

**Mentalizing Adolescence: Reflective Functioning Capacities in Parents of
Identical Twins and its Relationship to Adolescent Attachment**

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I, Pia Tohme confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

Previous behavioural genetics studies have converged in finding a shared influence of maternal sensitivity on attachment security at age 1 but contradictory findings were reached when investigating its non-shared effect on attachment organization. However, to date, no research has investigated this association in adolescence. This study was the first aiming to investigate reflective functioning capacities in both, mothers and fathers of adolescent identical twins, and understanding the nature of its relationship to adolescent attachment coherence. One hundred families were interviewed, with each parent asked to complete the Parent Development Interview twice, once about each twin. Adolescent attachment was assessed using a semi-structured interview, the Child Attachment Interview. This study provided some support for predictions of attachment theory suggesting a shared environmental effect of parental reflective on the shared variance in adolescent attachment coherence. Thus, the similarity between twins' coherence scores was partially explained by consistencies in their experience of parental reflective functioning. Examining maternal and paternal RF separately, strong associations were found between mothers' and fathers' RF scores, which were found to, partially independently, influence twins' coherence scores at a family level only. This study did not quantitatively identify non-shared environmental influences of parental RF which, it was suggested, could reflect some shared genetic effects from twins to parent. Finally, based on a case study analysis, it was suggested that the interaction between a number of non-shared factors, such as twins' level of psychological maturity, their potential de-identification from each other and from their parents, their perception of the twinship relationship and the parents' description of each twin, could explain discrepancies between twins' attachment classification.

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Chapter 1: Attachment Theory and Parental Mentalization

Bowlby (1969) presented his attachment theory based on the observation of infants and young children. The first chapter opens with a presentation of the origins of Bowlby's attachment theory and research in parent-infant relating, providing an outline and a foundation to the developments and changes occurring in the attachment system in adolescence. Next, points of contact and divergence between attachment theory and psychoanalysis are discussed and determinants of attachment from both perspectives are presented. This is followed by an introduction to the concept of mentalization, focusing on the roles of reflective functioning (Fonagy, Steele & Steele, 1991) and mind-mindedness (Meins, 1997) in explaining the intergenerational transmission of attachment and closing the transmission gap highlighted in the literature (van Ijzendoorn, 1995). This chapter draws to a close with a brief summary of findings regarding mentalizing about twins.

1.1 Attachment theory

1.1.1 Main premises of Bowlby's attachment theory

Bowlby (1969) emphasized the importance of the relationship with the primary caregiver in the formation of a child's sense of self and capacity to relate to others. He stated that through repeated interactions with the primary caregiver, mainly the mother, the infant learns what to expect from her in times of need (Bowlby, 1969). His main contribution was his emphasis on the infant's need for a secure attachment relationship with an older and wiser adult who is able to regulate and satisfy his/her needs, first through physical proximity and then through psychological closeness. Bowlby explained that attachment behaviours, such as smiling, vocalizing or crying, are the infant's way to seek proximity from the caregiver and attempt to engage with the external world (Bowlby, 1969). He emphasized that the goal of

the infant's signals is not the object per se; rather, through these cues, the infant is seeking to regulate emotions through maintaining a desired degree of proximity to the primary caregiver. Therefore, the attachment figure's responses to the infant's needs strongly impact the attachment system (Bowlby, 1969).

Although initially, the infant directs proximity-promoting signals indiscriminately to any adult, these behaviours become increasingly focused on primary caregivers who are more responsive to the infant's cues such as vocalizations, smiling or crying (Schaffer & Emerson, 1964). Between 6 months and 2 years of age, the infant, now able to explore the environment more independently, is able to use the attachment figure as a secure base for exploration and a safe haven to return to for reassurance. The infant displays a range of attachment behaviours to maintain proximity to the caregiver which manifests as protesting the caregiver's departure, clinging when frightened or following the attachment figure when able (Ainsworth, 1967; Schaffer & Emerson, 1964). How effectively the attachment figures can serve in these roles depends on their sensitivity to the infant's signals (Ainsworth, 1967; Bowlby, 1969; Schaffer & Emerson, 1964). Bowlby (1969) further theorized that from the second year onwards, the attachment behavioural system undergoes further reorganization as the child begins to see the caregiver as an independent person and a more complex parent-child relationship develops. Bowlby (1969) refers to this stage as goal-corrected partnership as, contrary to the earlier one-sided relationship, the child begins to notice others' goals and feelings and plans his/her behaviours accordingly, which increases opportunities for reciprocal interactions.

In 1973, having closely worked with Ainsworth, Bowlby established that the goal of the attachment system was not proximity between infant and mother but the attachment figure's availability, which he defined as consisting of accessibility and responsiveness. He further explained that availability is based on the infant's expectations of the attachment

figures, built through repeated experiences (Bowlby, 1973). The attachment behavioural system was seen as supported by cognitive, but not necessarily conscious, mechanisms. Bowlby (1973) posited the development of a representational system, the internal working model, which encompasses attachment behaviours and the caregiver's availability and responses to them. Bowlby further suggested that, within a child's internal working model of the world, working models of the self and attachment figure are crucial as they are complementary. He theorized that if the attachment figure acknowledged the infant's need for comfort and protection while providing him/her with the independence needed to explore the environment, the child is likely to develop an internal working model of the self as valuable and reliable. However, if the parent tends to reject the child's attempts for explorations, he/she is likely to construct an internal working model of the self as unworthy and incompetent (Bowlby, 1973). Bowlby (1973) suggested that the infant uses working models to predict the attachment figure's and others' behaviours and plan his/her own response; therefore, what type of model is constructed is of great consequence on the infant's development.

Based on these ideas and given that attachment is the result of a biological instinct and need for closeness (Bowlby, 1969), Bowlby (1969) hypothesized that the infant can become attached to a caregiver even if harsh or neglectful, which will result in different attachment behaviour (Strathearn, 2007). Attachment relationships can be broadly divided into two categories, secure and insecure, reflecting the infants' manifest behaviours as well as their internal working models. They differ in the infant's expectations of the caregiver's availability if a need for protection should arise and the infant's responses to the caregiver based on these perceptions (Ainsworth, Blehar, Waters & Wall, 1978; Bowlby, 1973).

Although Bowlby was trained as a psychoanalyst, his ideas were not accepted by the psychoanalytic society at the time. The next section aims to explore points of contact and divergence between the two theories.

1.1.2 Attachment theory and psychoanalysis

Bowlby was informed by Freud's ideas in formulating attachment theory. As a trained psychoanalyst, three main psychoanalytically based premises are found at the basis of attachment theory. Firstly, inspired by Breuer and Freud's idea (1895), Bowlby considered the early influence of the parents as central to his theory. Secondly, parallel to Freud's thinking in his 1914 and 1917 papers, the child creates expectations of parental behaviours and responses which govern and model how he/she responds within the primary relationship in the first place, and later in social exchanges as the infant grows older. Thirdly, Bowlby and Freud converge in the belief that attachment responses, which follow templates based in the early mother-infant relationship, are triggered by fear of loss or anxiety provoking situations (Fonagy, 1999; Steele & Steele, 1998).

Attachment theory is also in accordance with some of Anna Freud's ideas regarding infancy: both theories highlighted the importance of the mother's providing responsive care based on the infant's survival needs, they both theorized that the infant's defences are activated in the face of danger or anxiety and both emphasized the role of a safe environment in allowing the infant to explore and progress. Regarding developments beyond childhood, Bowlby (1969) and Anna Freud (1936) converge in their theorization that the child's internal world is created based on internalizations of aspects of the caregiver. The former introduced the idea of goal-corrected partnership suggesting that individuals become more aware of the caregiver's and others' separate needs, feelings and goal and are able to plan their own behaviours accordingly. Internal working models of the mind, based on early repeated

interactions between mother and child also serve as prototypes for later relationships. The latter hypothesized that, as the child grows older, he/she becomes less reliant on the mother acting as an auxiliary ego helping him to strengthen his/her own ego. Anna Freud (1936) emphasized the role of the object in the structuralization of the child's internal world, where the object serves as a model for identification and internalisation in aspects of ego and superego functioning.

Joseph Sandler, a close colleague of Anna Freud's, rendered the representational world a major focus of his theory. He defined it as containing "more than object or thing representations. Sensations arising from the child's own body in its interaction with its environment result in the formation of a body representation (body schema), and the psychic representations of instinctual drives find form as need and affect representations" (Sandler & Rosenblatt, 1962, p. 133). This is in line with Bowlby's concept of internal working models which are based on early interpersonal experiences and form the model for future relationships (Bowlby, 1969).

The writings of Klein may enhance the understanding of insecure attachment, mainly the disorganized category of attachment. Klein stressed that the first year of life can be fearful to the infant who needs to negotiate the paranoid-schizoid position in order to enter the depressive position. This move implies the acceptance of both good and bad parts of the mother, later extended to those of other people (Klein, 1960). Based on Klein's theory, it could be hypothesized that the frightening/frightened caregiver leads the child to deal with this dilemma of "fear without solution" using strategies based in the process of projective identification described by Klein as the mechanism "in which the subject inserts his self - in whole or in part - into the object in order to harm, possess or control it" (Laplanche & Pontalis, 1973, p. 356; Klein, 1960).

Target (2005) provided a summary of major authors that have attempted to bridge the gap between psychoanalytic ideas and attachment theory. She states Fraiberg (1975) who suggested that problems within the parent-infant relationship can be based in the parent's own childhood experiences. Lyons-Ruth was also mentioned as she helped explain how and why parental unresolved trauma is transmitted to the child within the context of an insecure or disorganized attachment relationship. Eagle (1997) was also seen to bring together attachment theory and the psychoanalytic tradition as he argued that internal working models not only reflect real interactions, as developed by Bowlby, but they also include inner forces or phantasies, as highlighted by Freud and Klein. He used both these ideas to explain why different babies experience the same maternal behaviour in different ways (Eagle, 1999; Target, 2005).

However, even though points of contact have been found between attachment theory and classic psychoanalytic theories, Bowlby's contribution was not accepted by the psychoanalytic society at the time. Fonagy (1999; 2001) gave a summary of the main diverging points between Freudian concepts and attachment theory, some of which are described below. It is important to highlight that most of the existing literature is infancy-focused as Bowlby's theory was mainly based on early years.

Firstly, Bowlby's theory is based on early mother-infant interaction and its impact on further development, contrary to Freud who placed the Oedipus complex around the age of 3 or 4, thus reducing his focus on earlier experiences. Secondly, Freud perceived the infant as self-sufficient, in a state of narcissism (Freud, 1914) whereas Bowlby (1969) posited that, since birth, the infant is primed towards seeking interactions with the primary caregiver. Thirdly, even though supervised by Melanie Klein while training as a psychoanalyst, and the overlap between the two scholars regarding the central status of object-relations, Bowlby's theory diverged sharply from the Kleinian perspective as he put more emphasis on the role of

the caregiver and the latter's treatment of the infant as an explanation for distortions of the external world (Fonagy, 1999; Steele & Steele, 1998). Fourthly, Steele and Steele (1998) highlighted a diverging point between Freud's instinctual drive theory and Bowlby's motivational theory based on the belief that attachment behaviours are biologically rooted. Whereas Freud's instinctual drive theory explains a wide range of behaviours such as social, anti-social, or sexual, Bowlby's theory focuses on one object, the attachment figure (Steele & Steele, 1998). Bowlby (1969) explained that these attachment-related behaviours such as crying, clinging or holding-on are component instincts of the attachment system which was viewed as the most important interpersonal system across the lifespan (Bowlby, 1969). The next section aims at identifying some determinants of the quality of the attachment system.

1.1.3 Determinants of attachment and the intergenerational transmission of attachment

Determinants of attachment from a psychoanalytic point of view

Winnicott presented the notion that the mother's appropriate mirroring of the infant in her eyes and her providing good-enough regulation of the infant's affective state lead to the emergence of a True Self (Winnicott, 1967). This also echoes Bion's ideas that the mother needs to contain the infant's unbearable feelings and project them back to him/her in a way that is more bearable in order for the infant to incorporate them into his/her developing sense of self (Bion, 1962). Therefore, a mother is seen as soothing the infant and controlling negative affect, in order for him/her to master it and convert it into positive personal and interpersonal experiences (Bretherton, 1987).

Freud hypothesized that people with unresolved issues, whether remembered or not, are bound to repeat them (Freud, 1920). This is seen through his notion of the compulsion to repeat as he states, for instance, that "In the case of children's play we seemed to see that children repeat unpleasurable experiences for the additional reason that they can master a

powerful impression far more thoroughly by being active than they could by merely experiencing it passively“ (Freud, 1920, p.35).

Bowlby's and Ainsworth's conceptions based on observed behaviours are consistent with classic psychoanalytic ideas that provided a more micro-level model of how affect regulation and responsiveness happen, focusing on processes within the mind. As previously elaborated on in Section 1.1.1, Bowlby believed that maternal availability and appropriate responsiveness to the child's cues in times of distress are the main determinants of the quality of the attachment relationship between mother and infant. More specifically, early care and maternal emotional regulation of the infant lead to a later capacity for self-regulation and positive expectations with regards to interpersonal relationships (Bowlby, 1969; 1973).

Maternal sensitivity, defined as the mother's capacity to consider her child as a separate being, thus perceiving things from his/her point of view and respecting his/her activity (Ainsworth, Bell & Stayton, 1971), was hypothesized to directly impact attachment security (Ainsworth, 1971). In 1978, Ainsworth explored antecedents of attachment based on Bowlby's theory. Infant attachment was assessed using the Strange Situation Procedure (SSn) designed by Ainsworth in the 70s (Ainsworth et al., 1978). Its main focus is to look at the infant's use of the attachment figure as a secure base for exploration in times of stress and need for comfort. Based on the SSn, infants are classified into securely attached and two categories of insecurely attached, insecure-avoidant and insecure-resistant (Ainsworth et al., 1978). The secure child in the SSn is described as relatively freely exploring the surroundings, using the mother as a secure base and not being disturbed by the presence of a stranger. When the mother leaves the room, the secure child is likely to show signs of intense distress and preoccupation with the mother's absence. However, a secure mother-infant attachment relationship is characterized by the infant's ability to be quickly comforted by the mother's return and his/her ability to return to play and exploration (Ainsworth et al., 1978).

Conversely, insecurely attached children do not assume a consistent responsiveness from the caregiver which means they have to adopt strategies to overcome this inconsistency and unresponsiveness because previous bids for attention have been met with indifference or anger (Bowlby, 1973). Therefore, the insecure-avoidant child in the SSn treats the stranger in the same way as the mother, shows no interest in play and exploration and avoids the mother on her return. The insecure-resistant child shows signs of anger at times and passivity at others and oscillates between seeking contact from the mother and resisting her (Ainsworth et al., 1978; Bowlby, 1969).

It is noteworthy that during the late 70s and 80s, the disorganized/disorientated classification was added and children fitting this category were characterized by freezing, fear and disorientation. This was mainly recognized in children who suffered maltreatment and whose parents experienced unresolved traumas, thus producing extremely insensitive and disruptive parenting (Fonagy, 2001; Madigan, Bakermans-Kranenburg, Van IJzendoorn, Moran, Pederson & Benott, 2006). Main and Hesse (1990) described disorganized infants as showing conflictual, inexplicable and dissociative behaviours. They hypothesized that these behaviours are due to the infants' exposure to fear with no solution from the parents, therefore preventing the shaping of an organized strategy to use the attachment figure when distressed, leading to feelings of apprehension and fear when around the attachment figure (Bernier & Meins, 2008; Main & Hesse, 1990).

Investigating the influence of maternal sensitivity on infant attachment, Ainsworth et al. (1978) coded maternal sensitivity based on observations of the strange situation. They concluded that mothers of insecure infants tended to be less sensitive and responsive and more interfering in their children's behaviours whereas secure infants tended to have sensitive mothers.

Further research attempting to identify determinants of attachment

In line with Freud's compulsion to repeat theory presented in the previous section, the process of intergenerational transmission of attachment has been investigated and researchers have shown that parents' attachment classification were found to predict infant attachment (Main 1993; 1995; van Ijzendoorn, 1995). Infant attachment was assessed using the SSn while adult attachment was assessed through narratives about parents' early attachment experiences, using the Adult Attachment Interview (AAI; George, Kaplan & Main, 1985). Participants were asked to retrieve attachment related autobiographical memories from early childhood and evaluate them from their current perspective focusing on the impact of those relationships on development and current functioning (George et al., 1985). Interview narratives were transcribed and coded based on the coherence of the narrative and the participants' capacity to access memories and ascribe emotional meaning to them. The AAI yields secure and insecure categories of attachment, parallel to those produced by the SSn; however, in adulthood, attachment assessments focus on processes of thought and communication rather than dyadic behaviours. Based on the AAI, a secure/autonomous adult's narrative tends to be characterized by a balanced and coherent picture of attachment related experiences, without withholding negative aspects of the relationship with parents. Within AAI narratives, an insecure-dismissing adult is likely to devalue the need for an attachment figure and its impact on his/her personality or to idealize parents by emphasizing positive aspects of the relationship. Finally, an insecure-preoccupied narrative reflects an enmeshment in negative childhood experiences, with manifestations of anger (George et al., 1985; Main, Kaplan & Cassidy, 1985).

In a meta-analysis of 14 studies linking parents' and children's attachment status, parents' attachment classification was not only found to predict attachment security, but also the insecure category the child belonged to in cases of organized attachment (van Ijzendoorn,

1995). The author found a strong association between mothers' representations of their attachment experiences and the child's attachment classifications in times of stress which was argued to be mediated by the type of communication regarding emotions. During the AAI, secure mothers tended to openly discuss feeling whereas within insecure attachment relationships, mothers were more likely to have a defensive strategy, avoiding or over-involved, when discussing feelings (van Ijzendoorn, 1995). This conclusion is in line with other findings showing that open communication is transmitted between parent and child (Laranjo, Bernier, Meins & Carlson, 2010; Meins, Fernyhough, Wainwright, Das Gupta, Fradley, & Tuckey, 2002; Oppenheim, 2006; Oppenheim, Koren-Karie & Sagi-Schwartz, 2007; Steele, Steele & Fonagy, 1996).

Van Ijzendoorn (1995) further hypothesized that sensitive and responsive parenting could explain the intergenerational transmission of attachment. He suggested that sensitive parents, not only have securely attached children, but are also likely to have an autonomous attachment relationship to their own parents. He suggested that autonomous mothers were more likely to be sensitive and, therefore, be more responsive to their children's signals and needs. However, sensitive responsiveness was found to only explain 23% of the variance (van Ijzendoorn, 1995). He labelled this as the transmission gap and other scholars, starting with Fonagy and his colleagues (Fonagy, Steele, Steele, Moran & Higgitt, 1991) have attempted to fill it by identifying better determinants of the intergenerational transmission of attachment.

As part of the London Parent-Child Project, Fonagy and his colleagues (Fonagy et al., 1991) attempted to look for factors that could explain the high concordance obtained between parent and infant attachment. They interviewed 100 expectant parents using the AAI. Interviews were coded twice: once based on the four AAI classifications previously described, and then using a scale investigating reflective-self function, the parents' quality of

understanding of their infant's intentionality and feelings. Results showed that the parents' predisposition to see relationships in terms of mental content predicted infant attachment using the SSn at 1 year of age (Fonagy et al., 1991). In a follow-up on the same group, parents' reflective self-function was also found to predict children's higher performance on some self-belief tasks at 5 years of age with only part of the variance predicted by the infant's attachment classification at 1 year of age (Fonagy et al., 1997). The authors therefore theorized that maternal mentalizing capacities, conceptualized as reflective functioning (a more detailed account of this notion will be given in section 1.2), directly impacts the development of theory of mind in children but also have an indirect influence (Fonagy et al., 1997). This echoes Fonagy et al.'s (1995) suggestion that by giving meaning to the infant's affective experience and re-presenting this experience in a regulated manner, the mother allows for the development of a sense of security and safety for the child which, in turn, encourages the development of his/her mentalizing capacities. Based on these findings, parental mentalizing capacities were found to be the best determinants of infant attachment and close the transmission gap (Fonagy et al., 1998).

It is important to note that the literature investigating the relationship between parental mentalization and attachment focused on infancy and early childhood with only a few studies investigating this association in later years (Benbassat & Priel, 2011; Ensink, Normandin, Sabourin, Fonagy & Target, submitted). These will be described in detail in the next chapter, following a discussion of the roots of the concept of mentalization.

1.2 The role of mentalization in explaining the intergenerational transmission of attachment

1.2.1 The development of the concept of mentalization

Mentalization has been defined as a form of imaginative mental activity, perceiving and interpreting human behaviours as conjoined with intentional mental states such as needs, desires, feelings, beliefs and goals (Allen, 2008, Allen & Fonagy, 2006; Fonagy, Target, Steele & Steele, 1998). It incorporates both, an affective and cognitive aspect (Slade, 2005). This capacity develops in the child through interpersonal interactions with more mature minds, based on the quality of the attachment relationships with caregivers and it reflects the extent to which the child's subjective experiences are appropriately mirrored (Fonagy, Bateman & Luyten, 2012; Fonagy, Gergely, Jurist & Target, 2003). Although the first explicit formulation of mentalization, as defined by Fonagy and his colleagues, was made in the nineties, the concept of mentalizing has its roots in classical psychoanalytic theory (Bouchard & Lecours, 2008; Fonagy, 1999).

The roots of mentalization in psychoanalytic theories

The affective component of mentalization has its roots in classical psychoanalytic theories. In fact, in its widest sense, mentalizing includes a process of transformation based on Freud's concept of *Bindung*/binding or linking (Freud, 1911). It is an ego function which transforms physical quantities and somatic experiences (immediate) into psychological ones (associative) to restrict the free flow of excitations by linking ideas to one another thus creating more stable forms. This process leads to the creation of associative pathways as part of secondary processes in order to adapt to the external reality by creating stable mental representations of the self and others (Freud, 1911; Laplanche & Pontalis, 1973; Lecours & Bouchard, 1997).

Bion (1962) described a similar process, containment, which he first noticed in patients who were expressing things they could not understand themselves, thus needing a container, the therapist, in order to make sense of them. Bion (1962) then applied this idea to the relationship between mother and infant and suggested that the baby has raw sensations from the outside and inside that he cannot cope with. Bion further explained that the mother needs to be in a state of reverie allowing her to tolerate the raw sense impressions, β -elements, projected onto her by the child, and transform them into α -elements, which the baby can understand in order to make sense of feelings of the self and others. Through this process of containment, the child goes through a continuous state of coming-to-know which gives meaning to emotional experiences. Through repeated interactions, the child will, in time, internalize this function and regulate his own negative affective states (Bion, 1962; Fonagy, 1999; Fonagy et al., 2003; Holmes, 2006). The α -function is also necessary for the establishment of the contact barrier which differentiates between unconscious and conscious thinking, a notion echoed in the concept of mentalization given that a pre-requisite to its acquisition is the ability to differentiate between reality and fantasy (Bion, 1962; Holmes, 2006).

The Winnicottian model also emphasized the importance of the mother-infant relationship for the development of a sense of self in the baby (Winnicott, 1956). The mother plays the role of a holding object, providing psychical cohesion to the infant. This transitional phenomenon is necessary as the mother's playful mirroring responses to the child's actions and gestures allow him/her to see his/her reflection through the mother's expression (Bouchard & Lecours, 2008). The 'good enough' mother should consistently mirror the infant's needs but should also have the "capacity to put herself in the baby's place and to know what the baby needs" (Winnicott, 1962, p.57) and can therefore keep away the "unthinkable anxiety" experienced by the infant (Winnicott, 1962). It is argued that in normal

development, the mother identifies with the child and thus allows him/her to see him/herself in a way that validates the self. Thus, the infant begins to build up a distinct picture of both internal and external reality based on the perception of himself as thinking and feeling through his mother's mind (Fonagy et al., 2003; Holmes, 2006; Winnicott, 1956).

Independently, a group of French psychoanalysts elaborated their own notion of mentalisation based on Freud's early concept of "binding" and economic model of the mind (Lecours & Bouchard, 1997; Luquet, 1988, Marty, 1968). Marty (1968) considered mentalisation as ensuring stability as he suggested it plays the role of a protective buffer in the preconscious system in order to prevent disorganization within the systems. He suggested that mentalisation allows fluidity in the use of associations linking drive excitations and internal representations (Marty, 1990; 1991). Luquet (1987) distinguished different forms of thinking and organization of inner experience including primary mentalisation and secondary mentalisation. The former was characterized by the absence of mentalisation while the second was conceptualized as symbolic mentalisation, linked with sensory data and primary unconscious fantasy as seen through dreams or play (Luquet, 1987). Summarizing the French definition of the concept of mentalisation, Lecours and Bouchard (1997) explained that it can be conceived as the antithesis of *pensée opératoire* – thinking devoid of affect. They stated that mentalisation is, firstly, "a *process of transformation*, [...] a preconscious/ego activity that transforms, maintains and further elaborates basic somatic or motor drive-affect experiences into psychic contents. This transformation is achieved through a linking activity that establishes representations and symbols in order to permit the individual to free him/herself from the concrete and absolute nature of the primary motivational (drive-affect) pressures. Secondly, mentalisation refers to a theoretical hierarchy of *levels of psychic elaboration* that differ qualitatively" (Lecours & Bouchard, p. 860).

In sum, psychoanalytic theories posited that a transformation process is necessary to move from raw and concrete experiences to recognizing and naming their affective states (Bion, 1962). This transformation was hypothesized to allow a differentiation between internal and external reality as well as between the mother's and the infant's feelings and goals (Winnicott, 1956; 1962).

