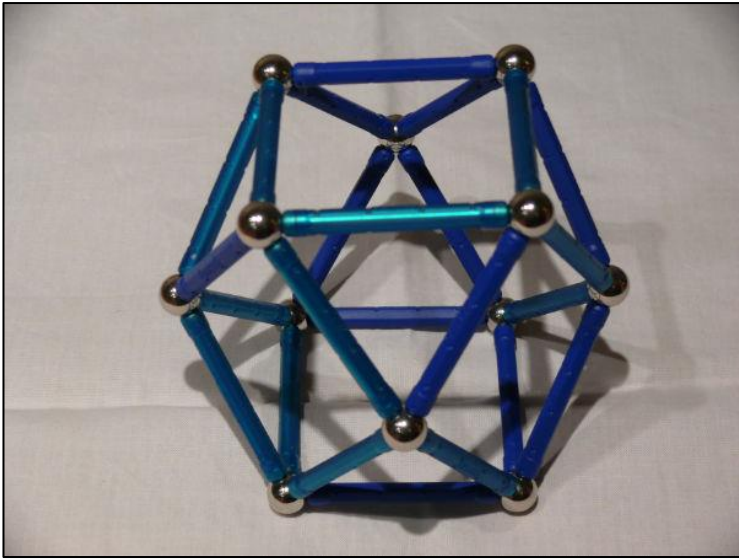
Well-behaved

Well-mannered

Works close to home

**Appendix C: The play session toys**









**Appendix D: Psychological mindedness measure photographs**

**Time 1**



Time 2