Within the context of attachment theory, Bowlby (1969) suggested that it is through repeated dyadic interactions with the mother that the infant constructs internal working models of the self as an independent being with feelings, goals and interests that are separate from the mother's (Bowlby, 1969; Bretherton, 1992). According to Bowlby (1973), working models of the self are derived from the way the child believes he/she is perceived by the attachment figure, the availability and responsiveness of the caregiver and the child's perception of the parents' accessibility in times of distress and need. Bowlby (1969) and Ainsworth et al (1978) suggested that these parental features as the central determinants of the child's attachment security (see Section 1.1.1). It can therefore be argued that psychoanalytic theories, focusing on mirroring, naming and containing affect, underlie the affective component of mentalization whereas attachment theory is more in line with studies looking at the cognitive aspect of mentalization described below.

Theory of mind and mentalization as a cognitive capacity

Mentalization also includes a cognitive capacity which is rooted in the concept of theory of mind. Dennett (1987) proposed his theory suggesting three stances available to predict behaviour. The physical stance, through which the individual understands behaviour only through physical properties, the design stance which emphasizes the programming behind development and finally the intentional stance, which allows the individual to predict what the most rational move is in terms of a theory of mind.

Premack and Woodruff (1978) had defined the concept of theory of mind as the ability to ascribe feelings and thoughts to self and others as well as anticipate their influence on the self and other's behaviours. The idea underlying the theory of mind concept was that children around 3 or 4 start understanding the separateness of mind between self and other, and therefore recognize that thoughts, beliefs and feelings differ according to the knowledge each person possesses (Premack & Woodruff, 1978).

Researchers attempting to investigate the determinants of the development of theory of mind in children agree upon the importance of social and family factors such as the family structure (Hughes & Dunn, 1998; Jenkins & Astington, 1996), parental talk about emotions (Denham, Zoller & Couchoud, 1994) and quality of parental control (Dunn, Brown, Somkowski, Telsa & Youngblade, 1991). However, theory of mind has not been able to adequately explain how children acquire the capacity to perceive mental concepts (Fonagy & Target, 1997). Theory of mind fails to take into account how the understanding of behaviours in terms of mental states is transmitted from the social world to the child (Fonagy & Target, 1997). Moreover, the theory of mind model states that mental states understanding comes from introspection which has been criticized for focusing on conscious motivations rather than affect regulation and unconscious processes (Fonagy & Target, 1997). These limitations have led to a more complex conceptualisation of mentalization as not only including a cognitive component, such as theory of mind, but also include an affective component (Fonagy et al., 1991; Meins, 1999, van Ijzendoorn et al., 1995).

Mentalization as including affective and cognitive components

The first explicit formulation of mentalization including both the affective and cognitive components was based on Marty's (1991) observation of clinical somatization disorders which he identified as devoid from any affective understanding, which

characterizes the antithesis of mentalization (Bouchard & Lecours, 2008; Holmes, 2006; Marty, 1991).

Some philosophers of the mind have presented the idea of the theory of unconscious mind (Hopkins, 1992; Wollheim, 1995) in an attempt to expand the concepts presented by Dennett (1987) and Premack and Woodruff (1978). They highlighted that behaviours should not solely be understood in terms of an interconnected set of beliefs and desires as explained by Premack and Woodruff (1978), but the unconscious mind should also be explored in terms of unconscious mental states in order to understand feelings and desires underlying behaviour (Fonagy & Target, 1997). Slade (2005), writing from a psychoanalytic perspective, summarized this concept as including both a cognitive process, perspective taking, allowing the person to understand what the other person believes, and an affective process, through which one can regulate and contain one's own and others' emotions. More recently, based on neuro-imaging, developmental social and cognitive research Fonagy and Luyten (2009) considered mentalization as a multidimensional construct. They proposed that mentalization can be characterized as "organized along four polarities: automatic/controlled, cognitive/affective, internal/external-based, and self/other focused. Each of these dimensions reflects the involvement of two relatively distinct neural systems" (Fonagy & Luyten, 2009, p. 1358). Discussing the cognitive/affective polarity, they argued that, cognitive processes in mentalization rely on the same mechanism called upon during theory of mind tasks, based on self- and others' attitude representations. In contrast, they suggested that affective processes in mentalization rely on the empathy system and representations of one's own and others' emotions, whereby representations of the other's emotions are based on the effect these emotions are thought to have on the self (Fonagy & Luyten, 2009).

In sum, mentalizing capacities enable the individual to understand mental states of the self and others in order to explain overt behaviours (Gergely & Unoka, 2008; Target &

Fonagy, 2000). The following sections aim at illustrating the importance of parental mentalization, more specifically reflective functioning and mind-mindedness, in mirroring the child's behaviours and promoting the development of a secure attachment relationship.

1.2.2 Parental reflective functioning and infant attachment

As briefly presented in the previous section, Fonagy and his colleagues developed their own conceptualization of mentalization in an attempt to explain the intergenerational transmission of attachment. The concept was developed partly (with George Moran) on the basis of clinical psychoanalytic experience with borderline adults and young children, and partly (now working also with Miriam and Howard Steele and Anna Higgitt) within the London Parent-Child Project. This project investigated the determinants of the intergenerational transmission of attachment, specifically looking at meta-cognition monitoring and coherence of attachment narratives (Fonagy et al., 1991). Reflective functioning (RF) was an operationalization of mentalization as manifested in speech about attachment related interactions and narratives.

Fonagy et al. (1997) defined maternal RF as the mother's ability to attribute feelings, thoughts and desires underlying her own and her baby's behaviours as well as to hold her baby and his mental states in her mind in a non-defensive way in order to allow him to discover his internal world through her representation of it (Fonagy et al., 1991; Fonagy, 2008; Slade, 2005). This idea echoes Winnicott's notion of the infant looking into the mother's eyes to see and validate himself as an intentional being with his own thoughts, beliefs and feelings (Steele & Steele, 2005; Winnicott, 1956). Extending the theory of unconscious mind presented in Section 1.2.1, they stated that RF concerns "knowledge of the nature of experiences which give rise to certain beliefs and emotions, of likely behaviours given knowledge of beliefs and desires, of the expectable transactional relationship between

beliefs and emotions, and of feelings and beliefs characteristic of particular developmental phases or relationships” (Fonagy & Target, 1997, p. 680).

As part of the London Parent-Child Project, the RF scale was elaborated through a careful study of adult attachment narratives, focusing on the presence or failure to appropriately use mental state language when giving an account of their history with attachment figures (Fonagy et al., 1991). RF is determined on the basis of four main types of mental functioning: awareness of the nature of mental states, explicit effort to tease out mental states underlying behaviours, recognition of the developmental aspects of mental states and recognition of mental states in relation to the interviewer (Fonagy et al., 1991; Slade, Bernbach, Grienenberger, Levy & Locker, 2004). Fonagy and his colleagues (Fonagy et al., 1991) were the first to demonstrate that parents who scored high on RF, based on the AAI narrative, tended to have an autonomous attachment with their own parents and that RF assessed prenatally could predict the infant’s attachment security on the SSn at 1 year of age. They explained that parents classified as autonomous were more likely to describe relationships by making references to mental states and were therefore more likely to provide the infant with an environment promoting the development of a secure relationship. In contrast, parents with a history of trauma and insecure attachment tended to rely on defensive strategies such as splitting or denial which limit their capacities to reflect on mental states. In line with previous findings (Main et al., 1985), insecure parents were more likely to be less coherent when reporting narratives of their own attachment history and scored lower on RF (Fonagy et al., 1991). The authors hypothesized that this was likely to constrain their providing of an adequate psychological environment promoting the development of a secure attachment in the infant, as the offspring is not seen for who he/she is but as a depository for the parents’ projections and distortions.

RF was conceptualized as comprising a self-reflective component as well as an interpersonal one (Fonagy et al., 1991). Grienberger, Kelly and Slade (2005) emphasized that the hallmark of reflectiveness is not only to recognize mental state in the self and other but also to be able to link and be aware of the interaction between mental states underlying self and others' behaviours. Slade (2005) made the distinction between adult RF based on attachment narratives between the parent and their own parents (Fonagy et al., 1991) and RF based on attachment narratives about the ongoing developing relationship between the parent and the child (Slade et al., 2005), the latter presenting a more direct measurement of the mechanism underlying the intergenerational transmission of attachment.

Slade et al. (2005) were the first to report that the mothers' ability to reflect about their relationship with their own child was linked to both their attachment status with their parents and their children's attachment status. More specifically, they reported that mothers who were classified as having a secure attachment with their own parents autonomous on the AAI were more likely to score high on RF, followed by mothers who were classified as dismissing or preoccupied, with unresolved mothers scoring lowest on RF. Thus, parents who were able to coherently describe their own childhood experience were more likely to ascribe mental states underlying their children's behaviour. It is important to note that, in contrast with Fonagy et al. (1991), Slade et al. (2005) coded RF based on narratives of the Parent Development Interview (PDI; Aber, Slade, Beger, Bresgi & Kaplan, 1985), a semi-structured interview assessing parents' representations of themselves, their children and the parent-child relationship revised by Slade and her colleagues to be coded on RF (Slade, Aber, Bresgi, Berger & Kaplan, 2004). Slade et al. (2005) suggested that using an interview discussing the ongoing parent-child relationship rather than the parent's own attachment history may provide a more stable representation of the relationship rather than just representations of the child and the self. Correlations between mothers' RF scores and their child's attachment

status yielded similar results, with mothers scoring high on RF being more likely to have securely attached children. Most importantly, RF was shown to be a central mechanism in the transmission of attachment as the relationship between parent and child attachment disappeared when RF was controlled for (Slade et al., 2005).

However, what are the mechanisms underlying the relationship between parental RF, child attachment and child mentalization capacities? Echoing Winnicott's (1956) theory of good-enough mothering and transitional space, Fonagy and his colleagues suggest that secure mothers are more sensitive to represent clearly and accurately their child's mental states in a playful way, in order for the child not to be overwhelmed by reality (Fonagy, Steele, Steele & Holder, 1997; Slade, 2005). Furthermore, mothers with a secure attachment history are more likely to have the capacity to explore their own mind and that of the child without any childhood events clouding the view of the child as a separate being. Moreover, secure mothers are capable of recognizing the mental states underlying their child's behaviours, thus giving him/her more opportunity to organize his/her sense of self which promotes the development of a secure relationship. This process is thought to support and accelerate the development of the child's mentalizing capacities (Fonagy, 2008; Fonagy & Target 1997). Furthermore, in a follow-up study of the Parent-Child Project, mothers' ability to mentalize about their own childhood was found to be linked to the children's performance on theory of mind and mentalizing tasks at age 5, 6 and 11 years (Fonagy et al., 1997; Fonagy et al., 2003, Sharp, Fonagy & Goodyer, 2006). It can be argued that these findings, taken together, close the attachment transmission gap identified by van Ijzendoorn (1995).

1.2.3 Parental mind-mindedness and child attachment security

In parallel to Fonagy's and his colleagues' research and based on van Ijzendoorn's (1995) finding that maternal sensitivity only explained 23% of the variance in infant

attachment, another group of scholars (Meins, Fernyhough, Russel & Clark-Carter, 1998) attempted to find better predictors of child attachment and theory of mind than parental sensitivity. Meins (1997) argued that the mother's capacity to respond to the child on a mental level is more important than her responsiveness to his/her physical and emotional needs. Meins et al. (1998) applied the concept of mentalization to attachment related interactions and operationalized it as maternal mind-mindedness (MM), defined as the "mother'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, Fernyhough, Fradley & Tuckey, 2001, p.638).

Investigating the association between maternal MM and children's later understanding of the mind, Meins, Fernyhough, Wainwright, Clark-Carter, Das Gupta and Fradley (2003) coded mother-infant interactions on MM when the infant was 6-month-old, coded MM from maternal interviews when the child was 48-months-old and assessed children's theory of mind at 45 and 48 months. They have shown that mind-minded parenting in the first year of life predicted the ToM of children four years later, even controlling for later mind-minded parenting, security within the relationship, and global sensitivity. However, because the children were only six months old the judgement of appropriateness was not based on child language, but instead, on inferences of infant behaviour and intent.

Taking this limitation into consideration, Symons, Fossum and Collins (2006) investigated the association between maternal cognitive and desire state discourse during play interactions with their 2-year-old children and children's theory of mind capacities at the age of 5. They concluded that maternal desire state comments were predictive of the children's desire state language and later theory of mind. They explained that, for the toddler to begin to understand how desire states reflect thoughts and influence behaviours, parents need to correctly reflect them in order to promote children's social understanding. This is in line with

Fonagy et al.'s (1997) suggestion that children's theory of mind and mentalizing capacities are enhanced if caregivers observe and respond appropriately to moment-to-moment changes in children's mental states. However, Symons et al. (2006) also found that mothers' appropriate cognitive state language was found to be associated to children's cognitive state language but not to later theory of mind. The authors hypothesized that this finding could be explained by the young age of the children. They proposed that children's social understanding is rooted initially in the desire state talk of their mothers, which then becomes scaffolded into belief state talk later during the preschool period. It can be argued that looking at Fonagy's notion of mirroring could help encompass the limitations highlighted above in relation to the age of the child and the development of cognitive and belief talk. Fonagy et al. (1995) looked at mothers' responses and affect mirroring when their 8-month-old infants were distressed. They suggested that the mothers' mirroring of "complex affect", the distress displayed by the infant and other affect such as smiling or questioning, provides a unique source of information to the child about his own internal states, even before language has developed (Fonagy & Target, 1997). They further suggested that maternal mirroring helps the infant recognize emotions as analogous but not isomorphic to their experience. Fonagy and Target (1997) hypothesized that the combination of the representation of self-experience and the representation of the reaction of the caregiver elaborates the development of the child's theory of mind.

In an attempt to bridge the transmission gap issue (van Ijzendoorn, 1995), Meins et al. (2001) and Laranjo, Bernier and Meins (2008) compared the role of maternal mind-mindedness and sensitivity in explaining the intergenerational transmission of attachment. They concluded that the relationship between maternal sensitivity and attachment is weaker than Ainsworth et al. (1971) had claimed as they showed that MM explained a larger percentage of the variance in child attachment. Maternal sensitivity was measured using the

same system as Ainsworth et al. (1971) (see Section 1.1.3) and maternal MM was measured based on coding of videotaped sessions of mother-infant interactions on 5 dimensions: maternal responsiveness to change in infant's direction of gaze, maternal responsiveness to infant's object-directed action, imitation, encouragement of autonomy and appropriateness of mothers' mind-related comments. In comparison to maternal sensitivity, MM accounted for 12.7% of the variance as a predictor of attachment security while the former only accounted for 6.5%, which is in line with van Ijzendoorn's (1995) finding that maternal sensitivity might not be the best determinant of attachment (Meins et al., 2001). Meins et al. (2001) suggested that the finding that MM was a better predictor of attachment than sensitivity could be explained by the idea that, in contrast with MM, maternal sensitivity does not distinguish between the recognition of the infant's needs and the appropriate response to the needs.

Later, studies investigating the role on mind-mindedness in clarifying the transmission of attachment from parent to child concluded that MM could mediate between parents' and children's attachment classification as all mothers who were classified as autonomous on the AAI and high in MM were likely to have a securely attached child and most of the mothers who were non-autonomous and low in MM tended to have an insecurely attached child (Arnott & Meins, 2007). However, the authors emphasized that these results should be replicated on a larger sample before firmly stating that MM mediates the intergenerational transmission of attachment (Arnott & Meins, 2007). This is consistent with more recent research showing that mothers who were aware of their children's internal world and mental states during a given interaction and made positive attributions to the children were more equipped to be sensitive and responsive, which in turn promoted secure attachment (Demers, Bernier, Tarabulsy & Provost, 2010).

In conclusion, it can be argued that, even though MM was found to be a better predictor of attachment security than sensitivity, it is not without its limitations. Firstly, even

though Bernier and Dozier (2003) concluded that age-appropriate representations of the child helped explain intergenerational transmission, they emphasized that further research should look at parental representations of the child as part of a multidimensional network of parental influences on child attachment rather than only looking at the number of appropriate mind-minded comments in parents' narratives (Bernier & Dozier, 2003). Secondly, Ereky-Stevens (2008) failed to find a significant relationship between mothers' mental state language and children's subsequent mentalistic abilities in 54 months-old children. They suggested that these findings could be explained by the fact that children were slightly older than in previous studies. In addition, the sample had a higher socio-economic status and the study design was different than other studies looking at mind-mindedness (Ereky-Stevens, 2008). It is noteworthy that, as discussed in the previous section, parental RF assessed prenatally, was found to predict infant attachment at one year of age and children's later theory of mind (Fonagy et al., 1991; Fonagy et al., 1997). This can suggest that parental RF is less likely than MM to be affected by the child's age as it is based on the mother's metacognitive representation of her relationship with her child rather than momentary real-life interactions (Sharp & Fonagy, 2008). Thirdly, Rosenblum, McDonough and Sameroff (2008) emphasized that MM is coded on brief observational material and therefore is less likely to explain a larger range of parenting behaviours which can be generalized to wider settings. Critically, Slade (2005) highlighted that both concepts – sensitivity and MM - do not include the parent's capacity to describe the dynamic relationship between mental states of parent and child and how this interaction impacts feelings and behaviours. It can therefore be argued that coding narratives reflecting parents' attachment relationships or their ongoing relationship with their child, such as the PDI previously described in Section 1.2.2, could reflect a more comprehensive picture of parents' understanding of the child's behaviours, thoughts and feelings (Slade, 2005).

Before elaborating on parental mentalization of twins, as the sample in this study consists of twins and their parents, a brief summary of the effects of failures in mentalizing will be presented.

1.2.4 The effect of failures in mentalizing

Based on the findings presented in this chapter, child mentalizing capacities have been suggested to develop within the context of a secure parent-child attachment relationship and have been deemed important in perceiving and interpreting behaviours in terms of mental states (Fonagy et al., 1991; Slade et al., 2004). However, what is the effect of failures in mentalizing?

Fonagy and Target (1997) suggested that within the context of a secure mother-infant relationship, the mother has the capacity to mirror the child's feelings, in a way that the child can understand what he/she is feeling, thus elaborating a map of his/her self-representations. Similar mechanisms have been theorized to take place in instances of insecure attachment, in which case failed mirroring occurs due to a discrepancy between the infant's feelings and their representations by the mother (Fonagy & Target, 1997). It was hypothesized that dismissing parents tended to reject their children's signals in stressful situations as they awaken unresolved past trauma in parents. As a result, it was posited that parents provide inappropriate mirroring of affect to the child which, in turn, fosters the creation of an insecure-avoidant response in them (van Ijzendoorn, 1995). Van Ijzendoorn (1995) further explained that preoccupied parents tended to be more focused on their own feelings with current issues or past attachment figures, and they were therefore unable to attend to the infant's needs, or responded excessively in order to compensate for previous negative experiences. This could explain the development of insecure-resistant attachment behaviours in the child (Van Ijzendoorn, 1995).

Later, Fonagy and his colleagues have hypothesized that disorganized children tend to have an alien sense of self, and that the attachment relationship between the child and the caregiver revolves around externalizing parts of this alien self onto the attachment figure rather than working on internalizing a capacity of containment (Fonagy et al., 2003). This is in line with Slade's hypothesis that non-reflective parents tend to mirror a faulty image to the child, coloured by their own distorted representations and mental functioning within their insecure attachment. This in turn leads to the construction of a false sense of self in the child, who is not seen for whom he is (Fonagy et al., 1991; Slade, 2005).

Within the framework of developmental psychopathology, Sharp, Fonagy and Goodyer (2006) developed the accuracy of the parental mentalizing paradigm. The task consisted of asking 7- to 11-year-old children to attribute thoughts to peers based on imaginary distressing scenarios, and then invite the mothers to guess the responses of their children. Looking at the concordance and discordance between the children's actual thoughts on stressful scenarios and the mothers' attributions about the child's thoughts, the researchers concluded that low maternal accuracy, considered to reflect low maternal RF capacities, facilitated ineffective mentalizing in the child. The authors put forward that parents with distorted RF skills were unable to contain the children's negative and stressful affects because their reactions to the child depended on inferences they made based on unresolved issues within their past. It was suggested that these were then projected onto their children, which could have led to low socio-cognitive reasoning skills and psychological adjustment in the children (Grienenberger et al., 2005; Sharp et al., 2006). In sum, based on these findings, it can be suggested that parental mentalization capacities continue to play a role as the child grows older as they influence children's subsequent development, adaptation and psychological adjustment. It can therefore be hypothesized that parental mentalization can be

associated with adjustment and the development of a balanced view of the self during adolescence, characterized as a phase of major developmental changes.

Before moving to a detailed account of adolescence and given that the sample of the study consists of twins and their parents, the last section of this chapter presents findings regarding parental mentalization of twins.

1.2.5 Parental mentalization of twins from a behavioural genetic point of view

In recent years, given the widely accepted idea that both environment and genes play a role in development, the behavioural genetics method has been used to test how much of development can be explained by genes, and how much is due to the environment. Environmental influences have been divided into two categories, shared environment, the common environment between siblings, and non-shared environment which includes differential parenting, school friends, or other influences which are unique and specific to each child in the family. These influences are used to explain the variability between siblings within the same family and investigate whether they are based on heritability traits or environmental influences. For example, identical twins (monozygotic, MZ) share all of their genes and thus should be closely similar on traits governed by genes. Differences between MZ twins are therefore explained by environmental influences, more specifically non-shared influences (Burt, 2009; Rodgers & Bard, 2006).

Plomin and Daniels (1987) published an influential paper, as part of the Non-shared Environment Adolescence Development (NEAD) project, looking at child-specific influences on the parent-adolescent relationship. They argued for the bi-directional nature of influences between mother and child and suggested that adolescents' behaviours towards parents are mostly governed by genetic influences whereas parents' behaviours are guided by greater shared environmental influences (O'Connor, Hetherington, Reiss & Plomin, 1995). The

authors further argued that parents react similarly to genetically identical twins, who, in turn, evoke similar treatment from their parents (O'Connor et al., 1995). More recently, Mullineaux, Deater-Deckard, Petrill and Thompson (2009) extended these findings by emphasizing the impact of non-shared and child-specific influences on parents' differential treatment of twins. They studied twin differences in externalizing and internalizing problems and positive social engagement as well as differential maternal positivity and negativity over 1 year by gathering observers' ratings and maternal reports. They concluded that parents differentiated their adolescents in terms of their behavioural and emotional problems as the twin who showed more conduct problems and less positive social engagement received more maternal negativity and less maternal warmth than his twin.

Fearon, van Ijzendoorn, Fonagy, Bakermans-Kranenburg, Schuengel and Bokhorst (2006) investigated the nature of the influence of maternal sensitivity on infant attachment from a behavioural genetic point of view, looking at maternal sensitivity to 1-year-old MZ and DZ twins. They found no significant genetic influences on maternal sensitivity, which is in line with previous sibling research revealing no evidence that genetic variation plays a role in intergenerational transmission of attachment (Dozier, Stovall, Albus & Bates, 2001; Verissimo & Salvaterra; 2006). Studies looking at concordance of attachment between siblings also revealed that maternal sensitivity was governed by shared environmental influences, as mothers were likely to be as sensitive or insensitive to both siblings and that maternal insensitivity which was associated with an increased concordance of insecure attachment (Dozier et al., 2001; Van Ijzendoorn, Moran, Belsky, Pederson, Bakermans-Kranenburg & Kneppers, 2000; Verissimo & Salvaterra, 2006).

Fearon et al. (2006) further concluded that non-shared environmental factors explained most of the variance in cases where twins had different attachment classifications with the mother. In these instances of discordant attachment, maternal sensitivity was found

to be negatively correlated to attachment security, meaning that mothers' sensitivity to one twin but not the other led to insecurity in the twin receiving higher levels of sensitivity. The researchers argued that this conclusion could be explained in one of two ways. One explanation would be that mothers tended to be more sensitive to the insecure twin as she was aware of the differences between her relationships with each one of the twins. This echoes a previous conclusion by Meins et al. (1998) who explained that mothers tended to be more sensitive to insecure children as their behavioural responses called for more complex maternal mentalization in order to identify the underlying feelings and thoughts behind these insecurely attached children's behaviours (Sharp & Fonagy, 2008). However, it is important to highlight that Meins et al.'s (1998) findings were based on foster dyads. The authors suggested that MM could function differently for foster dyads compared to biological dyads as child characteristics and the bidirectional nature of the relationship between attachment security and parental mentalizing are more salient. They hypothesized that it is likely that the behavioural responses of insecurely attached children call for more intense attempts on the part of foster parents to identify the child's thoughts and feelings (Meins et al., 1998). The second hypothesized explanation presented by Fearon et al. (2006) was that, if the mother was insensitive to one twin but not the other, the latter, i.e. the twin receiving sensitive parenting, was still influenced by maternal insensitivity through sibling comparison and observed sensitivity. This process might decrease the sibling's sense of security, even if the twin to whom the insensitive parenting is directed is securely attached to the mother. Therefore, differential parenting appears to be linked to the quality of the relationship that siblings have with each other (Brody, Stoneman & McCoy, 1994; Fearon et al. 2006). However, it is still unclear how this effect might occur and further research is required to explain the effect of non shared environmental influences on maternal sensitivity (Fearon et al., 2006; Fearon, Bakermans-Kranenburg & van Ijzendoorn, 2010).

More recently, Roisman and Fraley (2008) conducted home visits to observe parenting quality between parents and their 2-year-old twins. Replicating previous findings, they concluded that variations in parenting quality and infant attachment were based on shared and non-shared environmental factors, with no significant genetic influences identified. Similarly to Fearon et al. (2006) they found that the relationship between infant attachment and parental sensitivity was mostly accounted for by shared environmental factors given that in cases of concordant attachment between the twins, maternal sensitivity was positively associated with infant security. However, in cases of discordant attachment between the infants, the authors found that maternal sensitivity was higher towards the securely attached child. This finding contradicts the findings previously stated by Fearon et al. (2006) but is more in line with attachment theory suggesting that parental sensitivity is governed by the parents' representations of their own attachment experiences; therefore, it can be argued that similar levels of maternal sensitivity are likely to be exhibited towards different children in one family (Ainsworth et al., 1978).

This chapter opened with an explanation of the main premises of attachment theory, its points of contact and divergence with classic psychoanalytic theory and an overview of some determinants of attachment. It highlighted the development of attachment from a more one-sided relationship focusing on the child in infancy, to a goal-corrected partnership involving both, the mother's and the infant's needs and feelings in planning behaviours (Bowlby, 1969; 1973). It also emphasized the concordance between mothers' and infants' attachment classification and described studies attempting to find determinants of the intergenerational transmission of attachment, starting with maternal sensitivity (see van Ijzendoorn et al., 1995 for a meta-analysis of these studies).

The second section of the chapter focused on mentalization as it was argued that it could bridge the transmission gap highlighted in the literature. This section opened with a presentation of the roots of mentalization, focusing on the evolution and refinement of the concept from Freud's formulation to that of attachment theorists. Next, the chapter expanded on the role of parental reflective functioning and mind-mindedness in explaining the intergenerational transmission of attachment (Bernier & Dozier, 2003; Fonagy et al., 1991; Fonagy & Target, 1997; Meins et al., 2001; Slade et al., 2005). It was argued that parental mentalizing capacities operationalized as RF in interviews about attachment relationships, were the best determinant of the intergenerational transmission of attachment (Fonagy et al., 1991; Fonagy & Target, 1997; Slade et al., 2005). Fonagy and his colleagues suggested that an autonomous mother is more likely to be sensitive, explore her infant's and her own mind and accurately represent mental states without being overwhelmed with any childhood events. They further argued that this allows the infant to be seen as a separate being with his/her own feelings and needs, providing him/her with the opportunity to organize his/her sense of self which are the foundations of the development of a secure attachment relationship. This, in turn, promotes the development of the infant's own theory of mind and mentalizing capacity (Fonagy et al., 1997), bridging the transmission gap highlighted by van Ijzendoorn (1995). It is also of importance to note that parental mentalizing of distress was found to provide a unique source of information to the infant regarding the different, sometime contradicting, emotions felt at one point in time, thus further elaborating the development of the child's theory of mind (Fonagy et al., 1998)

Finally, this chapter concluded with a discussion of the behavioural genetics of mentalization, highlighting the importance of the environment rather than genes in explaining the association between maternal sensitivity and attachment in infancy. The main findings of the only two behavioural genetics studies looking at the nature of the influence of maternal

sensitivity on infant attachment concluded a strong shared environmental influence of sensitivity (Fearon et al., 2006; Roisman & Fraley, 2008). In line with attachment theory premises (Ainsworth et al., 1978; Bowlby, 1973), they suggested that maternal sensitivity is likely to be based on the parent's own internal working model of the mind, therefore, different children in a family are expected to receive the same level of sensitivity from their mother (Fearon et al., 2006; Roisman & Fraley, 2008). However, it is important to note that Fearon et al. (2006) also highlighted a non-shared influence of maternal sensitivity in cases of discordant attachment between the twins, but further research is necessary to elucidate this finding.

It is noteworthy that the findings presented in this chapter investigated the association between parental mentalization and attachment security in infancy and childhood. To date, no research has looked at the relation between parental mentalizing capacities and attachment security in adolescence or the nature of the influence of maternal mentalizing capacities on attachment in adolescence, even though it has been emphasized that, during this stage of development, the relationship with the parent undergoes changes as the offspring is separating from the family and becoming more independent (Blos, 1967). Furthermore, some scholars have suggested that the changes happening during adolescence could result in adolescent distress and it was hypothesized that these changes could render the individual and the parent-adolescent relationship more fragile and conflictual (van Doorn, Branje & Meeus, 2011). The next chapter will focus on attachment from the vantage point of adolescence, leading to the hypothesized importance of the role of parental mentalization during this developmental phase.

Chapter 2: Adolescent Attachment to Parents, Twins' Relationships in Adolescence and Parental Mentalization of Adolescence

The previous chapter presented an overview of attachment theory and the concept of mentalization. However, as previously noted, the majority of studies within this field have focused on infancy and early childhood (Ainsworth et al., 1978; Bowlby, 1969; Fonagy et al., 1991; Fonagy & Target, 1997).

This chapter opens with a description of the main developments occurring in adolescence from different theoretical perspectives. The next section emphasizes the different roles played by attachment figures and peers, the latter playing a crucial role during this phase of life. Family interactions are also explored focusing on the effect of differential parenting on the relationship between parents and siblings as well as the sibling relationship. A presentation of twin relationships and twins' attachment strategies to their parents, with a description of markers that determine concordance and discordance of attachment follows. The only study looking at behavioural genetics of attachment in adolescence is then described, leading to the last part of this chapter describing the few studies looking parental mentalization in middle childhood and adolescence.

2.1 Major changes occurring in adolescence

2.1.1 *Psychoanalytic theories on adolescence*

Freud argued that, in adolescence, “one of the most significant, but also one of the most painful, psychical achievements of the pubertal period is completed: detachment from parental authority” (Freud, 1905, p. 227). The adolescent, whose simplest course of action would be to take his parents, the people he has known and loved since childhood, as love-objects, should now exclude them from being potential love-objects as the now more mature

ego put a barrier against incest, forbidding previously acceptable object-choices (Freud, 1905).

Anna Freud extended her father's ideas about the struggles of adolescence. She characterized this stage of development as a period of turbulent sexuality, during which the psychic balance achieved during latency is disturbed, due to the influx of libido caused by sexual maturity (Freud, A., 1958). According to the developmental line "from dependency to emotional self-reliance and adult object relations", she specified that, during adolescence, there is a great effort around loosening the infantile ties to parents and a defence against pregenitality, occurring before puberty, in order to move to a more acceptable choice of love object (Freud, A., 1958). This process entails an emotional struggle and a mourning process, in order for the libido to detach itself from the oedipal strivings towards parents and cathect new appropriate heterosexual objects, a development made possible by some narcissistic withdrawal to fill the gap made by the lack of an appropriate external object to cathect (Freud, A., 1958).

Jacobson (1961) suggested, paradoxically, that the ego reinstates past positions in order to relinquish past attachments and gain the optimal and acceptable instinctual freedom needed to find new ways of instinctual discharge to build on adult relationships. This genuine development is based on a revision and selective acceptance or rejection and flexible mastery of substitutions of aims and representations of self, other and relationships, which starts with the loosening of ties with parents and reasserting one's role within the family structure, as earlier psychic formations now have a subordinate role (Deutsch, 1944; Schafer, 1973). It is argued that these changes allow the child to move towards a conscious experience of the self as a mature adult (Gourevitch, 1980).

Blos (1967), based on classic psychoanalytic ideas and Mahler's (1963) concept of separation-individuation, compared adolescence to this period of the infant's life, as they both

have in common firstly, the urgency in psychical change in order for development to happen, and secondly, a heightened vulnerability. However, they could both be followed by psychopathology if the individuation process fails (Blos, 1967). What Mahler (1963) described in infancy as hatching from the symbiotic relationship with mother, becomes in adolescence, according to Blos, a pulling away from parental infantile dependencies (Steinwand, 1984). Adolescence was thus conceptualized as a period of second individuation, characterized by a regressive pull during which the adolescent learns to manage the tension between primitivization/differentiation and regressive/progressive positions (Blos, 1967; Tyson & Tyson, 1990). The changes described above are thought to render the ego and the self during this time very fragile, leading to feelings of apprehension and uncertainty (Ammaniti, 1988). Feelings of anxiety and aggression also prevail and the adolescent needs to find ways to channel these feelings in a meaningful way, in the service of the goals and aspirations of the ego's changing needs, in order to healthily pass this stage and attain independence from infantile ties (Gourevitch, 1980).

The theories outlined above focused on the concept of regression which has been defined in psychoanalysis and modern psychology as “a reversion to earlier forms in the development of thought, of object relationships or of the structure of behaviour” (Laplanche & Pontalis, 1973, p. 386). Blos (1979) described resistance against regression, which is related to the defence mechanisms explained by Anna Freud. He added that some of the forms it can take are negativism, oppositionalism or indifference as a way of asserting the adolescent's independent and individual persona. It can also take the form of a turn towards the outside world in a reversed attitude that gives the adolescent an illusionary and apparent victory towards parents. According to Blos, the more dependent a child was on his parents during the early years, the more distance he will take from parents during adolescence to assert independence (Blos, 1967). This is in line with Ammaniti's (1988) idea that one of the

most typical defensive strategies is the externalization of conflicts to avoid the threat of passivity or submissiveness to parents and the dissolution felt by the renewed dependency on them. Most importantly, Ammaniti (1988) suggested that externalizing conflicts allow the adolescent not to think about those painful feelings or acknowledge the separation and individuation taking place. For the restructuring of the ego to be possible, it was hypothesized that the adolescent will need, after temporary regression and use of defences, to be able to renounce infantile ties and cope with the stress it entails, as well as accept his independence from parents (Jacobson, 1961). Given this context, it can be argued that classical psychoanalytic theories view adolescence as a time of emotional turbulence during which strong drives confront a weak ego.

Erikson (1956) highlighted another objective of adolescence is identity formation. Following the development of autonomy and identifications with aspects of parents and peers, the process of identity formation begins, an important aspect of which is the society's recognition of the individual as a person. Erikson (1956) argued that self-identity is reached when all the experiences of the temporary self-diffusion caused by the regression that occurred during that period are successfully contained and integrated. He also suggested that the process of identity formation is constantly evolving in order to integrate biological changes, identifications, defences and libidinal needs and some role repudiation is needed in order to delimit identity through experimenting with roles before reaching one's identity (Erikson & Erikson, 1997). Erikson (1970) highlighted the difference between role diffusion which the adolescent's ego seeks in order to expand the boundaries of the self for a sense of wider identity to gain certainty and conviction, and role confusion, defined as "states in which there is an impoverishment and a dissipation of emotional, cognitive, and moral gains" (Erikson, 1970, p.15). According to Erikson (1970), the basic patterns of identity emerge

from two main areas, repudiation and choice of childhood identifications and, the way society and the community accept and recognize the adolescent.

The next section will explore other areas of development in adolescence, mainly the development of cognitions and emotions.

2.1.2 Cognitive and emotional development in adolescence

The negotiation of separation - individuation and the formation of identity as outlined above are accompanied by major changes in other areas of development. It was suggested that brain developments in adolescence can be compared to the maturation of the brain in the first five years of life given the extensive and crucial changes that occur (Storelder & Ploegmakers-Burg, 2010).

With regards to emotional development, the capacity to control emotions starts to emerge by early adolescence, and is efficient in most situations; however, it is not before middle to late adolescence that young people can express and accept inner conflict and explain it in terms of feeling states. This suggests that the development of the adolescent's capacity to hold contradicting feelings towards one situation develops (Harris & Gross, 1988; Saarni, 1984). Empathy also develops as the young person now has the basic skills to be self-aware and infer the emotional states of others, and thus empathically responds to situations (Rosenblum & Lewis, 2006). These developments can be explained by the far-reaching neuro-biological and psychological organization taking place as well as the developments in the adolescent brain. The two main observations to be made about the growth of the "emotional brain" during this developmental period are firstly, developments in the brain areas that control the regulation of behaviour and emotions as well as the evaluation of risk and reward, and secondly, changes in arousal brought about by the physical maturation precede the development of appropriate regulatory systems. These changes, quoting

Steinberg (2005), could be compared to “ a situation in which one is starting an engine without yet having a skilled driver behind the wheel” (p.70). This is in line with Somerville, Jones and Casey (2010) who suggested that risk-taking behaviours should not be considered as a deficit in cognitive ability to comprehend and anticipate the consequences of one’s actions, given that cognitively, adolescents do have the necessary capacities to foresee negative and dangerous outcomes. They added that during adolescence, the environmental context, including peers, as well as emotional states, take over cognitive capacities and cloud the adolescent’s judgments.

With regards to cognitive developments, Steinberg (2005) explained that, throughout adolescence, brain areas controlling executive functioning, including long-term planning, self-regulation and self-evaluation develop, explaining the adolescent’s improvements in reasoning and information processing, as well as hypothetical thinking (Steinberg, 2005). It was suggested that this allows the adolescent to integrate information more autonomously, think in abstract terms, make decisions and predict emotions more accurately. One additional implication is that the young adult is more able to recognize imperfections in parental reasoning and discuss different perspectives appropriately, a crucial pre-requisite for perspective-taking and conflict resolution (Blakemore, 2008; Steinberg, 2005, Storelde & Ploegmakers-Burg, 2010).

Investigating parents’ responses to these changes, researchers have found that parents’ validating and empathic responses to their adolescents’ feelings were linked to better emotion regulation skills and conversely, dismissing and hostile responses from parents were related to later internalizing and externalizing behaviours (Davidov & Grusec 2006; Gottman, Katz & Hooven, 1997; Klimes-Dougan & Zeman, 2007; Morris, Silk, Steinberg, Myers & Robinson, 2007, O’Neal & Magai, 2005). Therefore, it can be argued that parents’ flexibility and modifying of their affective responses in order to match the changes occurring in their

adolescents could lead to a better adjustment and might be apparent at the heart of the parent-adolescent relationship discussed throughout the next section.

2.2 The changing parent-offspring relationship in adolescence and the growing influence of peers and siblings

2.2.1 *The changing relationship between parent and adolescent*

As mentioned in the previous section, important changes occur, leading the adolescent into a state of instability which, if appropriately negotiated within the parent-adolescent relationship, helps the adolescent gain back the coherence and stability needed to enter adult life (Granic, Dishion & Hollenstein, 2006). To make this possible, the roles in the family, whether the adolescent's or other family members', need to be realigned in order to match the new goals being set by the adolescent in order to surpass the disequilibrium that characterizes this transition phase (McGue, Elkins, Walden & Ianoco, 2005). The dyadic patterns are expected to fluctuate frequently, as does the adolescent's mood, as he/she starts realizing that parents are not as ideal as they were perceived to be in childhood; on the contrary, parents can be wrong or hold different opinions, leading to an increase of conflict (Granic et al., 2006). This is in line with Steinberg's (1987a, 1987b, 1988) idea that there is an increased distance between the adolescent and both his parents, caused by maturation and the increase and intensification of the difference between the perceived closeness, the need for parents and reciprocity. This pushes the adolescent to seek autonomy from them, which is one of the goals during the transition period, alongside identity formation, acceptance from peers, need for romantic relationships, and the desire to be recognized by parents as a mature individual. It is expected that after the appropriate parent-adolescent negotiation and completion of the transition phase, the family system as well as the dyadic relationships with the adolescent would go back to stability (Granic et al., 2006; Kroger, 2006; Zimmer-Gembeck & Collins,

2006). Scott and his colleagues (2011) suggested that a sensitive mother will acknowledge the separation process occurring in adolescence and modify her responses to the adolescent according to his/her changing needs and striving for autonomy (Scott, Briskman, Woolgar, Humayun & O'Connor, 2011).

As elaborated on in Section 1.1.1, Bowlby suggested the development of goal-corrected partnerships as the infant grows older (Bowlby, 1973). Allen and Land (1999) added that, with the development of the adolescent's cognitive capacities such as perspective-taking (see Section 2.1.2), his/her behaviours are not only determined by current needs, but also by the recognition of the need to manage "set goals" for the partnership. The increasingly goal-corrected nature of the relationship helps the adolescent become less reliant and dependent on his/her parents. Allen and Land (1999) further theorized that, as the independence increases, so does the emotional distance necessary to the adolescent to re-evaluate the nature of the attachment relationship to parents (Allen, 2008; Allen & Land, 1999). Kobak and Madsen (2008) added that open lines of communication between parent and adolescent were found to be of main importance during this stage of life as a parent's hostile or unexplained reaction to a child's misbehaviour could be perceived as a rejection or a threat to caregiver's availability (Kobak & Madsen, 2008).

Regarding adolescents' perceptions of the changes occurring, McGue et al. (2005) investigated the association between parent-adolescent conflict and aspects of warmth in the relationship. They found that, between 11 and 14 years of age, adolescents perceived, based on self-report questionnaires, a decline in the quality of their relationship with their parents, an increase in conflict with their parents, less parental involvement in their life, less positive regards towards their parents and that their parents had less positive regard for them. The authors highlighted the importance of parents' need to compromise and negotiate appropriately with their adolescents, putting value on the important outcome, discussing

issues through less negative and more positive interactions, in order to help the adolescent understand these changes (McGue et al., 2005). This suggestion is in line with research looking at the adolescent's perceived parental support. For instance, McElhaney, Porter, Thompson and Allen (2008) showed that adolescents valued their mothers' opinions in the context of a positive and supportive relationship. When adolescents perceived parents as a strong influence, they were more likely to go to mothers for support and advice and showed better negotiation skills during disagreements. McElhaney et al. (2008) considered this as a pre-requisite for the development of autonomy and positive decision-making. Dix (1991) highlighted an additional important factor promoting a healthy parent-adolescent relationship: the need for the adolescent to be aware of their parents' concerns, as it reduces frustration and enables them to explore and learn social skills. It is expected that over time, through this process, parents and adolescents develop shared representations and stable conceptions based on the parent's involvement and cooperativeness and the adolescent's realization of parental concerns reciprocally (Dix, 1991). Dix (1991) emphasized the necessity for affective communication from parents as it promotes more understanding on the part of the adolescent in the processing of messages and intentions and gives them the opportunity to evaluate different points of view. Granic et al. (2006) extended this idea by arguing that responsive parenting during conflict encourages independence and the development of negotiation skills through support and give-and-take interactions. In addition, they explained that parents need to be more flexible and allow adolescents to make their own decisions, trusting them to make the right choices, in order to, with time, and through appropriate feedback process, give them more confidence and competence.

In an attempt to identify markers of a secure base in adolescence, Allen, McElhaney, Land, Kuperminc, Moore, O'Beire-Kelly, Liebman and Kilmer (2003) looked at data collected from the AAI, mother-adolescent interactions and other self-report measures.

Findings suggested four potential markers of security of attachment in adolescence, based on parental, adolescent and dyadic characteristics: a) maternal attunement and consistent responding to the adolescent, b) the adolescent's de-idealization of the mother which allows independence and the adolescent's acceptance that parents can be wrong or have different views than theirs, c) the adolescent's perception of maternal responsiveness and d) the ability of the mother-adolescent dyad to reaffirm their relationship while disagreeing. Each marker was found to predict a unique dimension of attachment and together, they were found to explain 40% of the variance in adolescent attachment (Allen et al., 2003).

Using a similar method to Allen et al. (2003), Berger and his colleagues (2005) pinpointed a fifth marker of security, the adolescent's ability to communicate internal state to parents and close peers (Berger, Jodl, Allen, McElhaney & Kuperminc, 2005). In contrast to infancy, Allen et al. (2003) and Berger et al. (2005) highlighted through these studies that determinants of attachment in adolescence are expected to be more interpersonally-oriented in order to be optimal.

In sum, up to the 1990s, attachment researchers developed the theory mainly focusing on the early mother infant relationship, with few studies investigating the attachment relationships in adolescence and even fewer exploring attachment in middle childhood (Kerns, 2008). Bowlby (1973) and Ainsworth et al. (1978) acknowledged the shift in the goal of the attachment system in middle childhood, with a goal-corrected partnership developing emphasizing the availability of attachment figures rather than proximity and the children's awareness of the importance of both their goals and those of the child-caregiver partnership. Furthermore, in middle childhood, cognitive and emotional abilities develop, leading attachment theorists to suggest that children's representations become more complex, allowing the integration of attachment representations in relation to each attachment figure into an overarching internal working model of the attachment (Allen & Lamb, 1999; Bowlby,

1969; Main et al., 1985; Mayseless, 2005). These developments have also been suggested to help the adolescent compromise, negotiate and accept different perspectives which constitute important aspects of healthy conflict resolution strategies (Allen, 2008; Allen & Lamb, 1999). Another important difference between childhood and adolescence is the roles played by adults and peers outside the family, as adolescents spend more time at school and away from home and become more autonomous (Allen, 2008). Based on the changes, the following section explores attachment in adolescence.

2.2.2 Attachment classifications in adolescence: are adolescents more dismissive of parents?

As previously mentioned in Section 2.1, adolescence is a transitional period in which the adolescent might feel that some relationships meet their needs better than parents do, thus leading them to be more angrily preoccupied or more dismissive of parents, but ideally steering them to greater flexibility to re-evaluate attachment relationships within the secure relationship with their parents (Allen & Lamb, 1999)

Studies investigating the parent-adolescent attachment relationship have yielded different and somewhat contradictory results, based on two lines of thought (Buist, DeKovic, Meeus & VanAken, 2002). On the one hand, some researchers have found no significant changes in the attachment relationship from childhood through to adolescence (Bartholomew, 1993; McCormick & Kennedy, 1994). These studies used the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987), a 5-point Likert scale format self-report questionnaire measuring how well attachment figures serve as sources of psychological security. Answers yielded continuous attachment scores which can also be sorted in 3 main dimensions: degree of mutual trust, quality of communication and extent of anger and alienation. In a meta-analysis of 33 studies, this time using the Adult Attachment Interview,

van Ijzendoorn and Bakermans-Kranenburg (1996) found no overrepresentation of any insecure categories in adolescence in a non-clinical sample showing a similar distribution of attachment patterns to both parents: around 25% were dismissing, 60% autonomous and 15% preoccupied (van Ijzendoorn & Bakermans-Kranenburg, 1996). These results have been explained by the notion that attachment is formed in infancy and is not altered by maturation developments (Bowlby, 1969; 1973).

On the other hand, other researchers have concluded that the adolescent's urge for independence and maturity leads to substantial changes in the parent-adolescent relationship, thus impacting the security of attachment throughout these years (Colin, 1996; Paterson, Field & Pryor, 1994). More recently, Allen (2008) explained that the attachment system balances exploration and safety in a homeostatic way. It is therefore expected that, in adolescence, exploration will increase, thus decreasing overt attachment behaviours. This was found in Doyle, Lawford and Markiewicz (2009) who administered a modified version of the Relationship Questionnaire (RQ, Bartholomew & Horowitz, 1991) which yields continuous self-report ratings of the 4 attachment styles and the Who Do You Turn To questionnaire (Who To; Hazan, Hutt, Sturgeon & Brisker, 1991) which consists of nomination questions for attachment-related functions such as proximity-seeking or secure-base. It is noteworthy that the RQ was modified to be adapted to adolescents rather than adults and only correlated moderately with the original version yielding limited reliability and therefore, results should be interpreted carefully. Furthermore, attachment assessment relied on self-reports given that attachment had to be measured twice, at different stages of adolescence. The findings showed that older adolescents tended to be more dismissive which was explained by the researchers as a clear indication of the adolescents' striving for autonomy and self-sufficiency (Doyle et al., 2009).

Even though the questionnaires discussed have shown evidence of validity and reliability, it is important to highlight that this type of measure is not without its limitation. Firstly, answers obtained from questionnaires are limited as they are not open-ended. Secondly, answers on self-report questionnaires are more likely than interviews to be coloured by the participant's mood at a specific-point in time whereas interviews are more likely to provide an overall representation of the attachment relationship, less influenced overall by the participant's mood. Thirdly, it can be argued that they only provide participants' conscious knowledge of their relationships, and less is known about their unconscious processes. Finally, validity of the data collected through questionnaires can be compromised as self-report questionnaires could increase the likelihood of the participants deceiving themselves or the researcher, especially when reporting socially undesirable thoughts or behaviours.

Using an adapted version of the AAI, the Attachment Interview for Childhood and Adolescence (AICA), Ammaniti and his colleagues (2000) were the first to look at the stability and change of attachment classifications between late childhood and adolescence. Compared to the AAI, questions in the AICA were simplified to be more accessible to adolescents and questions only related to parenthood were removed. Like the AAI, the AICA assesses adolescents' overall state of mind in relation to attachment rather than the quality of a specific relationship. It is coded on twelve 9-point scales reflecting the quality of earlier relationships and that of current representations and an overall attachment classification is then assigned to the interview. Ammaniti et al. (2000) found considerable stability of both the dismissing and autonomous categories but specified that more dismissive strategies were observed in adolescence, with more perceived rejection from parents. The authors suggested that these dismissive strategies can be perceived as an adaptive and a necessary step for adolescents as they attempt to separate from their parents and become more autonomous

(Ammaniti, et al., 2000; Fonagy, Steele, Moran, Steele & Higgit, 1993). Another important finding was that although the secure category did show considerable stability, some children who were classified as secure at 10 years of age moved into an insecure category at 14 (Ammaniti et al., 2000). However, it is important to note that no other study known to the author has used the AICA and it can be argued that the findings reported need to be replicated with another population in order to ensure the validity of the results. In line with the findings reported by Ammaniti et al. (2000), Weinfield, Whaley and Egeland (2004) highlighted a significant move towards the dismissing category when comparing attachment continuity between infancy, assessed using the SSn, and adulthood. Using the AAI in higher-risk samples, they suggested that attachment relationship might be harder to maintain when stressors are high (Egeland & Farber, 1984; Fonagy, 2001; Weinfield et al., 2004).

In conclusion, in spite of the developmental changes occurring in adolescence and the growing influence of peers, the caregiver's availability and responsiveness to the adolescent preserves a primary importance in influencing security of parent-child attachment (Kobak & Madsen, 2008). In fact, Allen (2008) suggested that as much as adolescents deny their need for their parents, primary attachment relationships continue in adolescence and develop dramatically through that period as the adolescent is able to reconstruct his/her mental representations of the self and these relationships. A following section will aim at exploring the growing influence of peers in adolescence after exploring differences and similarities between adolescents' attachment to mothers and fathers.

2.2.3 *Attachment to fathers in adolescence*

Lamb (1975) was the first to argue that the role of fathers during children's development has been overlooked in research throughout the years and emphasized the importance of looking at the different influences exerted by mothers and fathers and their

differential impact on child and adolescent development (Lamb & Lewis, 2010; Schoppe-Sullivan, Diener, Mangelsdorf, Brown, McHale & Frosch, 2006). However, the number of studies investigating these differences is low, and even fewer have looked at the interaction between mother-child and father-child attachment relationships and their impact on each other (Braungart-Rieker, Garwood, Powers & Wang, 2001; Eastbrooks & Golberg, 1984; Lundy, 2002; Schoppe-Sullivan et al., 2006).

Parents' interactions with adolescents were found to differ on a variety of fronts, one of which is the topics of discussion shared with each parent (Smetana, Campione-Barr & Metzger, 2006). This could be explained in light of the evidence that mothers and fathers have been found to have different interaction styles with their children, in terms of quality and substance (Lucassen, Tharner, van Ijzendoorn, Bakermans-Kranenburg, Volling, Verhulst, van de Berg & Tiemeier, 2011; Smetana, Campione-Barr & Metzger, 2006). Lucassen et al. (2011) argued that mothers tend to spend more time in direct interaction with the child while fathers' interactions are mostly based on play and goal-oriented actions. Steinberg and Silk (2002) theorized that differences between mothers' and fathers' relationships with adolescents could be related to the perceptions adolescents have of their parents: mothers are seen as providers of emotional support and fathers providers of informational help. This echoes Collins (1991) suggesting that adolescents perceived less reciprocity during interactions with fathers whereas, with mothers, they felt a sense of care and emotional support. It was argued that this rendered the mother the parent with whom more personal matters were easier to discuss (Collins, 1991).

Lewis and Lamb (2003) explained that fathers are not only directly influenced by their children through interacting with them, but fathers' behaviours are also indirectly affected by maternal behaviours. This is in line with other studies that have shown that the father-child relationship is more vulnerable to environmental influences such as the quality of

co-parenting, child gender and temperament than is the mother-child relationship (Doherty, Kouneski & Erickson, 1998; McBride, Schoppe & Rane, 2002).

Studies comparing mother-adolescent and father-adolescent attachment relationships have yielded somewhat inconsistent results. In a meta-analysis, van Ijzendoorn and Bakermans-Kranenburg (1996) concluded that the distribution of adolescent attachment classifications with respect to mother and father, based on the AAI, was very similar. Investigating mediating factors influencing adolescent attachment to mothers and fathers, van Ijzendoorn and Bakermans-Kranenburg (1996) found that concordance between mothers' and fathers' own attachment classifications was a mediating factor explaining the adolescent's similar attachment to both parents. Therefore, adolescents are more likely to have the same attachment classification to mothers and fathers if both parents' attachment styles correspond (van Ijzendoorn & Kranenburg, 1996).

More recently, a study by Doyle et al. (2009) found differences in the quality of attachment to mothers and fathers assessed through a self-report questionnaire, the RQ (Bartholomew & Horowitz, 1991), with adolescents classified as securely attached to mothers and more dismissing and fearful of fathers. This was explained by the idea of an attachment hierarchy, in which the primary caregiver, in most cases the mother, is most likely to be a secure base, with fathers or peers coming second (Doyle et al., 2009; Waters & Cummings, 2000). Similar findings identifying differences between the quality of the mother-adolescent and father-adolescent attachment relationship were highlighted using the AAI. In a longitudinal study looking at attachment to mothers and fathers from toddlerhood to adolescence, Grossmann and his colleagues administered a battery of tests to parents and the offspring from birth to age 16. Measures used included parents' sensitive responsiveness, sensitive and challenging interactions during play, the SSn and the AAI. The researchers were able to identify fathers' unique contribution to emotional security: mothers provide

soothing and comfort in times of distress whereas fathers provide sensitive support (Grossmann, Grossmann, Fremmer-Bombik, Kindler, Scheuerer-Englisch & Zimmermann, 2002). In sum, it is important to look at adolescent attachment to mothers and fathers as distinct but nevertheless related in order to understand the interaction and the impact they have on one another (Buist et al., 2002; Patterson et al., 1994).

As previously presented in Section 2.2.2, peers play a more important role in adolescence (Allen, 2008; Blos, 1967). The influence of peers and the effect of peers' relationships on adolescent attachment to parents is detailed next.

2.2.4 The growing influence of peers

Understanding changes in the attachment system in adolescence is rendered more complicated by the growing influence of peers who tend to become sources of intimacy and feedback about social behaviour for the remainder of the lifespan (Allen, 2008). The separation from the parents can create a sensation of aloneness, leading the adolescent to turn to peers and contemporaries in order to create relationships in a different way (Blos, 1967). Adults outside the family may be idealized to represent a narcissistic ego ideal, with a peer group providing support to the adolescent as he/she identifies and spends time with people who have shared ideas and goals, enabling the young adult to try new roles and identities within the group (Brandt, 1977).

Based on these theories, Laible, Carlo and Raffaelli (2000) investigated the association between adolescent attachment classifications, the quality of relationships with peers and adolescent adjustment. They administered a self-report questionnaire to adolescents, the IPPA (Armsden & Greenberg, 1987) to measure the quality of attachment relationships with parents and peers. Adolescent adjustment was measured using a battery of self-report questionnaires including the Child Depression Inventory (Kovaca & Beck, 1977),

the Interpersonal Reactivity Questionnaire (Davis, 1983) and other measures of anxiety and aggression. They concluded that even though parents and peers may serve similar functions, adolescents who scored high for both relationships showed the best pattern of adjustment. This finding is in line with attachment theorists who have argued that being securely attached to more than one attachment figure is more beneficial for child development and adjustment than a single secure relationship (Howes, 1999). However, it is important to note that measures only included self-report questionnaires which could have influenced the correlation found between the two scores (see Section 2.2.2, p.61, for a summary of the disadvantages of self-report questionnaires).

Laible et al. (2000) also found that the quality of the adolescents' relationship with peers is relatively more influential on adolescent adjustment than attachment to parents, echoing previous findings by Furman and Buhrmester (1992). The latter administered a questionnaire, the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985), assessing adolescents' perceptions of their relationships with significant others to fourth graders, seventh graders and tenth graders. They found that whereas fourth graders perceived mothers and fathers as providers of support, friends and romantic partners moved up in rank as the adolescents grew older (Furman & Buhrmester, 1992). This is supported by the ideas presented in previous sections suggesting that adolescents go through a process of separation-individuation (Blos, 1967) and have a greater desire for autonomy (Allen, 2008) which could lead them to turn to peers rather than parents (Furman & Buhrmester, 1992; Laible et al., 2000).

Finally, using the IPPA, Nickerson and Nagle (2005) compared adolescents' attachment to parents and peers and concluded that parents remained the secure base and the main attachment figure, but that peers fulfilled this role when attachment to parents tended to be less secure (Nickerson & Nagle, 2004; 2005).

Before moving to a detailed exploration of the unique and special case of twins' relationships with their parents and differential parenting of twins, as the sample in this study consists of twins and their parents, the next section explores adolescent siblings' relations in the family.

2.2.5 Sibling relationships within the family

As previously illustrated in the previous section, peers play an increasingly important role in adolescence as the adolescent struggles to gain greater independence from parents and form his/her own identity away from the family (Blos, 1967; Furman & Buhrmester, 1992; Laible et al., 2000). Laible et al. (2000) found that adolescents were more likely to score highly on questionnaires assessing the quality of their relationship with peers during this stage as these relationships provide the possibility to discuss topics and share concerns, thus playing on the adolescents' emerging autonomy and decreasing reliance on parents. It can therefore be argued that siblings close in age could play the same role as peers and form a secure base to each other that is different from parents.

Using a battery of self-report questionnaires assessing the level of commitment between siblings, the level of affectionate communication and communication-based emotional support, Rittenour, Myers & Brann (2007) established that in adolescence, siblings tend to form alliances with each other. The authors argued that this suggests that the sibling-relationship becomes more voluntary as they provide companionship and emotional support for each other, and a coalition against the parents could emerge in some cases. This echoes previous findings by Cummings and Smith (1989) showing that in situations of family conflict and marital unhappiness, adolescents tend to respond to parental anger by providing more caregiving towards younger siblings.

Some studies have investigated the impact of the quality of sibling relations on psychological adjustment. Scholars have repeatedly emphasized the role of siblings in adolescence in providing support to overcome the distress associated with this phase (Brody, 1998; Teti, 2002; Volling, 2003). Updegraff and her colleagues found that the quality of siblings' relationships to each other, measured using self-report measures assessing intimacy levels and the degree of negativity between them, often provided a buffer to psychosocial adjustment in times of parental stress, and mediated peer acceptance and supportive friendships in adolescence (Updegraff, Thayer, Whiteman, Denning & McHale, 2005).

Exploring parents' perceptions of siblings in the family, Schachter and her colleagues (Schachter, 1985; Schachter, Shore, Feldman-Rotman, Marquis & Campbell, 1976) presented the sibling de-identification theory. They stated that parental perceptions of children's attributes and their labelling as good versus bad, creative versus intellectual, academic versus non-academic or any dichotomy based on personality traits or preferences can be beneficial in families as it helps lessen family conflicts and sibling rivalry (Schachter, 1985; Schachter et al., 1976). However, in clinical cases, Schachter (1985) suggested that sibling de-identification is likely to lead to psychopathology as the two poles of the dichotomy are taken to the extreme and could form the basis of a self-fulfilling prophecy.

Later, Brody (1998) presented the concept of differential parenting of siblings and twins, hypothesized to "compromise sibling relationships when children interpret their parents' differential behaviour as an indication that their parents are less concerned about them or that they are less worthy of love" (Brody, 1998, p. 8). It was shown that, when parents' behaviours were unequal between siblings, the latter were more likely to display more signs of rivalry and anger (Brody et al., 1994). A recent study by Updegraff et al. (2005) presented in Section 2.3.1, suggested that adolescents were more likely to react to differential parenting than younger children were (Updegraff et al., 2005).

Feinberg and his colleagues explained how sibling experiences and individual functioning are rooted in the family system as a whole. They posited the sibling comparison theory, which they defined as the process through which an adolescent uses a sibling as a basis of comparison and self-evaluation (Feinberg, Neiderhiser, Reiss, Hetherington, Plomin & Simmens, 2000). Based on this theory, they interviewed first- and second- born siblings who were asked to report on their dyadic family relationships. The authors illustrated how adolescents were affected by their own treatment by the parents but also by that of their siblings: if an adolescent perceived his/her sibling as being more negatively parented, he/she was more likely to demonstrate more positive adjustment (Feinberg, McHale, Crouter & Cumsille, 2003). An alternative hypothesis could be put forward, that, in cases where there is little differential parenting and negative parenting is directed towards both siblings, siblings are likely to turn to each other for compensatory warmth and support (Boer, Goedhart & Treffers, 1992).

Richmond, Stocker & Rienks (2005) assessed sibling relationships quality using a self-report questionnaire, the Sibling Relationship Questionnaire (Furman & Buhrmester, 1985) and used the Differential Experience questionnaire (Daniels & Plomin, 1985) to assess their perceptions of parents' differential treatment. The authors concluded that children are sensitive to changes within the sibling relationship which in turn affects psychological adjustment in other situations and leads to increasing psychological difficulties. More specifically, perceived support from siblings and a less conflictual relationship between them was associated with better adjustment, measured using the Child Behaviour Checklist (Achenbach, 1991), whereas a decrease in the quality of siblings' relationship led to an increase of depression over time (Richmond et al., 2005). These findings echo Brody's (1998) idea that the unfavoured adolescent receiving less warmth and support was more

likely to create a false sense of self with feelings of inadequacy and rejection manifesting as anger towards the preferred adolescent.

Based on these findings in relation to siblings and their support to each other acting as a buffer in times of stress (Cummings & Smith, 1989; Richmond et al., 2005), and based on the influence of one sibling's relationship to parents on the other sibling (Feinberg et al., 2000; Richmond et al., 2005), it could be suggested that siblings' perception of the quality of their relationship with each other is associated with their attachment classification to their parent. The next section will elaborate on these themes presented in this section, focusing on the special case of identical twins. It will detail the impact of parental differential treatment on twins as well as explore the unique relationship between identical twins and its impact on separation and individuation from the family in adolescence.

2.3 Twins' relationships and attachment to parents in adolescence

2.3.1 Twin differentiation in adolescence and differential parenting

Scholars have been attempting to understand the process of identity formation in twins and Leonard (1961) explained that twins' differentiation and delineation of their own personalities is delayed as their sense of self and boundaries is blurred from a very young age. Burlingham (1949) further postulated that twins lack a sense of uniqueness and look in each other for parts they feel are missing in them. She also suggested that they tend to rely more on the mothers' perceptions of them in order to delineate their separate identities. Orr (1941) gave the example of twins who had difficulty detaching and finding their own self and looked for a "twin" in any new situation they were facing alone, thus attempting to recreate a "twinship" situation (cited in Miliora, 2003). According to these analysts, the role of parents is crucial in identifying with each twin differently and emphasizing the twins' separateness

from birth onwards in order to optimize their potential of achieving autonomy and their own identity (Burlingham, 1946; Miliora, 2003).

It can therefore be argued that applying the de-identification theory to identical twins become more difficult. It might be hypothesized that identical twins are more likely to de-identify given that parents may compare them to each other more than non-identical twins or other siblings (McCartney et al., 1990).. As Leonard (1961) explained, since infancy, identical twins are continuously within each others' range of perception and have more contact with each other than with adults (Leonard, 1961). More recently, Penninkilampi-Kerola, Moilanen and Kaprio (2005) added that the dyadic relationship between mother and infant becomes replaced by a triadic one in the case of twins, in which the basic dyadic relation is between the two infants. This is in line with Burlingham's (1963) longitudinal study describing how, in adolescence, identical twin boys not only need to detach from the mother, but also from each other. She illustrated how the twins took their resentment out on each other instead of negotiating detachment from the mother, thus leading to the development of a false sense of self based on the mirror image of each other.

As they grow up, identical twins sometimes fail to develop their separate identities. Burlingham (1946) put forward the question as to whether this is due to the twinship or to the attitude parents, more specifically mothers, have towards them by treating them as "the twins" or individuals with separate and different needs. Burlingham (1952) underlined the importance of the mother creating a one-to-one relationship with each one of the twins, a process made easier when the twins are more different to one another. This will facilitate the clear delineation of each of their personas, given that the more alike the twins, the more the tendency for the environment to treat them that way, which is detrimental to the development of individuality. The task of the mother is therefore to be able to identify with two infants, and help them move from primary inter-twin identification into object relations. Parents of

twins are therefore faced with the task of sharing their attention between both twins in order to meet the separate individual needs of each (Rutter & Redshaw, 1991). However, what is the impact of twins perceiving differential treatment or favouring from their parents?

Sheehan and Noller (2002) investigated the effect of mothers' favouring of one of the twins over the other on attachment classification and adolescent adjustment. Twins were asked to complete a booklet of questionnaires including the Sibling Inventory of Differential Experience (Daniels & Plomin, 1985), the Attachment Style Questionnaire (Feeney, Noller & Hanrahan, 1994), the Coopersmith Self-Esteem Inventory (Coopersmith, 1975) and the trait measure of the State-Trait Anxiety scale (Spielberger, Gorsuch & Lushene, 1968). As expected, they reported that, a twin who perceived the mother as favouring his/her sibling was likely to perceive receiving less warmth and affection from the mother and perceived the mother as unsupportive and unavailable. In line with Bowlby's and Ainsworth's research, they found that the less favoured adolescent was more likely to be classified as insecure (Ainsworth et al., 1978; Sheehan & Noller, 2002). Insecure attachment to the mother was hence found to be associated with the adolescent's psychosocial adjustment, and the less favoured child showed signs of low confidence and high anxiety (Sheehan & Noller, 2002). This is in line with a previous study by Pike, Reiss, Hetherington and Plomin (1996) involving twin adolescents that found that adolescents perceiving paternal favouritism of one twin over the other led to the development of depressive symptoms, antisocial and externalizing behaviours in the less-favoured twin.

The impact of fathers' favouring a twin was found to be different as it affected the adolescent's self-esteem. Adolescents who reported receiving more paternal control were more likely to have higher self-esteem which was explained by the authors as the adolescents' expectation and need for guidance rather than affection from the father, which is

in line with researchers who described the differential roles of mothers and fathers in adolescence (Sheehan & Noller, 2002).

In sum, the findings to date suggest that the twins' perceptions of parental differential treatment have an impact on the family system as a whole. A sensitive, attentive and responsive parent who can respond in different ways to each child, keeping in mind each sibling's needs, is likely to minimize the likelihood of them perceiving differential treatment in favour of the sibling (Brody, 1998).

Previous sections have detailed the general relationship between parents and siblings within the family. The next section will elaborate on a specific relationship, the attachment relationship, between adolescent siblings/twins and their parents and will present findings related to determinants of attachment from a behavioural genetics point of view as well as the concordance and discordance of adolescent twins' attachment to their parents.

2.3.2 Determinants of adolescent attachment from a behavioural genetics point of view and the influence of non-shared environmental factors

It is noteworthy to remind the reader that, from a behavioural genetics point of view, as explained in Section 1.2.5, the nature of influences on twins' development can be divided into 3 areas: a) genetic influences, b) shared environmental influences which are factors common to both twins and c) non-shared environmental influences which are unique or specific to each child in the family such as peer relationships or differential parenting (O'Connor et al., 1995). In the first and only study investigating the behavioural genetics of attachment in adolescence, Fearon, Shmueli-Goetz, Viding, Fonagy and Plomin (2013) investigated how much of the variance in adolescent attachment can be attributed to genes and to environmental influences. They found that, contrary to findings in infancy, attachment in adolescence is largely influenced by genes, with the remaining variance attributed to non-

shared environmental factors. They reported that, in a sample of 551 twin pairs, the estimates of heritability obtained for the two-way attachment classifications were around 35% and they attributed the remainder of the variance to non-shared environmental influences and measurement error. Findings also suggested that attachment security in adolescence emerges from the interplay between genes and the caregiving environment (Fearon et al., 2013).

Based on the finding that non-shared environmental factors influence attachment classifications in adolescence (Fearon et al., 2013), it is possible to hypothesize that, children and adolescents in the same family can have different relationships and attachment styles to their parents (Plomin, Asbury, Dip & Dunn, 2001). The remainder of this section aims at investigating determinants of discordance of attachment to parents, focusing on non-shared environmental influences.

Using the AAI to assess attachment, Kiang and Furman (2007) investigated concordance and discordance of attachment in adolescent twins, focussing on the impact of siblings' perceptions of closeness to each parent on adolescent attachment. They found a significant moderate concordance in twins' attachment to parents when twins felt as close to both parents. However, when one sibling stated he/she was closer to one parent, results showed a significant discordance of attachment classifications. Therefore, it was suggested that adolescents' perceptions of their relationship with their parents, constituting non-shared environmental influences as they are specific to each sibling, can be considered as one of the determinants of discordance of attachment between twins (Kiang & Furman, 2007; McCartney et al., 1990).

Other potential non-shared environmental factors that may explain twins' discordance of attachment are related to the emotional, cognitive and social changes occurring during this stage of development (see Section 2.1.2). For instance, it was suggested that adolescent twins tend to become more different as they grow older, which may be a sign of them seeking to

differentiate themselves from each other, thus affecting the parenting they received and potentially the attachment relationship with their parents (Caspi, Herbener & Ozer, 1992; Kiang & Furman, 2007). In addition, peers and experiences outside the family play a bigger role in adolescence, especially if twins have different sets of friends which may constitute another source of non-shared environmental influences (Plomin et al., 2001). It is therefore important to examine the effect of the quality of siblings' and twins' relationship to each other, as well as that of the relationship to peers, as potential non-shared environmental influences and determinants of the discordance of attachment with parents.

Finally, the only studies investigating the influence of differential parenting and sensitivity on attachment were conducted in infancy (see Section 1.2.5). They highlighted that non-shared environmental influences, mainly differential parenting and sensitivity, were considered to be the main determinants of the discordance of attachment (Bokhorst, Bakermans-Kranenburg, Fearon, van Ijzendoorn, Fonagy & Schuengel, 2003; Fearon et al., 2006). However, no study to date has investigated this association in adolescence.

Before presenting the hypotheses of this study, the last section summarizes the few studies investigating parental mentalization in middle childhood and adolescence as well as the role of paternal mentalizing capacities.

2.4 Parental mentalization of middle childhood and adolescence

Most of the research on parental mentalization has focused on parents of infants and young children, with very few looking at parental mentalization of middle childhood and only one investigated parental RF in adolescence (Arnott & Meins, 2007; Meins et al., 2001; Benbassat & Priel, 2011; Slade et al., 2005, de Wolff & van Ijzendoorn, 1997). However, parental mentalizing capacities may also be important in adolescence as they might help the parent understand the changes occurring in the adolescents (Benbassat & Priel, 2011). It can

be hypothesized that this could facilitate the adolescents' experiences during this period, as well as lead to a better understanding of feelings and thoughts underlying their behaviours (Benbassat & Priel, 2011).

Using the maternal accuracy paradigm previously described in Section 1.2.4, Sharp et al. (2006) were the first to assess the relationship between maternal RF and children's socio-emotional development in middle childhood. They concluded that maternal accuracy was a predictor of the child's psychosocial outcomes at 9 years of age and that low maternal accuracy was associated with an unrealistic image of the child.

Ensink et al. (submitted) were the first to look at parents' reflective functioning (RF) scores in relation to the mentalizing capacities of their children aged between the ages of 8 and 12. Parental RF was measured using the PDI (see Section 1.2.2, p. 36) and children's mentalizing capacities were assessed by coding the Child Attachment Interview (CAI; Shmueli-Goetz, Target, Fonagy & Datta, 2008) on RF, using a scoring system based on the one used to code the AAI on RF. The CAI has been designed to assess attachment in children and adolescents aged between 8 and 16 years. It is based on the AAI but focuses on current attachment relationships and recent events rather than representations of earlier attachment relationships. It is coded based on nine scales, some of which are coded separately with regards to each attachment relationship, and yields a broad attachment classification to each attachment figure. It also includes behavioural codings which have been deemed important to differentiate categories of insecurity (Shmueli-Goetz et al., 2008). Ensink et al. (submitted) found a significant moderate correlation between parents' and children's RF capacities. The authors suggested that this association was likely to be mediated by the mother's ability to understand and make sense of attachment related experiences.

More recently, Benbassat and Priel (2011) assessed RF in adolescents aged between 14 and 18 and their parents. The authors measured parental mentalizing capacities using a

short version of the PDI which they developed for the study. Adolescent RF was assessed using a semi-structured interview developed for the study using questions from the CAI and other validated interviews. Parents' and adolescents' interviews were coded on RF based on a scoring system adapted from the one used for the AAI. Results showed a strong association between parents' and adolescents' RF scores consistent with previous studies finding an association between parents' and children's mentalizing capacities in younger years (Ensink et al., submitted; Fonagy et al., 1997). They also concluded that parental RF mediated the association between parenting behaviours, such as parental warmth and control, and adolescent self perception (Benbassat & Priel, 2011). When looking at the separate effects of maternal RF and paternal RF on the adolescent, it was concluded that fathers facilitated the separation process by promoting adolescent autonomy and helping to discuss conflicts within the parent-adolescent relationship. Furthermore, the authors explained that higher RF capacities helped fathers remain emotionally engaged within the family life and increased their tendency to avoid conflict and negative feelings (Benbassat & Priel, 2011). However, the relation between parental RF and adolescent attachment classification remains unexamined.

In sum, this chapter opened with a presentation of the major changes occurring in adolescence and investigated the different determinants of attachment throughout this phase, as well as the growing reliance on peers or siblings and their crucial roles in this developmental period (Furman & Buhrmester, 1992; Laible et al., 2000). This led to a presentation of twin relationship and differentiation in adolescence and the growing influences of child-specific and non-shared environmental factors on twins' development and de-identification from parents and from each other (Burlingham, 1968; Fearon et al., 2013). This chapter closed with an explanation of the importance of parental mentalization in

helping the adolescent understand and reflect upon the changes occurring this stage of development without being overwhelmed. The paucity of studies investigating this association was also highlighted (Benbassat & Priel, 2011; Ensink et al., submitted),

Based on the literature presented in the previous chapters, focusing on the importance of parental reflective functioning in helping the infant overcome distress and understand mental states underlying behaviours (Fonagy et al., 1997, see Section 1.2.2) and the idea that adolescence has been described as a time of emotional and cognitive changes that could lead the child into states of distress (Allen, 2008; Blos, 1967, see Section 2.1), it would be expected to find an association between parental RF and attachment in adolescence.

The first aim of this research was to investigate, on an inter-familial level, whether there is a shared influence on adolescent attachment from the overall level of both, maternal and paternal RF. Behavioural genetics studies in infancy concluded that maternal sensitivity, a similar construct to RF, mostly constituted a shared influence on attachment, as mothers tended to be as sensitive or insensitive to both twins (Fearon et al., 2006; Roisman & Fraley, 2008, see Section 1.2.5). This is in keeping with one of the fundamental premises of attachment theory suggesting that parents' pattern of behaviours may be shared by children in one family as they are governed by the parents' own internal working model of attachment (Fearon et al., 2006; van Ijzendoorn, 1995). *It was therefore expected to identify a shared influence on adolescent attachment from the overall level of parental RF.*

In addition, from a behavioural genetic point of view, Fearon et al. (2006) and Roisman et al. (2008) did not look at the differential influence of mothers' and fathers' sensitivity and parenting quality on infant attachment. However, based on studies in adolescence suggesting that mothers and fathers have distinct relationships with their adolescents (Buist et al., 2002; Patterson et al., 1994) and that they affect different areas of

adolescent development and adjustment (Benbsassat & Priel, 2011; Grossmann et al., 2002; see Sections 2.2.3 and 2.4), it is expected that both, maternal and paternal RF would be associated with adolescent attachment.

The second aim of this study was to explore whether additional shared family factors or adolescent characteristics, such as adolescent gender, family income, parental education and the number of siblings in the family (Cutting & Dunn, 1999; Fearon et al., 2006) have a direct influence on parental RF in order to get a more complete picture of factors affecting the relationship between adolescent attachment and parental RF.

Focusing on an intra-familial level analysis, *the third aim of this study was to investigate whether differences in a parent's RF about each twin, examining parental RF of mothers and fathers separately, constitute a non-shared environmental influence on adolescent attachment. Additionally, differences in the quality of the twins' relationships to peers and differences in the quality of the twins' relationship to each other were examined as potential factors, linked to adolescent attachment.* As described in Sections 2.2.5 and 2.3.1, adolescents are more likely than younger children to react to differential parenting (Updegraff et al., 2005). The evidence suggests that siblings who perceive less warmth and support were more likely to be classified as insecurely attached or to exhibit signs of externalizing behaviours (Brody, 1998; Pike et al., 1996; Richmond et al., 2005; Sheehan & Noller, 2002). From a behavioural genetics point of view, Fearon et al. (2006) had highlighted that, in cases of discordant attachment between the twins, maternal sensitivity was likely to partly have a non-shared environmental influence on attachment (see Section 1.2.5). *It was therefore hypothesized that differences in parental RF are associated with differences in attachment classifications.*

It is also noteworthy that non-shared environmental factors, such as relationships with peers and siblings, were found to play a larger role in adolescence (Kiang & Furman, 2007;

Plomin et al., 2001; Sheehan & Noller, 2002, see Section 2.2.5) and that the quality of siblings' attachment relationships to their parents was found to be associated with sibling support and the quality of their relationship to each other (Brody, 1998; Sheehan & Noller, 2002, see Section 2.2.5 and 2.3.1). *It was therefore predicted that differences in the twins' perceptions of the quality of their relationships to peers and to each other would be associated with differences in their attachment relationship to their parents.*

Based on Fearon et al.'s (2013) finding that genes and non-shared environmental factors are influential in adolescence (see Section 2.3.2), and the fact that the sample consisted of identical twins (see Chapter 3), *the fourth aim of this study was to examine, through a case study presented in Chapter 5, additional child-specific factors that could be associated with attachment discordance between identical twins.* These include twins' perceptions of closeness to a parent (Kiang & Furman, 2007), twins' de-identification from each other (Burlingham, 1952; Caspi et al., 1992) and others discussed in detail in Chapter 5.

The next chapter aims at detailing the method used in this study in order to test the hypotheses as presented above.

Chapter 3: Methods

3.1 Design

3.1.1 *The MZ twin model and its limitations*

In the last three decades, researchers have turned their attention from genetic influences on development to focus on environmental factors and their interactional effect with genetically governed traits (Barsky, 2010; Plomin & Colledge, 2001). These environmental influences were divided into shared environmental variance which leads to similarities between siblings within the same family, and non-shared environmental variance which is child-specific and governs variation between siblings in the same family (Barsky, 2010). Fearon, Shmueli-Goetz, Viding, Fonagy and Plomin (2013) used a quantitative genetic model and ran model-fitting analyses in order to investigate the proportion of variance in attachment that is attributable to genes, shared environment and non-shared environment. They showed that, in a sample of 551 adolescent-twin pairs, heritability and non-shared environmental factors were influential on twins' attachment, explaining 35% and 65% of the variance respectively, with the effect of shared environmental factors close to zero. Furthermore, Neale and Cardon (1992) emphasized that the most direct measurement of non-shared environmental influences are differences between identical twin pairs given that they share the same genetic background and shared environment. Therefore, any discordance found would be due to child-specific experiences (Asbury, Dunn, Pie & Plomin, 2003; Plomin & Daniels, 1987; Vitaro, Brendgen & Arseneault, 2009).

One of the methods used to assess non-shared environmental factors in twin pairs is the "difference in scores" strategy which involves computing a new variable by subtracting twin 1's scores from twin 2's scores on an environmental factor and then conducting the appropriate analyses to correlate it with the relative difference between twin 1's scores and

twin 2's on the outcome measure (Pike, Reiss, Hetherington & Plomin, 1996; Vitaro et al., 2009). A correlation of 1 would mean that knowing the twins' discrepancy for the environmental factor allows the researchers to predict the discrepancy for the outcome measure (Pike et al., 1996). This method has been successfully used in previous quantitative analysis with large samples looking at discrepancies in differential parenting and its correlation with differences in twins' adjustment (Asbury et al., 2003; Asbury, Dunn & Plomin, 2006; Caspi, Moffitt, Morgan, Rutter, Taylor & Arseneault, 2004; Pike et al., 1996).

For instance, Asbury et al. (2003) used the within-pair difference scores method by first subtracting the parent's score about one twin from that about the other on 4 behavioural measures: anxiety, pro-social behaviour, hyperactivity and conduct problems. This difference in twins' behaviours was then correlated with the difference in parenting scores about each twin on harsh parental discipline and negative parental feelings. They found that differences in parenting significantly correlated with differences in perceived adolescent behaviour, with higher effect sizes in cases of extreme discordance between the scores. However, these findings should be interpreted with some limitations in mind. Asbury and her colleagues highlighted that parents reported their parenting behaviours as well as their children's which could have inflated the associations found between the two variables. They emphasized the need for multiple informants in order to obtain a more realistic correlation between the variables. The authors also suggested the need to move from using questionnaires towards a more comprehensive approach using interviews as it might help develop hypotheses about other sources of non-shared environmental influences and how they influence twins' behaviours (Asbury et al., 2003; Plomin, Asbury & Dunn, 2001).

With these limitations in mind, Asbury et al. (2006) conducted interviews with parents of twins and, by contrasting both interviews, they observed six potential sources of non-shared environmental influences relating to anxiety in middle-childhood: negative school

experiences, twin comparison, illness and accidents, traumatic neonatal life events, parent-child relationships and peer rejection. It is noteworthy that the current study attempted to account for these influences, however, data regarding illness, accidents and traumatic life events was not accessible to the researcher. Twin comparison and parent-child relationships will be investigated in a case study in Chapter 5.

Caspi et al. (2004) measured maternal expressed emotion by coding mothers' interviews about twins on positive/negative comments, negativity and warmth. They used the twin differences method to investigate the association between the difference in mothers' scores about each twin and the difference in twins' scores on the Child Behaviour Checklist (CBCL; Achenbach, 1991). In line with Asbury et al.'s (2003) findings, they found that the relationship between the two variables was unlikely to be genetically mediated as they found that differences in maternal expressed emotion predicted the difference in twins' scores on the CBCL. Besides limitations related to the twin design, the authors noted others which were specific to their study. First, they highlighted the possibility that other non-shared environmental factors which were not measured could have influenced the association between the two variables. Second, they argued that the measure used yielded limited information as it only consisted of a five-minute speech sample. Finally, they solely measured maternal differential expressed emotion and not fathers', which, they argued could account for additional variation in children's differential outcomes.

3.1.2 *Design of the study*

This study is a monozygotic (MZ) twin study aimed at testing environmental influences and investigating the effect of non-shared environmental factors on parents' and twins' behaviours and perceptions while controlling for any genetic contribution.

As this research was designed, some of the limitations and gaps highlighted in previous studies were taken into account. Asbury et al. (2006) highlighted the importance of using interviews rather than questionnaires in order to pinpoint potential non-shared environmental influences. This echoes Reiss, Neiderhiser, Hetherington and Plomin's (2000) idea, emphasizing the importance of using interview narratives to investigate non-shared environmental influences. They identified a difference between non-shared environment and non-shared representations and emphasized that the latter seemed to be more influential in identifying differences between identical twins. More specifically, Polkinghorne (1988) and Mc Guire (2001) stated that representations identified in narratives are a primary source of individual differences. Therefore, in this study, interviews looking at parental representations of identical twins were used in order to look at the parents' perceptions of the twins' emotional needs. Results were interpreted quantitatively, followed by a more in depth analysis of the narratives in order to try to pinpoint individual differences in parental mentalization of twins.

In addition, when looking at intra-familial experiences, Vitaro et al. (2009) highlighted the importance of having different raters for each twin in order not to accentuate bias and similarities between them (Vitaro et al., 2009). Therefore, in this research, different informants rated twins' and parents' variables in order to further reduce this bias.

However, it is noteworthy that some limitations of the within-twin difference design could not be addressed. Rutter Murray, Pickles and Eaves (2001) and Asbury et al. (2006) highlighted some of these limitations. Firstly, they explained that, unless longitudinal studies

are conducted comparing the effects of the environment at two points in time, findings cannot differentiate between environmental effects on the participant and participant effects on the environment. Secondly, given that twins are the same age, they are more likely than singletons or siblings to share the same experiences in the family, at school or with peers. Furthermore, identical twins share the same genetic background, therefore psychosocial experiences influenced by the interaction between genes and the environment tend to be more similar in MZ twins than singletons or siblings. This could limit the generalizability of the results to a population of singletons. A limitation specific to the MZ twin difference design was identified with regards to the nature of the outcome variables used. Generally, continuous variables have been found to provide the optimal variance measurement (Vitaro et al., 2009). In the case of categorical variables, the likelihood of finding a sufficient number of discordant MZ twin is low, which could compromise statistical power. Therefore, Vitaro et al. (2009) suggested that the use of dimensional variables is preferable in order to generate enough within-pair variability. However, they emphasized that the choice of variables should ultimately be based on theoretical considerations rather than methodological constraints. In order to overcome this limitation in this study, parent and adolescent variables chosen yielded continuous scores.

In sum, the MZ twin design is not without its limitations (Oliver, Pike & Plomin, 2008; Rutter et al., 2001; Vitaro et al., 2009). However, when the appropriate precautions are taken into account in the design of the study and the interpretation of the results, this method provides a unique opportunity to explore the role of both shared and non-shared environmental influences.

3.2 Sample

The twins and their families were part of the Twin Early Development Study (TEDS), an ongoing longitudinal study consisting of 16 810 twin pairs born between 1994 and 1996 as identified by the Office for National Statistics (ONS) from their children's birth records (Pike, Iervolino, Eley, Price & Plomin, 2006). Zygosity was established through parental report questionnaires. Ratings led to 95% unambiguous identification when validated against zygosity determined by DNA markers (Price, Freeman, Craig, Petrill, Ebersole & Plomin, 2000).

From the initial TEDS sample, 1000 families were recruited for the project run at the Anna Freud Centre (AFC) and Institute of Psychiatry (IoP), based on their location in London and the home-counties. The project aimed to look at the behavioural genetics of attachment in adolescence, using the Child Attachment Interview (CAI; Shmueli-Goetz et al., 2008; Target, Fonagy & Shmueli-Goetz, 2003). Given the size of the participating TEDS cohort (2374 families within a 1 hour travel-radius of London), a stratified sampling strategy was employed so that the study sample matches the distribution of socio-economic circumstances found in the community at large, based on census data and existing socio-economic data on TEDS families.

For the purpose of this study, the author selected families of identical twin pairs (MZ) who had completed the CAI through the study at the AFC/IoP within the past 10 months. Because of limited funding, the first families contacted were not randomly selected; instead, families contacted were exclusively from London in the first instance. Subsequent funding was received which allowed the researcher to travel within an hour and a half from London to interview the majority of the families. Previously excluded cases were therefore included in the sample. The inclusion criteria for this study were a) intact families, b) living in London and the home counties and c) twins living at home with parents.

This sample consisted of 100 pairs of MZ twins and their parents. Twins were between 14 and 16 years of age. Fifty pairs of twins were boys and 50 girls. Table 1 provides descriptive statistics of the demographics of this sample.

Comparing the sample's demographics with data from the general population in England, Census data showed that, with regards to ethnicity, this sample is representative of the general population, as 88% reported being White British in the 2011 report. It is noteworthy that the sample was collected from London and the home counties where the percentage of White British is lower, which could reflect a middle-class/high SES bias. Furthermore, income and education levels in the sample did not match data collected by the Office for National Statistics (ONS). In 2009, they reported that 58% of families in England had a yearly income between 0-30k, 22% earned between 30-50k and 20% more than 50k. With regards to educational attainment, the ONS found that, in 2011, 48% of 16- to 64-year olds ended education at GCSE level or A-level and 34% completed a further degree or postgraduate studies. Therefore, it can be argued that the sample in this study has a higher SES and educational attainment which will be taken into account when interpreting the results.

Table 1

Sample's Demographics

Twins' age	
14 years	3%
15 years	77%
16 years	20%
Twins' Gender	
Male	50%
Female	50%
Ethnicity	
White British	85%
Other	12%
Family Income	
0-30k	13%
30-50k	23%
50k +	60%
Father's employment	
Unemployed	5%
Part-time	3%
Full-time	70%
Self-employed	19%
Mother's employment	
Unemployed	8%
Part-time	51%
Full-time	24%
Self-employed	14%
Father's education	
None	4%
GCSE	20%
A-level	10%
NVQ/degree	40%
Postgraduate	9%
Other	13%
Mother's education	
None	4%
GCSE	19%
A-level	12%
NVQ/degree	41%
Postgraduate	11%
Other	10%

3.3 Measures

3.3.1 Parents

Parent Development Interview (PDI) coded on Reflective Functioning (RF)

The Parent Development Interview (PDI; Aber, Slade, Berger, Bresgi, and Kaplan, 1985) was initially devised to assess the parents' representations of a) themselves as parents, b) their children, and c) the relationship between themselves and their child. The PDI is an hour and a half semi-structured interview, composed of 45 questions.

Ten years ago, the PDI was adapted by Arietta Slade's group (PDI-R; Slade, Aber, Bresgi, Berger & Kaplan, 2004) (see Appendix 1.1) assisted by Peter Fonagy and Mary Target to be coded for Reflective Functioning (RF), defined as the ability to understand the self and others by inferring the mental states behind overt behaviours (Slade, Bernbach, Grienberger, Levy & Locker, 2004). During the interview, parents are called to draw upon representations of their feelings, their child's feelings and the relationship, which taken together, give a stable, cross-situational index of mentalizing capacities (Slade et al., 2004). High PDI-RF scores reflect the parents' strong capacity to be aware of their children's mental states and their grasp of the interplay between their own mental states and those of their offspring (Slade et al., 2004).

The PDI was chosen as a measure to evaluate parental reflective functioning as the questions pull from commonly experienced feelings which can be generalized to give a stable and cross-situational representation of the relationship between parent and child rather than just a representation of the child or self (Slade et al, 1999; 2005). This is of great importance given the age of the children in this study as the relationship between parent and adolescent is undergoing changes during this stage of development. Therefore, the PDI gives the researcher the opportunity to estimate the parent's mentalizing capacities drawn from episodes of interactions. This allows the researcher "to evaluate the caregiver's ability to openly reflect

on complex and often uncomfortable mental states without the over-intrusion or the breakdown of defensive processes” (Conway & Holmes, 2004; Grienberger & Slade, 2005, p.307).

Four advanced doctoral candidates in clinical psychology were trained to reliability and then coded the PDI on RF and excellent inter-rater reliability of the RF scale was achieved for both individual passages and the narrative as a whole, with a correlation varying between .78 and .95, with an average of .88 for individual passages and .87 for the overall scoring of the interview (Slade, Grienberger, Bernbach, Levy, & Locker, 2005).

Slade et al. (2004) provided validation of the construct of parental RF and its predictive validity of parent and infant attachment security. Forty women were administered the AAI during pregnancy, the PDI when the infant was 10 months of age and the SSn was administered when the baby was 14 month-old. Findings showed that maternal RF measured using the PDI was predictive of maternal attachment status and infant attachment at 14 months of age. Autonomous mothers had the highest RF scores, followed by insecure-dismissing and insecure-preoccupied mothers, and disorganized mothers had the lowest RF scores. “Post-hoc tests revealed that free/autonomous moms had significantly higher RF scores than dismissing ($p < .023$), preoccupied ($p < .043$), and unresolved moms ($p < .001$), and that both dismissing ($p < .077$) and preoccupied ($p < .032$) moms had higher RF scores than unresolved moms” (Slade et al., 2004, p. 290). Similarly, mothers with higher levels of RF were likely to have securely attached infants and lower levels of maternal RF were associated with insecure attachment status in children. Grienberger et al. (2005) further demonstrated that negative maternal caregiving as measured by the Atypical Maternal Behavioral Instrument for Assessment and Classification (AMBIANCE; Lyons-Ruth, Bronfman & Parsons, 1999) was inversely correlated to maternal RF capacities assessed through the PDI ($r = -.48, p < .01$). In addition, mothers who scored high on RF were less

likely to exhibit disruptions in affective communication during the SSn. Schechter et al. (2005) established the validity of the parental RF notion by showing that mothers who scored high on RF, thus having the capacity to view the child as having a mind of his own, were much more likely to have a balanced mental representation of the child measured by the Working Model of the Child Interview (WMCI; Zeanah & Benoit, 1995).

In order to code the PDI on RF, each interview was audio-taped, transcribed and each question was coded separately based on the presence or absence of mental states and types of RF. Then, a general score is assigned to the interview. Scores range from -1 to 9, with a score of 5 reflecting ordinary RF capacities representing the parent's ability to make sense of experiences in terms of thoughts and feelings. The overall score reflects the parent's overall tendency to be reflective, and is not the average of the scores for each question. Scores can be divided into 3 categories with scores below 3 classified as low RF, between 4 and 6 classified as moderate and over 7 classified as high RF. The four types of RF a) awareness of the nature of mental states, b) teasing out of mental states underlying behaviour, c) developmental aspect of mental states and d) mental states in relation to the interview, are usually found in moderate to high RF narratives (see Appendix 2 for more details about types of RF).

It is noteworthy that, in order to investigate the hypotheses posited at the end of Chapter 2, the PDI had to be shortened to be 1) less demanding in terms of time and focus given that each parent was asked to do the interview twice, once about each twin and 2) more appropriate to use with the targeted sample.

The Short PDI

The PDI was shortened in order to tie the questions specifically to the adolescent stage and to make them child-specific in order to get a differentiation between answers for each twin (see Appendix 1.2). Demand questions, directly linked to the assessment of

reflective functioning, were kept, and ones that are not directly relevant to RF were removed, with the exception of the first two which ask the parent to describe the adolescent and the relationship between parent and adolescent. One of the potential problems identified was that the shorter interview would not yield enough information to be coded on RF. However, the mean RF score in this sample was 5, which is in line with previous studies using the PDI-RF which have argued that, in a normative sample, parental RF scores are normally distributed with parents expected to score moderately on RF, with a score between 4 and 5 (Slade et al., 2005). Looking at the scores on the first demand question, which is the third question of the short interview, it was shown that parents were able to provide narratives that were codable on RF, some of which even scored high on RF. This shows that removing the original introductory questions from the PDI was not likely to affect the quality of the parents' responses.

Looking at the frequency of scores for each question, analyses showed that all questions had a mean score between 3.37 and 5.68, with the most frequent score for most questions being 5. It is interesting to note that parents were more likely to score higher on questions relating to guilt and instances when they didn't feel close with their adolescents. The latter could be explained by the fact that, during this stage of development, the adolescent is growing independent from the family and detaching himself from family ties as he/she goes through the second individuation process (Blos, 1967). This separation from the parents leads the adolescent to turn to peers and contemporaries in order to create relationships in a different ways (Blos, 1967), 1979), which could explain the parents feeling less close to their adolescent. This newly found independence can often be overwhelming for the adolescent, which has led some researchers to characterize this period as "storm and stress" (Somerville, Jones & Casey, 2010). This is in line with authors who have emphasized the prevalence of conflict with parents during this phase as a way for the adolescent to state

his/her independence from the family and express his/her separateness of mind. To make this possible, the roles in the family, both the adolescent's and other family members', need to be realigned in order to match the new goals being set by the adolescent in order to surpass the disequilibrium which characterizes this transition phase (McGue, Elkins, Walden & Ianoco, 2005). This is reflected in some of the PDI narratives as the two recurrent themes within the "not close" question were the idea that adolescents spend more time with their friends or romantic partner and that arguments between parents and adolescents were frequent.

Recurring themes also emerged in response to the guilt question. Most parents felt guilty about not spending enough time with their adolescents discussing current issues from school or with friends, but the majority felt guilty about "nagging" their children or felt guilty after having had an argument with them. This relates to the issue of increased conflict in adolescence as a way to de-idealize parents, which is a necessary step for the adolescent to de-identify with them and separate from infantile ties. Adolescents tend to be more focused on constructing their own individuality and preoccupied with their parents' acknowledging them as mature individuals with their own opinions, rather than children who naively accept their parents' ideas (van Doorn et al., 2011; Youniss & Ketterlinus, 1987). Therefore, high RF scores on both of these questions might illustrate the parents' awareness of changes happening within the adolescent and in their relationship and their ability to reflect on the impact of these changes on both themselves and the adolescents.

Looking at psychometric properties of the short PDI, internal consistency was computed resulting in a high Cronbach's alpha coefficient of .85. Inter-rater reliability was then examined between the author and two other coders trained on coding the PDI on RF. ICC were found to be high with coefficients of .87 and .88 for overall RF scores and correlations ranging between .72 and .95 on the remaining questions.

One concern in this study was that the quality of the second interview would be compromised and parents would potentially score higher for the second twin because they have been primed from the first interview. However, there were no significant differences in mothers' and fathers' RF scores between the twins. Though this could be thought to suggest that parents gave the same answers about each twin, it could also mean that they tended to give just as elaborated and thoughtful an answer in relation to each twin individually.

To further validate the shorter PDI, results yielded by this interview were compared quantitatively with those of a longer, already validated version of the interview, the PDI-R2 (see Appendix 1.1), which was used to interview a separate sample of 20 pairs of twins matched on child's gender, family income and ethnicity. The main result was that there were no significant differences between the overall scores yielded by both interviews. The same conclusion was reached when comparing parents' RF scores about each twin between the two versions of the PDI, therefore further recognizing the validity of the shorter PDI version.

When comparing mothers' and fathers' scores about each twin between the short PDI and the PDI-R2 for each question, results showed non-significant differences between the scores on most questions except for a few which yielded significantly higher scores with the shorter PDI. In fact, when answering the "losing" question, both mothers and fathers tended to score higher on RF in the second interview using the short PDI. This could be explained by the fact that this question is towards the end of the interviews and parents interviewed using the longer PDI are less able to maintain focus and a reflective stance for 2 hours, specially being asked the same questions twice. It can be argued they provided less detailed answers than they would have if interviewed with the short PDI which is less time consuming.

Fathers received significantly higher scores on the "guilt" question when using the shorter interview which could be explained by the change in wording of this question. The different probes might have provided more opportunities for them to mentalize about times

they felt guilty as a parent and reflect on the cause and impact of these feelings on themselves and their adolescents (see Appendix 4 for more detailed information regarding shortening the PDI).

For this study, coding the PDI on RF was done by two separate coders. Given that one of the aims of the study was to look at how parents are able to mentalize about their identical twins, coder's bias has been reduced as one coder coded the mother's PDI about Twin 1 and the father's PDI about Twin 2, and the second coder coded the mother's interview about Twin 2 and the father's interview about Twin 1, in which case, any single rater did not code both interviews of one parent and was blind to what the other parent discussed about the same twin. The author coded 200 PDIs.

3.3.2 Adolescents

Child Attachment Interview (CAI)

The Child Attachment Interview (see Appendix 1.3) is a semi-structured interview designed for children and adolescents aged 8-16 years (Shmueli-Goetz, Target, Fonagy & Datta, 2008). It is based on the well-known and highly validated Adult Attachment Interview (AAI, George, Kaplan & Main, 1994), an interview administered to determine adults' attachment classification. The CAI comprises 19 questions regarding current attachment relationships with the child's primary caregivers. The questions revolve around themes such as disagreements between the adolescent and the parent, times of distress, rejection, death and separation. On average, an interview lasts between 30 and 45 minutes and is both- video-taped and audio-taped. Each interview is then transcribed and coded based on the narratives elicited, as well as non-verbal behaviour.

The CAI was chosen as the measure of adolescent attachment as, unlike the AAI, it focuses on current attachment relationships and recent attachment related events. Questions

were formulated to be more flexible in order to help young children and adolescents report on their relationships with attachment figures. Furthermore, it provides both representational and behavioural codings. In fact, coding the CAI is based on the analysis of the content of the narratives as well as a behavioural analysis of the videos. The latter has been shown to provide information differentiating between attachment classifications which could have not been detected otherwise, especially in cases of disorganized attachment (Shmueli-Goetz et al., 2008; Target et al., 2003).

The coding and classification system was informed by the AAI. The CAI yields classifications of security and insecurity (Dismissing, Preoccupied, and Disorganized) and six scales which assess the child's overall current state of mind with respect to attachment as well as three scales, anger, idealization and dismissal, which are scored separately with regards to each relationship. Each scale is rated on a scale from 1 to 9. The CAI is also behaviourally coded based on "maintenance of eye contact, changes in tone of voice, marked anxiety, changes of posture in relation to the interviewer, and contradictions between verbal and nonverbal expressions" (Shmueli-Goetz et al., 2008, p. 943).

According to the four classifications yielded by the CAI, a secure child's narrative reflects a valuing of attachment relationships, an acknowledgement of the impact of separation and a need for comfort and support from attachment figures in times of illness and uncertainty. A dismissing child manifests a de-activation of the attachment system and often emphasizes an independence from parents, especially in times of separation, illness or hurt. A preoccupied child's narrative is characterized by an excessive focus and concern on a repetitive issue, or by a tone of complaint and resentment towards the attachment figure. Finally, disorganization is assigned when there are signs of incoherence and bizarre answers or behaviours (Shmueli-Goetz et al., 2008).

Inter-rater reliability was established between 3 coders in two phases with a median ICC for all scales of .88 in the first phase and .87 in the second. Inter-rater agreement for the main classifications was also established with a median kappa statistic of .86 for the two-way (secure/insecure) classification model and .80 for the four-way classification model. Test-retest reliability was established at a 3-month and one-year interval with 85% concordance in attachment for the two-way classification model and 83% concordance at 3 months and 76% at 1 year for four-way classifications.

Convergent validity was assessed in a subsample and concordance of attachment was found between mothers' and children's attachment as assessed by the AAI and CAI respectively, with a highly significant association found between the two measures at $p < .004$ (Shmueli-Goetz et al., 2008). Criterion validity was established as 77% of a referred sample was classified as insecure, with a predominance of the dismissing attachment classification, with 56% of the referred sample being classified as dismissing towards mothers and 62% towards fathers.

It is noteworthy that, given that the adolescents interviewed for this study were twins, questions were added to the CAI in order to get information about the twins' relationship with each other and their perceptions of their twin's relationships with parents.

Coding the CAIs was done as part of the larger TEDS project at the Anna Freud Centre and coding of each family's CAIs was done by two separate coders in order to avoid bias. In addition, no single rater coded PDIs and CAIs from the same family, thus, the author could not code the 200 CAIs of this sample. This was therefore done by research assistants and interns from the study at the AFC in exchange for the author's coding 150 CAIs of DZ twins for their study and conducting 12 CAI interviews.

It is important to highlight that previous studies have suggested that one of the disadvantages of categorical variables is the lack of variability within each group and the loss

of information and power (Royston, Altman & Sauerbre, 2005; Vitaro et al., 2009). In addition, as elaborated on in Section 2.2.2, studies investigating attachment classifications in adolescence diverge in their findings in relation to the prevalence of each insecure category of attachment during this stage of development (Ammanitti et al., 2000; van Ijzendoorn & Bakermans-Kranenburg, 1996). Therefore, the coherence scale of the CAI, defined as “reflectiveness, spontaneity and flexibility in discourse” (Shmueli-Goetz et al., 2004), was chosen as a marker of attachment in this study as earlier studies using the AAI have found that the strongest relationship with overall attachment categories was to the dimension of coherence (Main et al., 1985; Fonagy et al., 1998). In fact, interviews that are coherent were found to have few internal contradictions and constitute spontaneous, credible discourse. Incoherence was found to be common in parents of insecure children (Main et al., 1985; Fonagy et al., 1998). This was explained by the idea that coherence of the narrative reflects the capacity to understand and contain both positive and traumatic experiences (Fonagy et al., 1991) and that markers of coherence reflect the effort to maintain a good relationship with the attachment figure despite current negative situations (Fonagy et al., 1998).

Furthermore, coherence scores on the CAI, recorded continuously, have been shown to be highly consistent at two testings a year apart (Shmueli-Goetz et al., 2008). It can therefore be argued that this CAI dimension is less likely to be influenced by the maturational changes occurring in adolescence, contrary to the overall attachment classifications which have been found to fluctuate (Ammanitti et al., 2000). Consequently, twins’ coherence scores were subsequently used as markers of attachment security.

The Inventory of Parent and Peer Attachment (IPPA)

The Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987) (see Appendix 1.4) is a 5-point Likert scale format self-report questionnaire initially devised

to assess the quality of adolescents' attachment relationship to parents and peers. This questionnaire was devised based on Bowlby's theoretical framework and measures how well these figures serve as sources of psychological security. The first version contained 28 items assessing the adolescent's relationships to the parents and 25 measuring the adolescent-peers relationship. It was then modified to 25 items for mother, father and peers, thus yielding 3 continuous attachment scores which are calculated by summing the score for each question after reversing the negatively worded items. Items can also be sorted in 3 main dimensions: degree of mutual trust, quality of communication and extent of anger and alienation.

Test-retest reliability and internal reliability have been found to be high for both the original and revised version with correlations between .86 and .93, and .87 and .92 respectively. Concurrent validity was established as it was found that less secure attachment scores to parent were associated with a clinical diagnosis of depression and parents' rating of adolescents' depressive symptoms (Armsden, McCauley, Greenberg, Burke & Mitchell, 1991). In addition, more secure attachment scores to parents were related to less conflict with parents and less adolescent loneliness (Armsden, 1986). Discriminant validity was shown as attachment to parents measured by the IPPA distinguished delinquents from non-delinquents among 12- to 17- year olds (Redondo, Martin, Fernandez & Lopez, 1986). However, it should be noted that the authors suggest using the revised version when possible (Greenberg & Armsden, 2009).

For the purpose of this research, a fourth set of 25 items was added in order to assess the quality of adolescents' attachment to their twin. The items included are the same as those used to measure the quality of adolescent-peer attachment, but wording of the statements was modified to describe the twins' relationship rather than peer relationships. The IPPA therefore yielded 4 separate scores conveying the quality of a twin's relationship to mother, father, peers and twin.

3.4 Procedure

3.4.1 Interviewing the Adolescents

Adolescents were interviewed first as part of a joint study run by the Anna Freud Centre (AFC) and the Institute of Psychiatry (IoP) between August 2010 and June 2013. Initial contact with the families was made over the phone and a verbal summary was given to parents, explaining what the study involved. If interested, consent forms and information sheets were posted to them and a date was set for the interview, either at the participants' home or at one of the sites, according to the families' preference. On the day, consent was re-confirmed as each twin was given an information sheet and asked to sign a consent form, then, they separately completed the CAI in a quiet room. The average interview lasted between 30 and 45 minutes. After completing the CAI, adolescents were asked to complete a battery of questionnaires, including the Family Conflict Questionnaire, the Inventory of Callous-Unemotional Traits and the IPPA described in Section 3.3.2, filled in that order. The average visit therefore lasted around two hours, including filling out consent, completing the CAI and additional questionnaires. The twins were each given a £15 gift token as a token of appreciation for taking part in the study.

It is important to note that interviews with adolescents were conducted by a group of researchers at the Anna Freud Centre (AFC) and the Institute of Psychiatry (IoP), with some help from the author. As previously mentioned, in exchange for the use of the CAI data of the 100 adolescent MZ twin-pairs of the parents interviewed for this study, the author conducted 12 CAI interviews and coded 150 CAIs of DZ twins.

3.4.2 Interviewing the Parents

For this specific study, parents of 100 pairs of identical twins who have been invited to the study at the AFC/IoP and who completed the CAI were contacted by the author by

phone and given initial information. Parents were contacted between 2 and 10 months after the twins' interviews were completed, and parent visits were conducted between April 2011 and September 2012. If interested in participating, a date and time was set for the author and another researcher to go to the participants' house to conduct the Parent Development Interview (PDI). On average, the interval between the completion of the adolescents' interviews and their parents' interviews was of 4.5 months. The information sheet and consent forms were given once at the participants' home and the PDI was conducted twice, once about each twin, simultaneously for mother and father, in separate rooms. The author interviewed one parent about both twins while the other researcher interviewed the second parent, following the same procedure. Questions were first asked about the first born twin. Between each interview, the parent was reminded that the same questions will be asked about the other twin and they were asked to try not to assume that information given in the first interview is known to the interviewer. Parents were therefore tested in a single session and visits lasted approximately an hour in total, including reading and signing the consent forms as well as answering the PDI questions twice.

3.5 Data Analysis

The data collected through the interviews for this study was first subjected to quantitative analyses using SPSS. Based on the literature, twin studies using solely a MZ twin sample tended to use the MZ twin difference method (Asbury et al., 2003; Asbury et al., 2006; Pike et al., 1996; Vitaro et al., 2009), as it has been argued that “differences in [MZ twins'] experiences and their behavior can be ascribed directly to non-shared environment without the assumptions required by the more complicated multivariate genetic approach” (Asbury et al., 2003, p. 934), because they do not differ genetically. It was therefore

suggested that a focus on highlighting shared environmental influences would provide continuity for the data analysis plan.

Investigating shared environmental influences, the method relied on data analysis using correlations, simple and multiple regressions based on the shared parts of the variance in adolescent attachment, measured through the CAI coherence scale and the IPPA, and the shared part of parental RF. The former was based on the mean between both twins' scores on a) the CAI coherence scale and b) the IPPA, and the latter on the mean parental RF scores, both mothers' and fathers', about both twins. A significant correlation between parental mean RF scores and twins' mean attachment score would suggest a shared influence of parental RF on twins' attachment.

This was followed by correlational analyses between differences in parental scores and differences in twins' scores, based on the MZ twin difference model, argued to be the best method to pinpoint non-shared environmental influences (Pike et al., 1996; Vitaro et al., 2009).

The quantitative analysis was followed by a case study presenting a qualitative analysis based on the fourth aim of this study, looking for non-shared environmental influences, not measured in the quantitative analysis, which might explain discordant attachment between twins in one family.

The following chapter describes the quantitative analysis related to the first 3 aims set in Chapter 2.

Chapter 4: Quantitative Analysis

As noted in the previous chapters, studies have consistently found an association between parental RF and attachment in childhood (Fonagy et al., 1991; Grienberger et al., 2005; Slade et al., 2004; Slade et al., 2005). In addition, from a behavioural genetics point of view, maternal sensitivity, a similar construct to RF, has been found to have a shared influence on attachment at 1 year of age (Fearon et al., 2006; Roisman & Fraley, 2008). However, contradictory findings have been reported regarding the non-shared influence of maternal sensitivity on attachment (Fearon et al., 2006; Roisman & Fraley, 2008). To date, no study has investigated the association between parental RF, both maternal and paternal, on attachment security in adolescence or the nature of the influence of parental RF on attachment. Fonagy and Target (1998) posited that parental mentalizing capacities help the child understand feelings underlying behaviours and overcome distress without feeling overwhelmed. Furthermore, Blos (1967) compared adolescence to a period of second individuation during which emotional and cognitive changes occur, which could lead the adolescent into a state of instability and distress. In addition, parental RF has been found to be associated with better adolescent adjustment (Benbassat & Priel, 2011). It was therefore hypothesized that an association between parental RF and adolescent attachment security would be found.

This chapter presents a quantitative analysis of the aims presented at the end of Chapter 2: a) investigate, on an inter-familial level, whether there is a shared influence on adolescent attachment from the overall level of both, maternal and paternal RF (Aim 1), b) explore whether additional shared family factors and adolescent characteristics, such as adolescent gender, family income, parental education and the number of siblings in the family (Cutting & Dunn, 1999; Fearon et al., 2006) have a direct influence on parental RF

(Aim 2) and c) investigate, on an intra-familial level, whether parental RF, peer relationships and differences in the quality of the twins' relationship to each other, constitute a non-shared influence on adolescent attachment (Aim 3). This is followed by a discussion of the findings.

The results presented in this chapter are divided into four sections. In the first section, descriptive statistics of the main measures are presented. These include maternal and paternal RF scores based on codings of the PDI, twins' attachment coherence scores used as a measure of attachment security based on the CAI narratives and IPPA scores representing the quality of the twins' relationship to mother, father, peer and each other. In the second section, inter-familial level analysis, based on the first aim of this study, is presented in order to examine the shared influence of parental RF on adolescent attachment security. This construct was first measured through the CAI coherence scale and then based on the IPPA continuous scores, yielding separate scores for mothers and fathers. Analyses include correlations between both, mean maternal and mean paternal RF, and twins' mean coherence scores, followed by regression analyses examining the influence of each on adolescent mean coherence. Subsequent analyses focus on the role of shared family factors in influencing adolescent coherence and its association with parental RF. The same correlational analyses were run again using IPPA scores towards mothers and fathers as a measure of attachment security. The third section investigates the second aim of the study, analyzing results of multiple regressions examining whether any shared family predictors were associated with parental RF. The last section of the results focuses on intra-familial level analysis, thus the third aim of this study. Analyses were based on the MZ twin difference method, first investigating whether parental RF has a non-shared influence on adolescent attachment. Regression analyses investigated the association between differences in a parent's RF score between the two twins, in the case of both, mothers and fathers, and differences in twins' coherence scores as well as differences in twins' IPPA scores in relation to each parent

separately. Subsequent analyses focused on investigating whether the twins' perceptions of the quality of their relationship to peers and to each other, based on IPPA scores, constituted non-shared influences on adolescent attachment coherence using the same method. Multiple regressions included adolescent gender in the model to examine whether results were similar for boys and girls. The presentation of the results of quantitative analyses is followed by a discussion section based on the three aims of the study.

4.1 Results

4.1.1 Descriptive statistics of the sample

Range and descriptive statistics of RF scores

Descriptive statistics of total RF scores were first run. Scores ranged between 1 and 8 with a mode of 4 in most pairings (Table 2).

Table 2

Range of RF Scores

		Mother about Twin 1	Mother about Twin 2	Father about Twin 1	Father about Twin 2
N	Valid	100	100	100	100
	Missing	0	0	0	0
Mean		4.64	4.65	4.29	3.97
SD		1.43	1.46	1.65	1.39
Mode		4	4	3	4
Minimum		1	1	1	1
Maximum		8	8	8	8

Next, frequencies for each set of RF scores were run. Table 3 highlights that most RF scores ranged between 3 and 5.

Table 3

Frequency of RF Scores

RF Total Score	Mother		Father	
	Twin 1	Twin 2	Twin 1	Twin 2
-1	0	0	0	0
0	0	0	0	0
1	3 %	1 %	1 %	1 %
2	1 %	4 %	11 %	10 %
3	16 %	18 %	27 %	29 %
4	29 %	26 %	20 %	33 %
5	26 %	22 %	18 %	14 %
6	13 %	20 %	11 %	6 %
7	9 %	4 %	7 %	5 %
8	3 %	5 %	5 %	2 %
9	0	0	0	0

Given that the MZ twin difference method was used, descriptive statistics of the absolute difference in parental RF between the two twins were run. In all analysis using the MZ twin difference method, the absolute, rather than the relative, difference in scores was used as the aim was to investigate how far apart twins' scores tended to be, regardless of which twin received higher scores. The mean absolute difference in RF between twins was $M = 1.05$, $SD = .97$ for mothers and $M = 1.28$, $SD = 1.05$ for fathers (Table 4).

Table 4

Descriptive Statistics of the Difference Between Parents' RF Scores About Each Twin

		Mothers	Fathers
N	Valid	100	100
	Missing	0	0
Mean		1.05	1.28
SD		.97	1.05
Range		4.00	4.00
Minimum		0.00	0.00
Maximum		4.00	4.00

The effect of the interviews' order

Given that the PDI was conducted about the first-born twin first, analysis started by investigating whether the order of the interviews affected the results, by looking at the significance of the difference between a parent's RF score between the two twins. This time, the relative difference was used as it was of interest to study whether a parent tended to score lower during the second interview. As previously noted, no differences were expected to be found between a parent's RF scores between each twins as this would represent an effect of birth order, a variable confounded with interviewing order in this study as parents were interviewed about the first born twin first in all instances. In addition, birth order was not deemed to be influential given that the sample in question consisted of identical twins. Paired T-tests showed no significant differences between mothers' scores on RF for each twin, with $t(98) = -.07, p = .94$ (Table 5). However, significant differences were found between fathers' RF scores, with $t(98) = 1.99, p = .04$, with a moderate effect size of .30 based on the Cohen's d statistic (Table 6). Significant correlations were found between a parent's RF score for each twin with $r(98) = .53, p < .001, R^2 = .28$ for mothers and $r(98) = .45, p < .001, R^2 = .20$ for fathers (see Table 7 for mean overall RF scores).

*Table 5**Paired T-test Comparing Mothers' RF Scores for Twin 1 and Twin 2*

	Mean	SD	SE	95% Confidence Interval of the Difference		t	df	Sig.
				Lower	Upper			
Maternal RF about Twin 1 – Maternal RF about Twin 2	-.010	1.43	.14	-.29	.27	-.07	99	.94

Table 6

Paired T-test Comparing Fathers' RF Scores for Twin 1 and Twin 2

	Mean	SD	SE	95% Confidence Interval of the Difference		t	df	Sig.
				Lower	Upper			
Paternal RF about Twin 1 – Paternal RF about Twin 2	.320	1.63	.16	-.01	.64	1.97	99	.04

Table 7

Parents' Mean Overall RF Scores About Each Twin

		Mean	N	SD	SE
Mother	Twin 1	4.64	100	1.47	.15
	Twin 2	4.65	100	1.49	.15
Father	Twin 1	4.29	100	1.67	.17
	Twin 2	3.97	100	1.39	.14

Significant differences were found between fathers' overall RF scores on the first and the second interview (see Table 6) which could reflect an effect of the interviewing order. However, it is important to highlight that this difference in paternal scores between the two interviews was small and not highly significant, but cannot nevertheless be ignored. This will be taken into account when interpreting the results.

Descriptive statistics of the CAI attachment classifications

First, the distribution of attachment classifications was explored. Nearly 50% of twins were securely attached to both, mothers and fathers. The second most common classification was "insecure dismissing", followed by less than 10% of the adolescents classified as "insecure-preoccupied" or "disorganized". A similar distribution was found for both twins as shown in Table 8.

Table 8

Twins' 4-way Attachment Classifications to Mother and Father

		Mother	Father
Twin 1	Secure	49%	48%
	Insecure Dismissing	46%	45%
	Insecure Preoccupied	1%	3%
	Disorganized	4%	4%
Twin 2	Secure	57%	51%
	Insecure Dismissing	36%	39%
	Insecure Preoccupied	4%	8%
	Disorganized	3%	2%

It is important to highlight that, given that twins' attachment classifications within this sample fell largely equally between only two categories (Table 8), and based on previous studies highlighting some advantages to using dimensional rather than categorical variables (Royston et al., 2005; Vitaro et al., 2009; see Chapter 3, p. 96 for a more detailed discussion), the author used the continuous coherence scale of the CAI as a measure of attachment security. It is important to remind the reader that the coherence scale assessed the adolescent's overall current state of mind with regards to attachment and is not coded separately with regards to each attachment relationship.

Descriptive statistics of the twins' coherence scores and the difference in twins' coherence scores were therefore explored, with a mean absolute difference of $M = 1.45$, $SD = 1.10$ between the twins' coherence scores (Table 9).

A correlation of $r(98) = .41$, $p < .001$, $R^2 = .17$, was found between the twin's coherence scores.

Table 9

Descriptive Statistics of Twins' Attachment Coherence Score

		Twin 1 coherence	Twin 2 coherence	Difference in coherence scores between the twins
N	Valid	100	100	100
	Missing	0	0	0
Mean		5.09	5.25	1.45
SD		1.63	1.72	1.10
Mode		5.0	4.0	1
Range		6.5	8.0	4.50
Minimum		2.0	1.0	0
Maximum		8.5	9.0	4.50

Descriptive statistics of IPPA scores

Frequency distributions for both twins' IPPA total scores regarding their relationships with mother, father, peers and twin were tabulated (Table 10). The maximum score obtainable on the IPPA is 110.

It is noteworthy that both twins' total IPPA scores were found to be significantly correlated with $r(98) = .34, p = .001, R^2 = .12$, between their scores about their relationship to mother, $r(97) = .12, p < .01, R^2 = .01$, between their scores regarding their relationship to father, $r(96) = .27, p < .01, R^2 = .07$, between scores reflecting their relationship to peers and $r(92) = .28, p < .01, R^2 = .08$, between the scores relating to their relationship to each other. It is important to note that some adolescents did not answer all the questions of the IPPA which made it impossible to compute a full score, thus explaining the missing data.

Table 10

Descriptive Statistics of IPPA Scores

		Twin 1's relationship to				Twin 2's relationship to			
		Mother	Father	Peer	Twin	Mother	Father	Peer	Twin
N	Valid	99	98	99	99	99	99	97	95
	Missing	1	2	1	1	1	1	3	5
Mean		79.49	78.73	64.07	85.84	79.91	78.38	67.99	82.38
SD		3.89	3.92	5.12	15.71	4.37	4.15	4.84	17.56
Mode		80	77	63	94	79	77	68	92
Range		21	23	30	63	27	21	25	69
Minimum		67	68	49	47	63	68	58	41
Maximum		88	91	79	110	90	89	83	110

Table 11 provides the descriptive statistics of the absolute difference between twins' scores on the IPPA as well as twins' mean IPPA scores regarding each relationship. The highest mean score was found when twins reported on their relationship with each other with $M = 84.27$, $SD = 13.49$, followed by scores about their relationship to their mother with $M = 79.71$, $SD = 3.38$, then about their relationship to their father with $M = 78.54$, $SD = 2.76$ and lastly mean score reflecting the quality of their relationship to peers with $M = 66.00$, $SD = 4.09$.

As part of the validation of the IPPA, Armsden and Greenberg (1987) and Armsden (1986) found that peer attachment modestly, but significantly, correlated to parent attachment. However, non-significant relationships were found between IPPA peer attachment and attachment to mothers and fathers in this study (see Table 12). Given that this was the first study to investigate the quality of the twins' relationship to each other, analyses also investigated whether mean IPPA scores reflecting the quality of the twins' relationship to each other were correlated to mean IPPA scores regarding attachment relationship to mother, father and peer, but no significant relationships were found. The only significant

correlation was found between mean attachment scores for mothers and fathers with $r(96) = .39, p < .001, R^2 = 15$.

Table 11

Descriptive Statistics of Differences in and Mean IPPA Scores

	Differences in IPPA scores in relation to				Mean IPPA scores in relation to			
	Mother	Father	Peer	Twin	Mother	Father	Peer	Twin
N Valid	98	97	96	94	98	97	96	94
Missing	2	3	4	6	2	3	4	6
Mean	3.72	4.73	5.75	16.10	79.71	78.54	66.00	84.27
SD	2.98	3.53	4.25	12.09	3.38	2.76	4.09	13.49
Mode	1	3	4	12	80.50	79.00	68.00	85.00
Minimum	0	0	0	0	65.00	73.50	55.00	46.00
Maximum	14	14	18	53	86.50	86.00	75.50	109.00

Table 12

Correlations Between Mean IPPA Scores Regarding Mothers, Fathers, Peers and Twin

		Mean IPPA score about			
		Mother	Father	Peer	Twin
Mean IPPA scores about mother	Pearson Correlation	1	.39**	-.25	-.19
	Sig. (2-tailed)		<.001	.07	.06
	N	98	97	96	94
Mean IPPA scores about father	Pearson Correlation	.39**	1	-.09	-.02
	Sig. (2-tailed)	<.001		.87	.87
	N	97	97	96	94
Mean IPPA scores about peers	Pearson Correlation	-.25	-.09	1	.22
	Sig. (2-tailed)	.07	.87		.06
	N	96	96	96	94
Mean IPPA scores about twin	Pearson Correlation	-.19	-.02	.22	1
	Sig. (2-tailed)	.06	.87	.06	
	N	94	94	94	94

**Correlation is significant at the .01 level (2-tailed)

The last set of correlations were run between twins' mean attachment coherence scores and twins' mean IPPA scores for mothers and fathers and non-significant correlations were found with $r(97) = -.18, p = .07, R^2 = .03$ and $r(96) = .11, p = .28, R^2 = .01$ respectively.

4.1.2 Inter-familial level analysis: is there a shared influence of parental RF on adolescent attachment?

The association between mean parental RF and twins' mean coherence scores

The first aim was to investigate whether parental RF has a shared environmental influence on adolescent attachment. This was first examined by investigating the association between mean maternal RF (the mean between mothers' RF scores about Twin 1 and mothers' RF scores about Twin 2) and twins' mean coherence scores (the mean between Twin 1's and Twin 2's coherence scores) in the first instance and then looking at whether the same relationship was found between mean paternal RF (the mean between fathers' RF scores about Twin 1 and their RF scores about Twin 2) and twins' mean coherence scores.

Correlations were run between mean maternal RF scores and twins' mean coherence scores and then between mean paternal RF scores and twins' mean coherence scores with a significant correlation found in both cases (see Table 13). The simple regression analyses revealed that maternal RF explained a significant portion of the variance with $R^2 = .11, F(1,99) = 11.69, p = .001$ and paternal RF explained a significant portion of the variance with $R^2 = .09, F(1,99) = 10.48, p < .01$. For descriptive purposes only, mean maternal and paternal RF scores and mean coherence scores are presented in Table 14.

Table 13

Correlations Between Parental Mean RF Scores and Twins' Mean Coherence Scores

		Mean maternal RF scores	Mean paternal RF scores
Mean coherence scores	Pearson Correlation	.33**	.31**
	Sig. (2-tailed)	<.001	<.001
	N	100	100

**Correlation is significant at the .01 level (2-tailed)

Table 14

Descriptive Statistics of Mean Parental RF and Twins' Mean Coherence Scores

		Mean coherence scores	Mean maternal RF scores	Mean paternal RF scores
N	Valid	100	100	100
	Missing	0	0	0
Mean		5.17	4.65	4.13
SD		1.41	1.29	1.31
Variance		1.99	1.67	1.71
Minimum		1.50	1.00	1.50
Maximum		8.00	7.50	7.50

Given that both, maternal and paternal RF, were found to be correlated with twins' mean coherence, a multiple regression was run to see whether the effects of maternal and paternal RF on coherence were independent from each other. Results suggested that when both, maternal and paternal RF were entered in the model, they predicted 14% of the variance in twins' mean coherence with $F(1, 99) = 9.16, p = .001$, with a medium effect size $f^2 = .17$ based on the Cohen's f^2 statistic. Mean maternal RF and mean paternal RF were both found to be significant predictors, predicting almost similar amount of the variance in coherence, with $\beta = .24, t(99) = 2.32, p = .02$ and $\beta = .21, t(99) = 2.08, p = .04$ respectively (see Table

15). It is important to highlight that a correlation of $r(98) = .41, p < .001$, was found between mean maternal and mean paternal RF scores.

Table 15

Coefficients of the Multiple Regression Looking at the Association Between Mean Maternal RF, Mean Paternal RF and Twins' Mean Coherence

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	3.01	.55		5.459	<.001
Mean maternal RF	.26	.11	.24	2.32	.02
Mean paternal RF	.23	.11	.21	2.06	.04

Next, the effect of shared family factors, including adolescent gender, maternal and paternal education, family income and the number of siblings in the family (Fearon et al., 2006), on twins' mean coherence scores was investigated in order to examine whether any had a direct independent influence on twins' mean coherence .

Firstly, an ANOVA was run to look at the association between adolescent gender and adolescent mean coherence. A significant effect of gender was found with $F(1,99) = 8.19, p < .01$ and an effect size of $\eta^2 = .01$ based on the formula $\eta^2 = \text{Sum of Squares of the IV} / \text{Sum of Squares of the Corrected Total}$. Pairwise comparisons revealed that girls ($M = 5.56, SD = .19$) were more likely to score highly on coherence than boys ($M = 4.78, SD = .19$).

Secondly, an ANOVA looked at the association between maternal education and adolescent mean coherence. A significant effect of maternal education was found with $F(1,90) = 4.19, p < .05$ and an effect size $\eta^2 = .13$. Pairwise comparisons revealed that mothers who had only attained GCSE level education were more likely to have twins who scored lower on coherence than mothers who attained A-level ($M = 1.42, SD = .50$), NVQ

($M = 1.13$, $SD = .47$), postgraduate education ($M = 1.09$, $SD = .52$) or obtained another degree ($M = 1.01$, $SD = .41$). Then, an ANOVA looked at the association between paternal education and adolescent coherence. However, a non-significant association was found with $F(1,90) = 3.11$, $p = .93$, $\eta^2 = .02$.

Thirdly, an ANOVA was run to look at the association between family income and adolescent mean coherence scores resulting in a non-significant relationship with $F(1,90) = 1.52$, $p = .26$, $\eta^2 = .07$.

The fourth shared family factor was the number of siblings in the family. Correlations were run between this independent variable and adolescent mean coherence scores and a non-significant correlation of $r(98) = .04$, $p = .68$ was found.

Then, a multiple linear regression, with maternal RF entered as an independent variable alongside the shared family factors found to be significantly associated with mean coherence i.e. adolescent gender and maternal education, was run to explore whether the association between mean maternal RF and mean coherence remained when these covariates were included in the model. It is important to highlight that all categorical variables were recoded into dummy variables before being entered in the regression model. Results showed that the overall model was significant with $R^2 = .24$, $F(1, 99) = 3.67$, $p = .001$, with Cohen's $f^2 = .32$. Mean maternal RF and adolescent gender were found to be the only significant predictors of adolescent mean coherence with $\beta = .26$, $t(99) = 2.62$, $p = .01$ and $\beta = -.21$, $t(99) = -1.98$, $p < .05$ respectively. However, maternal education, previously found to be an independent predictor of twins' mean coherence scores, was not found to be a significant predictor when included in the model (see Table 16).

Table 16

Coefficients of the Multiple Regression Looking at the Association Between Mean Maternal RF, Shared Family Factors and Mean Coherence

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	4.12	.65		4.99	< .001
Mean maternal RF	.28	.11	.26	2.62	.01
Gender*	-.62	.26	-.21	-1.98	.02
Maternal education					
GCSE vs others	-.72	.57	-.20	-1.55	.21
A level vs others	.63	.61	.15	.51	.31
NVQ vs others	.21	.59	.06	-.11	.72
Degree vs others	.07	.57	.02	-.46	.90
Postgraduate vs others	-.09	.64	.02	-.64	.88
Other education vs others	.37	.64	.08	.08	.56

*. Reference category: Female

Similarly, a multiple linear regression, with mean paternal RF entered as an independent variable alongside the only shared family factor found to be associated with mean coherence i.e. adolescent gender, was run to explore whether the association between mean paternal RF and mean coherence remained when this covariate was included in the model. Results showed that the overall model was significant with $R^2 = .15$, $F(1, 99) = 8.48$, $p < .001$, with Cohen's $f^2 = .18$. Mean paternal RF and adolescent gender were both found to be predictors independently affecting mean coherence with $\beta = .27$, $t(99) = 2.86$, $p < .01$ and $\beta = -.23$, $t(99) = -2.44$, $p < .05$ respectively (see Table 17).

Table 17

Coefficients of the Multiple Regression Looking at the Association Between Mean Paternal RF, Shared Family Factors and Mean Coherence

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	4.29	.48		8.67	< .001
Mean paternal RF	.29	.10	.27	2.86	.01
Gender *	-.65	.27	-.23	-2.44	.02

*. Reference category: Female

The association between mean parental RF and twins' IPPA scores in relation to parents

Given that the CAI coherence scale yields a single score and is not coded separately for mothers and fathers, the next set of analyses investigated whether a similar association would be found between parental RF and adolescent attachment, this time measured based on mean IPPA scores, assessing the quality of the adolescents' relationship to mother and father separately. Correlations were first run between mean maternal RF scores and twins' mean IPPA scores towards mother (the mean between the first and the second twin's IPPA scores towards mother) and then between mean paternal RF scores and twins' mean IPPA scores towards father (the mean between the first and the second twin's IPPA scores towards father). Non-significant correlations were found in both cases with $r(97) = -.15$, $p = .14$ for mothers and $r(96) = -.02$, $p = .84$ for fathers.

4.1.3 The association between shared family predictors and parental RF

The second aim of this study was to explore whether the shared family factors included in previous analyses i.e. adolescent gender, maternal and paternal education, family income and the number of siblings in the family (Cutting & Dunn, 1999; Fearon et al., 2006),

have a direct influence on parental RF, in order to get a more complete picture of factors affecting the relationship between adolescent coherence and parental RF.

A multiple regression was first run with mean maternal RF as the dependent variable and the four independent variables included in the previous model: adolescent gender, maternal education, family income and the number of siblings in the family. Categorical variables were recoded into dummy variables before being included in the analysis. Results showed that the model was not significant with $R^2 = .15$, $F(1, 99) = 1.17$, $p > .05$, Cohen's $f^2 = .18$, with no variables independently predicting maternal RF (see Table 18).

Table 18

Coefficients of the Multiple Regression Looking at the Association Between Shared Family Factors and Mean Maternal RF

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	SE	Beta		
(Constant)	4.00	.88		7.55	< .001
Gender*	-.36	.28	-.14	-1.31	.19
Number of siblings in the family	.03	.14	.02	.10	.84
Maternal education					
GCSE vs others	.65	.68	.19	.96	.34
A level vs others	.64	.71	.16	.90	.37
NVQ vs others	1.13	.69	.32	1.66	.10
Degree vs others	1.46	.67	.50	2.19	.06
Postgraduate vs others	1.39	.74	.34	1.88	.06
Other education vs others	1.26	.75	.29	1.69	.09
Family income (per year)					
10k-20k	-.49	1.53	-.04	-.32	.75
20k-30k	.06	.87	.02	.07	.94
30k-50k	-.55	.82	-.18	-.67	.50
50k-70k	-.19	.82	-.07	-.24	.81
70k +	-.14	.82	-.05	-1.77	.86

*. Reference category: Female

This was followed by another multiple regression with mean paternal RF as the dependent variable and the four independent variables included in the previous model replacing maternal education with paternal education. Similarly, results showed that the model was not significant with $R^2 = .18$, $F(1, 99) = 1.46$, $p > .05$, Cohen's $f^2 = .22$ and no variables independently predicting paternal RF (see Table 19).

Table 19

Coefficients of the Multiple Regression Looking at the Association Between Shared Family Factors and Mean Paternal RF

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	SE	Beta		
(Constant)	5.82	.85		6.92	< .001
Gender*	-.28	.26	-.11	-.99	.33
Number of siblings in the family	.08	.14	.06	.57	.57
Paternal education					
GCSE vs others	.40	.63	.12	.64	.53
A level vs others	.12	.67	.03	.19	.85
NVQ vs others	.09	.63	.03	.13	.89
Degree vs others	.53	.62	.17	.85	.39
Postgraduate vs others	.77	.72	.17	1.06	.29
Other education vs others	-.05	.64	-.01	-.08	.94
Family income (per year)					
10k-20k	-2.49	1.53	-.19	-1.62	.11
20k-30k	-2.48	.88	-.60	-2.82	.06
30k-50k	-2.20	.81	-.71	-2.71	.06
50k-70k	-1.83	.81	-.64	-2.28	.07
70k +	-1.73	.62	-.62	-2.09	.06

*. Reference category: Female

After having presented results suggesting a shared influence of parental RF on twins' coherence scores, the last section reports results in relation to the third aim of this study, investigating whether parental RF, peer relationships and differences in twins' perceptions of their relationship to each other constitute non-shared influences on adolescent attachment security.

4.1.4 Intra-familial level analysis: are there non-shared influences on adolescent attachment?

The third aim of this study was to investigate whether part of the influence of parental RF on adolescent attachment security, measured through attachment coherence on the CAI and scores on the IPPA, was not shared between the twins and that peer relationships and differences in the quality of the twins' relationship to each other would have a non-shared environmental influence on attachment coherence.

Maternal RF

In order to examine whether there is a non-shared influence of maternal RF on attachment, adolescent attachment security was first measured through the coherence scores on the CAI, and the MZ twin difference method was used. It involved computing a new variable by subtracting mothers' overall RF scores about one twin from mothers' overall RF scores about the other twin and then correlating it with the difference between one twin's scores on coherence and the other twin's scores on coherence. As noted in Section 4.1.1, the absolute difference in scores was used as the aim was to investigate how far apart twins' scores tended to be, regardless of which twin received higher parental RF scores. A correlation of 1 would mean that differences in maternal RF between the twins exactly predict differences in twins' coherence scores. A multiple regression was run including the

difference in twins' coherence scores as the dependent variable and the difference in maternal RF scores, adolescent gender and the interaction between gender and differences in maternal RF scores as independent variables in order to examine whether results are similar between boys and girls and whether adolescent gender interacts with maternal RF in predicting differences in twins' coherence scores. Results showed that the model did not significantly predict differences in coherence scores with $R^2 = .01$, $F(1, 99) = .05$, $p = .96$, Cohen's $f^2 = .01$ (see Table 20).

Table 20

Coefficients of the Multiple Regression Looking at the Association Between Differences in Coherence Scores, Differences in Maternal RF Scores and Gender

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	1.45	.24		5.97	< .001
Difference in maternal RF	.06	.39	.05	.16	.87
Gender	-.07	.33	-.03	-.22	.83
Difference in maternal RF * Gender	-.02	.24	-.03	-.08	.94

In order to investigate whether this pattern, observed for the whole sample, persisted at the extremes (Asbury et al., 2003), the 10% most extreme discordant pairs on coherence, the pairs with the largest absolute difference in twins' scores, were identified and correlations between MZ differences in maternal RF and in adolescent coherence were calculated (see Table 21). Using the same method, the 10% most extreme maternal RF-discordant pairs were also selected and again correlations between MZ twin differences in maternal RF and in coherence scores were run (see Table 22). Consistent with results on the whole sample, no significant correlations between differences in maternal RF and differences in adolescent coherence were found at the extremes.

Table 21

Correlations Between Twin Differences in Maternal RF and in Coherence for the Most Discordant Pairs for Coherence

		Difference in maternal RF scores	Difference in coherence scores
Difference in maternal RF scores	Pearson Correlation	1	.11
	Sig. (2-tailed)		.77
	N	10	10
Difference in coherence scores	Pearson Correlation	.11	1
	Sig. (2-tailed)	.77	
	N	10	10

Table 22

Correlations Between Twin Differences in Maternal RF and in Coherence for the Most Discordant Pairs for Maternal RF

		Difference in maternal RF scores	Difference in coherence scores
Difference in maternal RF scores	Pearson Correlation	1	.08
	Sig. (2-tailed)		.82
	N	10	10
Difference in coherence scores	Pearson Correlation	.08	1
	Sig. (2-tailed)	.82	
	N	10	10

The same analyses were run again using the continuous IPPA attachment scores in relation to mothers as a measure of attachment. A multiple regression was run with the absolute difference in twins' IPPA scores in relation to mother as the dependent variable and the absolute difference in maternal RF scores, adolescent gender and the interaction between gender and differences in maternal RF scores as independent variables. The model did not

significantly predict differences in twins' IPPA scores for mothers with $R^2 = .02$, $F(1, 97) = .73$, $p = .54$, Cohen's $f^2 = .02$ (see Table 23).

Table 23

Coefficients of the Multiple Regression Looking at the Association Between Differences in Twins' IPPA Scores about Mothers, Differences in Maternal RF Scores and Gender

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	SE	Beta		
(Constant)	3.14	.65		4.82	< .001
Difference in maternal RF	-.09	1.04	-.03	-.09	.93
Gender	1.00	.89	.17	1.13	.26
Difference in maternal RF * Gender	.11	.64	.06	.17	.87

This pattern was also found at the extremes as non-significant correlations were found between differences in maternal RF scores and differences in twins' IPPA scores in relation to mothers for the 10% most extreme discordant pairs on IPPA scores with $r(9) = .19$, $p = .59$ and for the 10% most extreme maternal RF-discordant pairs with $r(9) = -.42$, $p = .23$.

Paternal RF

Analyses were run again investigating the association between differences in paternal RF and differences in twins' coherence scores in the first instance, followed by the association between differences in paternal RF and twins' attachment differences measured by the IPPA in relation to fathers. First, a multiple regression was run looking at the relationship between the absolute difference in coherence scores, the absolute difference in paternal RF and twins' gender. Results showed that the model did not significantly predict

differences in twins' coherence scores with $R^2 = .01$, $F(1, 99) = .42$, $p = .74$, Cohen's $f^2 = .01$ (see Table 24).

Table 24

Coefficients of the Multiple Regression Looking at the Association Between Differences in Coherence scores, Differences in Paternal RF Scores and Gender

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	SE	Beta		
(Constant)	1.48	.55		2.67	< .001
Difference in paternal RF	-.09	.33	-.09	-.27	.79
Gender	.08	.35	.04	.22	.83
Difference in paternal RF * Gender	-.02	.22	-.03	-.08	.93

Again, in order to look at whether this pattern persisted at the extremes (Asbury et al., 2003), the 10% most extreme discordant pairs on coherence were identified and correlations between MZ twin differences in paternal RF and in adolescent coherence were calculated (see Table 25) and this correlation was run again in the case of the 10% most extreme discordant pairs on paternal RF (see Table 26). Consistent with results on the whole sample, no significant correlations between differences in paternal RF and differences in adolescent coherence were found at the extremes.

Table 25

Correlations Between Twin Differences in Paternal RF and in Coherence for the Most Discordant Pairs for Coherence

		Difference in paternal RF scores	Difference in coherence scores
Difference in paternal RF scores	Pearson Correlation	1	.28
	Sig. (2-tailed)		.44
	N	10	10
Difference in coherence scores	Pearson Correlation	.28	1
	Sig. (2-tailed)	.44	
	N	10	10

Table 26

Correlations Between Twin Differences in Paternal RF and in Coherence for the most Discordant Pairs for Paternal RF

		Difference in paternal RF scores	Difference in coherence scores
Difference in paternal RF scores	Pearson Correlation	1	-.19
	Sig. (2-tailed)		.61
	N	10	10
Difference in coherence scores	Pearson Correlation	-.19	1
	Sig. (2-tailed)	.61	
	N	10	10

Second, the analyses were run using twins' IPPA scores about fathers as a measure of attachment. In order to investigate whether paternal RF had a non-shared influence on IPPA attachment, a multiple regression analysis was run including the absolute difference in twins' IPPA scores for fathers as the dependent variable and the absolute difference in paternal RF scores, adolescent gender and the interaction between gender and differences in paternal RF scores as independent variables. The model was not found to significantly predict differences

in twins' IPPA scores with $R^2 = .05$, $F(1, 96) = 2.75$, $p = .06$, Cohen's $f^2 = .05$ (see Table 27).

Table 27

Coefficients of the Multiple Regression Looking at the Association Between Differences in IPPA scores about Fathers, Differences in Paternal RF Scores and Gender

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	6.24	.79		7.89	< .001
Difference in paternal RF	1.99	1.02	.59	1.95	.07
Gender	-3.14	1.10	-.45	-2.84	.06
Difference in paternal RF * Gender	-1.31	.66	.65	-1.97	.06

This pattern was also found at the extremes as non-significant correlations were found between differences in paternal RF scores and differences in twins' IPPA scores for fathers for the 10% most extreme discordant pairs on IPPA scores with $r(9) = .09$, $p = .79$ and for the 10% most extreme paternal RF-discordant pairs with $r(9) = -.25$, $p = .49$.

The quality of peer relationships

The next set of analyses explored whether differences in IPPA scores reflecting the quality of twins' peer relationships were associated with differences in twins' attachment reflected through the CAI coherence scores. Based on the MZ twin difference method described above, a multiple regression was conducted, with the absolute difference in coherence scores as the dependent variable and the absolute difference in IPPA scores about peer relationships, gender and the interaction between gender and the difference in IPPA scores included as independent variables. The multiple regression analysis suggested that the

model did not significantly predict differences in twins' coherence scores with $R^2 = .14$, $F(1, 95) = .65$, $p = .59$, Cohen's $f^2 = .16$ (see Table 28).

Table 28

Coefficients of the Multiple Regression Looking at the Association Between Differences in Coherence Scores, Differences in IPPA Scores about Peer Relationships and Gender

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	SE	Beta		
(Constant)	-.28	.45		-.61	.55
Difference in IPPA scores about peers' relationships	.02	.14	.04	.12	.91
Gender	-.25	.64	-.07	-.39	.69
Difference in IPPA scores about peres' relationships * Gender	.02	.09	.08	.24	.81

The quality of the twins' relationship to each other

Finally, this study explored whether differences in IPPA scores reflecting the quality of the twins' relationship to each other, predicted differences in twins' attachment, measured through the CAI coherence scores. Again, using the MZ twin difference method, a multiple regression was run including the absolute difference in coherence as the dependent variable and the absolute difference in twins' scores on the IPPA about their relationship to each other, gender and the interaction between gender and differences in twins' scores as independent variables. Results showed that the model did not significantly predict differences in twins' coherence scores with $R^2 = .18$, $F(1, 99) = 1.04$, $p = .38$, Cohen's $f^2 = .22$ (see Table 29).

Table 29

Coefficients of the Multiple Regression Looking at the Association Between Differences in Coherence Scores, Differences in IPPA Scores about the Twins' Relationship and Gender

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	1.45	.36		3.99	< .001
Difference in IPPA scores about twins' relationships	.01	.02	.26	.78	.44
Gender	.02	.23	.01	.08	.94
Difference in IPPA scores about twins' relationships * Gender	-.01	.01	-.08	-.25	.80

4.2 Discussion

4.2.1 Overview of parental mentalization and adolescent attachment

Before discussing the findings in relation to the three aims presented in Chapter 2, it is important to highlight that parents were consistently interviewed about the first-born twin first as there was no a priori reason to balance the order as any discrepancy in scores would reflect the effect of birth order, a variable that was not deemed to be influential in most instances with identical twins. However, it could have also been argued that birth order could influence parental attitude as the second born could be perceived as unplanned and thus treated as an extra burden on the family. Thus, on further reflection, counterbalancing the order of the interviews would have been advisable. Nevertheless, this potential limitation was taken into account in the analysis and subsequent discussion of the findings.

By way of addressing this, the author first started by investigating whether the interviewing order affected parents' RF scores. No significant differences were found between mothers' RF scores in relation to each twin. However, significant but small differences were found between fathers' scores in the two interviews. This is more likely to

suggest an interview order effect rather than a birth order effect, although this remains unclear as these variables are confounded. It is noteworthy that, given that differences between paternal RF scores in the two interviews were small, data with regards to fathers will be analyzed, keeping this limitation in mind when discussing the results.

Given the developmental changes occurring in adolescence and the changing needs of the adolescent outlined in Chapter 2, a question can be posited: do these changes affect the parent-child attachment relationship during and beyond this stage of development? Existing findings seem to present a mixed picture. A meta-analysis of 33 studies investigating distribution of attachment classifications in adults using the AAI found no over-representation of any insecure category (van Ijzendoorn & Bakermans-Kranenburg; 1996) whereas others reported that adolescents were more likely than younger children to be dismissive of their need for their parents. This may be explained with reference to the developmental phase under consideration as it may reflect the adolescents' attempt to separate from parents and assert their independence and autonomy from the family (Ammaniti et al., 2000; Weinfield et al., 2004).

Attachment classifications of adolescent identical twins to both mothers and fathers were first explored. In accordance with previous studies with preschoolers and adolescents in non-clinical samples, around 50% of children were assigned a secure classification to their mother (Ainsworth et al, 1978; Bowlby, 1969, Van Ijzendoorn & Bakermans-Kranenburg, 1996). However, when looking at the distribution of the insecure categories, results showed that around 40% of twins were in the insecure-dismissive category while less than 10% of adolescents had a preoccupied or disorganized attachment. These results are consistent with the view that, due to the changes occurring during the adolescence phase, adolescents are more likely to be dismissive of their needs for their parents as they are separating and attempting to assert their independence from the family (Allen, 2005; Ammaniti et a., 2000;

Kerns et al., 2006; Mayseless, 2005). Blos (1967) described this phase as a second individuation in which the adolescent is moving away from infantile ties and parental dependencies. These developments could explain the lower prevalence of secure attachment and the higher frequency of dismissing attachment in this sample as the urge for independence leads to substantial changes in the parent-adolescent relationship. It is noteworthy that a higher prevalence of dismissing attachment tended to be reported in samples in which stressors such as low SES, parental or child psychopathology were influential (Ammaniti et al., 2000; Colin, 1996; Paterson et al., 1994; Weinfield et al., 2004). However, the sample in this study was not deemed to be high-risk and was mostly constituted of middle- to high-class families (see Table 1, p. 86). It can therefore be suggested that other factors, such as methodological limitations, could in part explain the higher prevalence of insecure-dismissing adolescents in this sample. Shmueli-Goetz et al. (2008) devised the CAI, partly modelled on the AAI, as not only does it provide analysis of the content of the narratives, but it also relies on behavioural analysis which has been shown to provide information differentiating between attachment classifications which could have not been detected otherwise, especially in cases of disorganized attachment (Shmueli-Goetz et al., 2008; Target et al., 2003). Furthermore, it provides scores on nine scales which assess the child's overall state of mind with respect to current attachment relationships, some of which are scored separately with regards to each attachment relationship. It was therefore suggested that the CAI could be a better measure of attachment in middle childhood and adolescence. However, it is noteworthy that the CAI was only validated for children between 8 and 12 and its psychometric properties are not available for adolescents over 12 years of age, which could have affected the findings.

As previously noted, a lack of variability in twins' insecure attachment classifications was found in this sample with most insecure adolescents classified as dismissing. Based on

previous studies highlighting the lack of variability when using categorical variables (Royston et al., 2005; Vitaro et al., 2009), the author considered that attachment could be better measured using a continuous scale of the CAI that yielded a wider range of scores (see Table 9, p. 107). As discussed in Chapter 3, the coherence scale, measuring “reflectiveness, spontaneity and flexibility in discourse” (Shmueli-Goetz et al., 2004), was chosen as it has been found to have the strongest relationship with overall AAI classifications and infant attachment (Fonagy et al., 1991; Main et al., 1985). Furthermore, Fonagy et al. (1998) argued that coherence in attachment narratives comes from the parent’s capacity to observe their own mental functioning with a plausible view of their own and others’ feelings, beliefs and desires. They further explained that these are also measures of reflectiveness which have a direct implication on the quality of the parent-child relationship (Fonagy et al., 1998). Based on these findings, coherence scores were used as a measure of adolescent security as it has been found to be the dimension which best informs the overall classification (Fonagy et al., 1991; Fonagy et al., 1998; Main et al., 1985).

Even though limitations of self-report questionnaires have been highlighted in Section 2.2.2, psychometrics of the IPPA nevertheless showed that this measure is valid and reliable (Armsden & Greenberg, 1987). In addition, contrary to the coherence scale of the CAI, it provides two separate measures of attachment, one in relation to mothers and one in relation to fathers. Therefore, analyses looking at attachment security were run twice, once using the CAI coherence scale as a measure of attachment, and then using the IPPA continuous attachment scores for each parent.

Looking at the correlations between twins’ mean attachment scores in relation to mother, father, peers and twin, the only significant association was found between twins’ mean IPPA scores in relation to mothers and those about fathers with $R^2 = .15$. This suggests that twins are likely to score similarly to both parents and may provide potential evidence for

the suggestion that, with maturation, an overarching internal working model of attachment is formed rather than an attachment strategy in relation to each attachment figure (Allen, 2008; Bowlby, 1969; Main et al., 1985; Mayseless, 2005; Shmueli-Goetz et al., 2008; van Ijzendoorn & Bakermans-Kranenburg, 1996). However, further study is needed to establish this more conclusively. In addition, correlations between twins' attachment scores to a parent were moderate to small, with $r = .34$ and an effect size of $R^2 = .12$ for mothers and $r = -.12$, $R^2 = .01$ for fathers, which, it can be argued, could reflect that parts of the variance in twins' attachment, even if small, are not shared between the twins. Non-shared influences on adolescent attachment will be discussed in Section 4.2.3. Interestingly, twins' mean IPPA scores about their relationship to peers was not found to be associated with attachment to neither parent, contradicting previous findings suggesting that attachment to primary caregivers provides a template for future relationships (Allen, 2007; Bowlby, 1969; 1973; Weinfield et al., 2008). This finding is also at odds with the argument that adolescents tend to turn to peers as they provide emotional support to each other through the difficulties faced during this stage of development (Blos, 1967; Bowlby, 1969); more specifically adolescents who perceived their relationship with their parents as less secure were more likely to choose peers to fulfil an attachment function (Nickerson & Nagle, 2005). However, much of the research has tended to focus on peers and siblings but not specifically twins. It is possible that the unique nature of the twinship relationship may suggest a lesser need for close peer relationships. This will be further elaborated in the discussion of the third aim of this study.

4.2.2 The shared influence of parental RF on adolescent attachment security

The first aim of this study was to investigate whether parental RF constitutes a shared influence on adolescent security measured through coherence scores of the CAI and IPPA scores. Both maternal and paternal mean RF scores were significantly correlated with twins'

mean coherence scores with a correlation coefficient of $r = .33$ and $r = .31$ respectively.

Maternal mean RF scores were found to predict 11% of the variance in twins' mean coherence scores and mean paternal RF predicted 9% of the variance independently.

Therefore, it can be suggested that part of the association between both, maternal and paternal RF, and adolescent coherence was accounted for by shared environmental variation. This finding is consistent with the two behavioural genetics studies run in infancy concluding that maternal sensitivity and sensitive parenting have a shared influence on infant attachment security and are positively associated (Fearon et al., 2006; Roisman & Fraley, 2008). This, in part, could be explained by the idea that a significant correlation of $r = .53$ was found between maternal RF scores for each twin, suggesting that mothers' RF scores about one twin predicted 28% of the variance in their scores about the other twin. Similarly for fathers, a correlation of $r = .45$ was found between their RF scores about both twins, with paternal RF scores about one twin predicting 20% of the variance in paternal RF scores about the other. This suggests a similarity between a parent's RF score for each twin. This echoes attachment theorists suggesting that parental mentalizing capacities are based on the parents' own mental representations of earlier attachment experiences and are less likely to be influenced by child-specific factors (van Ijzendoorn, 1995; Fonagy et al., 1991). In fact, Fonagy and his colleagues found that parental reflective function, assessed before the child's birth, predicted infant attachment at 1 year of age (Fonagy et al., 1991) and mentalizing capacities in childhood (Fonagy et al., 1997).

Given that both, maternal and paternal RF were found to be associated with twins' coherence scores, a multiple regression was run in order to investigate whether the relationships between maternal RF and coherence and paternal RF and coherence were independent from each other. Interestingly, when both variables were entered in the model they predicted 14% of the variance in coherence, more than each variable alone. Furthermore,

maternal RF and paternal RF were both found to be significantly associated with mean coherence suggesting that they operate partially independently on coherence. It is interesting to highlight that they both predicted approximately the same proportion of the variance in twins' coherence scores. This echoes previous studies suggesting that mothers and fathers influence their children differently. In a longitudinal study from infancy to adolescence, Grossmann et al. (2002) highlighted that mothers provided soothing and comfort in times of distress whereas fathers provided sensitive support. In addition, studies focusing on adolescents suggested that paternal rather than maternal control affected self-esteem which was explained by the authors as the adolescents' expectation and need for guidance rather than affection from the father, which is in line with researchers who described the differential roles of mothers and fathers in adolescence (Sheehan & Noller, 2002). Investigating the effect of maternal and paternal differential parenting, Feinberg et al. (2001) and Pike et al. (1996) reported that siblings' depressive symptoms and externalizing behaviours were more likely to be associated with paternal rather than maternal warmth. These findings were explained by the idea that adolescents tend to spend less time with fathers and are therefore more sensitive to differences in their parenting. This, in part, could explain the significant but partially independent effect of maternal and paternal RF on twins' coherence. It is noteworthy that, not only is it important to look at mothers' and fathers' influences as distinct, but it is also important to understand the interaction between them in order to look at the impact they have on one another and on adolescents (Buist et al., 2002; Patterson et al., 1994). Future studies could investigate different dimensions of RF and coherence in order to shed some light on the differential impact of maternal and paternal RF on adolescent coherence.

Based on the above-mentioned idea that mothers' and fathers' influences on twins tend to affect each other, the association between maternal and paternal RF was explored and a correlation of $r = .41$ was found between mothers' and fathers' scores. This finding suggests

a similarity in parents' RF scores at a family level, with a parent's RF scores predicting 17% of the variance in the other parent's RF scores. This could be explained in one of two ways. Firstly, these results can be interpreted by looking at family processes and the interaction between mothers and fathers. Van Ijzendoorn and Bakermans-Kranenburg (1996) have found that partners were more likely than random pairs of people to be similar in attachment and it can therefore be argued that they are more likely to have more similar mentalizing capacities. This could explain the correlation between mothers' and fathers' RF scores when asked to reflect about their adolescent. Secondly, it can be argued that this finding reflects a shared genetic influence from twins to parents. This is based on previous studies suggesting that influences from twins to parents are mostly genetically governed (Plomin et al., 2001) and that genetic effects are more influential in adolescence (Fearon et al., 2013). Given that MZ twins share the same genetic background, it can be argued that they exert similar influences on parents, which could partly explain the similarity between mothers' and fathers' RF scores. This is potentially a very important finding; however, a full behavioural genetics study including both MZ and DZ twins is necessary to ascertain this hypothesis.

Next, the author investigated whether the association found, as part of the first aim of this study, between parental RF and twin coherence remained statistically significant when shared family factors such as, adolescent gender, parental education, family income and the number of siblings in the family, were included in the model. First, examining whether shared family factors were independently associated with adolescent coherence, maternal education and adolescent gender were found to be the only factors having a direct effect on twins' mean coherence with an effect size of .13 and .01 respectively. Pairwise comparison revealed that mothers who had attained A-level or higher education were more likely to have twins who scored higher on coherence than mothers who had only reached GCSE levels and that girls were more likely than boys to score higher on coherence.

The relationship found between maternal education and adolescent coherence echoes previous studies highlighting an association between maternal education, attachment and theory of mind in childhood (Campbell et al., 2004; Cutting & Dunn, 1999; Jenkins & Astington, 1996; Pears & Moses, 2003). However, it is important to note that these studies were conducted with preschool children. Cutting and Dunn (1999) suggested that maternal education was positively associated with children's language abilities, which in turn, were associated with greater theory of mind understanding (Jenkins & Astington, 1996). In addition, the amount of time that mothers talk about feeling states was found to relate to their children's understanding of emotions and beliefs (Dunn, Brown, Slomkowski & Youngblade, 1991), as well as to children's own feeling talk (Dunn, Bretherton & Munn, 1987). More recently, Pears and Moses (2003) found a direct association between maternal education and children's theory of mind. Taken together, these findings suggest that mothers who are more highly educated may spend more time explaining causes underlying phenomena to children than less educated mothers, which in turn affects the development of coherence and theory of mind (Cutting & Dunn, 1999; Pears & Moses, 2003).

Interestingly, paternal education was not found to be associated with twins' coherence scores. This could reflect the effect of differential parenting on adolescent behaviours described above suggesting that fathers tend to provide information, whereas mothers tend to have more emotional discussions with adolescents and provide more emotional support in times of distress (Collin, 1991; Doyle et al., 2009; Smetana et al., 2006; Steinberg & Silk, 2002). It is interesting to highlight that Doyle et al. (2009) found that girls perceived mothers as more available than fathers, and that in adolescence, fathers were shown to have more distant relationships with their children, irrespective of gender (Hosley & Montemayor, 1997; Montemayor & Brownlee, 1987; Youniss & Ketterlinus, 1987). This could suggest that adolescents tend to turn to mothers for support more often than to fathers. This could be tied

to the idea that, during these times, mothers are likely to tap into a wider range of mental state descriptors and use more mind-minded comments to provide emotional support to their adolescent, which was previously found to be correlated with educational attainment (Rosenblum et al., 2008). It would be interesting for future studies to investigate the relationship between maternal and paternal education, topics of discussions between mothers, fathers and their adolescent and their association with adolescent coherence. This could shed more light on mothers' and fathers' differential impact on adolescent coherence highlighted above.

Furthermore, a significant but weak association was found between adolescent gender and twins' coherence scores, with girls more likely to score higher on coherence than boys. It is however important to remind the reader that adolescent gender was found to only predict 1% of the variance in adolescent coherence and future studies are necessary to further investigate the effect of gender on adolescent coherence using the CAI. A more detailed discussion of this finding will follow below.

Based on these findings, the next analysis investigated whether the model including parental RF in addition to shared obligatory factors would better explain twins' mean coherence scores than parental RF scores alone. Results showed that the model including maternal RF and shared family predictors significantly predicted 24% of the variance in mean coherence, with maternal mean RF scores and adolescent gender found to significantly contribute to the full effect in relation to coherence. Similar results were found for fathers with paternal RF and adolescent gender predicting 23% of the variance in adolescent attachment. This suggests the importance of parental RF, found to independently predict part of the variance in twins' mean coherence scores and to remain a significant predictor when shared family predictors were included in the model. This finding highlights the role of the shared nature of parental RF in predicting the shared variance in twins' coherence.

Interestingly, maternal education was no longer a significant independent predictor of coherence and it can be argued to have overlapping predictions with other variables included in the model, such as parental RF. This echoes previous findings suggesting that maternal education was found to be related to mothers' ability to verbalize awareness of infant mental states, such that mothers with higher levels of education were more reflective and engaged in more mind-minded commenting (Rosenblum et al., 2008). However, this study was the first to look at the association between parental education, parental RF and coherence in adolescence, and future studies are necessary to shed more light on this association and how these constructs interact.

It is important to add that, in both multiple regressions, adolescent gender was found to be independently associated with coherence scores with girls scoring higher than boys. This echoes some early findings suggesting that in adolescence, girls tended to be more secure and less dismissing than boys (Kenny, 1990; Rice, 1990; Schoppe-Sullivan et al., 2006), but is at odds with the findings of a meta-analysis of attachment in adulthood assessed using the AAI, which showed no effect of gender on adults' attachment security (van Ijzendoorn and Bakermans-Kranenburg; 1996). These inconsistent results could be seen as a by-product of age whereby differences between parent-girl and parent-boy relationships are more pronounced in adolescence, as girls tend to show greater concern for interpersonal relationships (Doyle et al., 2009; Furman et al., 2002). Furthermore, it can be argued that the AAI measures representations of past attachment relationships whereas the CAI, used in this study, measures representations of the ongoing attachment relationship with parents, and is therefore more likely to isolate gender differences. Further, it can be argued that continuous variables, such as coherence, yield more variability than categorical ones (Vitaro et al., 2009), and are thus more sensitive to gender differences. However, despite the different sex-role expectations in adolescence whereby Doyle et al. (2009) and Zimmerman and Becker-Stoll

(2002) theorized that females showed greater concern with interpersonal relationships than males, gender differences in attachment have not often been addressed and further research is needed to establish the association between gender and adolescent attachment more conclusively.

As previously discussed in Section 2.2.2, self-report questionnaires are not without limitations. However, a strength of the IPPA is that it provided a continuous attachment score to mother and father separately, whereas the attachment coherence scale of the CAI provided a single score based on the whole narrative. Interestingly, in contrast to results found using attachment coherence as a measure of attachment security, correlations between mean RF scores and mean IPPA scores were not found to be significant suggesting that parental RF, both maternal and paternal, does not constitute a shared influence on adolescent attachment measured using a self-report questionnaire. This study was the first to investigate the association between parental RF and attachment based on self-report questionnaires. In fact, most studies focused on parental RF and its relationship to attachment in infancy, mostly measured using the SSn, based on observations of the infant's behaviours (Slade et al., 2004; Fonagy et al., 1997; Grienenberger et al., 2004), while others investigated its relationship to attachment in middle childhood and adulthood based on CAI or AAI narratives (Ensink et al., in press; Fonagy et al., 1991). It remains an important question as to whether parental RF, argued to be based on the parent's own internal working models of attachment (Fonagy et al., 1991; Fonagy & Target, 1998), is more likely to be associated with measures reflecting the child's internal working model of attachment such as the CAI narratives, rather than self-report questionnaires. As previously argued, self-report questionnaires yield limited answers as they are not based on open-ended questions. It can be argued that they provide less insight about the participant's unconscious processes, and are therefore less likely to reflect internal working models of the mind. Furthermore, the validity of the data collected through

questionnaires could be compromised as they could increase the likelihood of the participants deceiving themselves or the researcher, especially when reporting socially undesirable thoughts or behaviours. It can therefore be argued that the limitations of self-report questionnaires highlighted above could explain the different findings between the two measures. Another explanation of the discrepant findings between the two measurements of attachment security could be that they potentially measure different constructs in relation to attachment. Arsmnden and Greenberg (1987) described the IPPA as measuring how well attachment figures serve as sources of psychological security whereas the attachment coherence scale focused on the adolescent's spontaneity and flexibility in their description of their relationships with caregivers. Furthermore, IPPA scores reflect three dimensions of attachment, trust, communication and alienation, that might not all be emphasized in the attachment coherence scale of the CAI which is based on the overall coherence of the narrative about adolescents' relationships to their caregivers. In fact, a non-significant correlation was found between twins' mean attachment coherence scores and mean IPPA scores to parents, further suggesting that the CAI coherence scale and the IPPA measure different constructs of attachment security.

Based on the second aim of this study, separate analyses were run in order to investigate whether any shared family factors were independently associated with parental RF, further explaining the relationship between parental RF and adolescent coherence; however, none were found to be influencing parental RF. While the findings did not reflect that the shared family factors investigated in this study are directly associated with parental RF, future studies are needed to test this further.

4.2.3 *Non-shared influences on adolescent attachment security*

The third aim of this study was, firstly, to explore whether parental RF has a non-shared influence on adolescent security using the MZ twin difference design. This involved correlating the difference between a parent's RF scores about one twin and those about the other with the difference in the twins' coherence scores in the first instance, followed by correlating the difference between a parent's RF scores about the twins with differences in twins' IPPA scores for that parent (Pike et al., 1996; Vitaro et al., 2009). A correlation of 1 would mean that knowing the twins' discrepancy for the environmental factor allows the researchers to predict the exact discrepancy for the outcome measure (Pike et al., 1996).

Interestingly, non-significant associations were found between differences in a parent's RF scores, both mothers' and fathers', about each twin and differences in twin's coherence scores and IPPA scores, whether boys or girls, suggesting that parental RF does not constitute a non-shared environmental influence on adolescent security. This could in part be accounted for by the high significant correlation of $r = .53$, $R^2 = .28$ found between mothers' RF scores for each twin and $r = .45$, $R^2 = .20$ between fathers' scores. In addition, the correlations of $r = .41$, $R^2 = .17$ found between twins' coherence scores, $r = .34$, $R^2 = .12$ between their IPPA scores for mothers and $r = .12$, $R^2 = .01$ between their IPPA scores for fathers, could suggest some similarity in their scores. Based on these findings it can be put forward that parents' RF scores for each twin are similar and little within-twin variance is present to predict differences in attachment security based on attachment coherence and a self-report questionnaire. In this regard, and based on the methodology used by Asbury et al. (2003), the analysis was run again on the ten most discordant pairs on coherence and then on the ten cases with the highest RF differences. However, even in cases of extreme discordance, no significant associations were found between the two variables.

These findings are in contrast with some of the results in Fearon et al.'s (2006) study, one of the two behavioural genetics studies investigating the nature of the influence of maternal sensitivity on 1-year old twins' attachment (Fearon et al., 2006; Roisman & Fraley, 2008). In fact, Fearon et al. (2006) had highlighted a small yet significant non-shared influence of maternal sensitivity on attachment as in instances of discordant attachment, maternal sensitivity was found to be negatively correlated to attachment security. These differences could be explained in one of two ways. First, the measures used in both studies differed in a number of important ways. Even though parental sensitivity and parental RF can be compared, the two constructs are slightly different. Sensitivity was defined as the mother's capacity to consider her child as a separate being, thus perceiving things from his point of view and respecting his activity. It includes the accurate interpretations of the implicit cues in the infant's behaviours and responding promptly and appropriately to his vocalizations and soothing him in times of distress (Ainsworth, Bell & Stayton, 1971). Furthermore, maternal sensitivity codings were based on coding direct interaction between mother and infant, focusing on features such as cooperation or contingent responsiveness whereas maternal RF was based on scoring attachment based on narratives providing a more global picture of the relationship. Reflective functioning also differs from sensitivity in that, not only does it measure the parent's capacity to be aware of beliefs and desires underlying behaviours, but it also includes the parent's knowledge "of the expectable transactional relationship between beliefs and emotions, and of feelings and beliefs characteristic of particular developmental phases or relationships" (Fonagy & Target, 1997, p. 680). Therefore, parental RF includes the parent's capacity to contain the child's negative affect without being overwhelmed (Fonagy & Target, 1998). It can thus be hypothesized that differential parental treatment or parental favouring of a twin, which have been found to be associated with differences in twins' attachment classifications (Brody, 1998; Fearon et al., 2006; Feinberg et al., 2000), is more

noticeable through the construct of sensitivity based on observations of mother-infant interactions.

Second, the age of the child could have influenced the differences between the two findings. Behavioural genetics studies have highlighted that, in adolescence, non-shared environmental influences were more likely to explain differences between siblings (Fearon et al., 2013); in addition, Burlingham (1952) theorized that identical twins strive for differentiation in adolescence as they are trying to assert their different personas. It can therefore be hypothesized that, even if adolescent identical twins differ in behaviour or attachment classification, mothers' overall reflective stance is reflected through interview narratives. This score is not only based on the mother's capacity to be aware of the differences between her twins, but her capacity to reflect about the twins' separate feelings, emotions and desires at a similar level. This could consequently explain the finding that discordant attachment between twins was not associated with differences in maternal RF capacities.

This study also investigated whether IPPA scores, measuring the twins' peer relationships and their relationship to each other, constituted a non-shared environmental influence on adolescent security using the MZ twin difference method described above. It was hypothesized that differences in twins' attachment, measured through coherence, are associated with differences in the quality of their relationship to each other and to peers i.e. if one twin is high on coherence and the second twin is low, then one might receive a higher score on the IPPA than the other. This was based on one of the basic premises of attachment theory suggesting that the quality of the attachment relationship to the primary caregiver provides a template for future relationships (Bowlby, 1973). However, a non-significant relationship was found between differences in twins' coherence scores and IPPA scores.

Previous studies (Furman & Buhrmester, 1992; Laible et al., 2000) have highlighted that peer relationships tend to be stronger in adolescence than in childhood, as peers provide opportunities to share their concerns and anxieties and these relationships play a role in the adolescents' increasing autonomy and decreasing reliance on parents. The finding that peer relationships do not constitute a non-shared influence on twins contradicts previous studies suggesting that peers play a bigger role in adolescence (Laible et al., 2000; Plomin et al., 2001). Laible et al. (2000), using the IPPA to measure adolescents' attachment to parent and peers, concluded that peers tended to be more influential than parents on adolescent adjustment in terms of aggression and depression. Based on the findings of this study, it is possible to argue that, in the specific case of identical twins, peers could play a less influential role than with singletons, as it can be argued that twins could perceive each other as providing the emotional support and communication necessary during this stage of development. This echoes Laible et al.'s (2000) idea that siblings closer in age tend to play the same role as peers.

This result could reflect the idea that twins share a more complex relationship than siblings as they have a unique bond since infancy and are continuously looking at the mirror image of themselves (Burlingham, 1946; 1952). It is noteworthy that twins' mean IPPA scores reflecting the quality of their relation to each other were not found to be significantly correlated with mean IPPA scores about mothers and fathers. This could further explain why previous findings that the quality of the parent-siblings relationships is associated with the quality of the siblings' relationship to each other (Feinberg et al., 2003; Richmond et al., 2005; Sheehan & Noller, 2002) was not replicated in the case of identical twins. This can also be interpreted in light of the measures used to assess both adolescent attachment and the quality of the twins' relationship to each other and to peers as previous studies finding a significant association between the two concepts mostly used self-report questionnaires

directly measuring differential treatment or aspect of the parent-adolescent relationship. Furthermore, the IPPA was only validated to investigate the quality of adolescents' relationship to peers and was adapted, for this study, to be used with twins. Therefore, future research could replicate this finding using more appropriate measures of the quality of the twinship relationship and specific aspects of the parent-twin relationship.

It is interesting to highlight that these results did not differ depending on the adolescent gender. This is in line with previous studies using the MZ twin difference model suggesting no significant non-shared environmental differences between boys and girls in childhood and adolescence (Anderson, Hetherington, Reiss & Howe, 1994; Asbury et al., 2003).

In sum, parental RF has been found to have a shared influence on twins' coherence, but not adolescent attachment based on the IPPA, suggesting that similarities in twins' coherence were partly explained by consistencies in parental mentalizing capacities towards both twins. It was suggested that parental RF capacities are based on parents' internal working models of attachment relationships rather than on child-specific factors. It can also be argued that the moderate correlation found between twins' coherence scores could also be partially explained by shared genes. Interestingly, even though mothers' and fathers' RF scores were found to be partially similar, which, it was hypothesized, could reflect some adolescent genetic effect or similarities in partners' attachment, they were found to influence adolescent coherence independently. Furthermore, adolescent gender was found to be significantly associated with twins' coherence scores, with girls more likely to score higher on coherence than boys. However, this study did not find non-shared influences of parental RF on adolescent coherence. This was reflected by the significant correlation found between parents' RF scores about each twin suggesting that a parent's scores about one twin was very

similar to those about the other twin. In addition, a moderate correlation was found between twins' coherence scores suggesting similarities between them. Taken together, this could imply that there was little within-twin variance to predict differences in coherence.

Based on Fearon et al.'s (2013) finding that non-shared environmental factors play an important role in understanding attachment in adolescence, and the failure to identify non-shared influences on adolescent attachment coherence in the quantitative analysis, a case study aiming to identify child-specific factors explaining twins' discordant attachment will be presented in the next chapter, before presenting a general discussion of the results.

Chapter 5: Case Study

The previous chapter has aimed at identifying whether parental RF constituted a shared or non-shared influence on twins' attachment in adolescence. The results were based on quantitative analyses from the whole sample, which limited the depth of study of the narratives provided by both parents and adolescents in order to give a better understanding of parents' representations of twins and the parent-twin relationship (McGuire, 2001; Polkinghorne 1988).

This chapter will provide a case study, focusing on the fourth aim of this study, illustrating some non-shared environmental factors influencing discordant attachment between the twins such as twins' perceptions of closeness to a parent (Kiang & Furman, 2007) and twins' de-identification from each other (Burlingham, 1952; Caspi et al., 1992), through a detailed comparison of the mother and the father's interview about each twin. Given that 400 interviews were conducted for this study, observations from various interviews will be brought in alongside the case study to illustrate the central themes presented above.

This chapter will open with a description of the family background followed by a section comparing both, mother's and father's narratives about their relationship with each twin in an attempt to identify markers of secure and disorganized attachment in the twins. The next part will focus on the interplay between parents' characterization of the twins and the twins' perception of themselves and their roles in the family, emphasizing the differences which might lead to discordance of attachment. This was based on the idea that, throughout the process of interviewing 100 families, the author identified an emerging impression that parents' characterization of the relationship as "easy" v/s "hard" or "easy-to-deal with twin" v/s "the twin who causes trouble" tended to affect their capacity to mentalize. The

interviewers observed that parents tended to mentalize more about the twin they tended to describe as “hard to manage”, the one they perceived as “causing more trouble”.

It is noteworthy that the family chosen was part of the sample interviewed using the long PDI (see Appendix 1.1) used to validate the short PDI (see Chapter 3); therefore, the narratives analyzed included questions relating to the parents’ relationships to their own parents as well as the parents’ description of the twins as these were considered as a useful tool providing information regarding the parents’ childhood and their perception of their twins.

5.1 Family background

This chapter examined the PDI interviews of both the mother and the father as well as the CAI narratives of the 16 year-old twin girls. The twins have a younger sibling of 10. The family comes from a high socio-economic background, both parents have a degree and work on a part-time basis.

The mother was moderately reflective when discussing her relationship with both twins and scored a 6 on the two interviews, whereas the father scored a 5 for Twin 1 and a 3 for Twin 2 (the PDI transcripts are given as Appendices 5.1, 5.2, 5.3 and 5.4). The twins’ attachment classifications were discordant, with Twin 1 being securely attached to both parents and Twin 2 disorganized-dismissing towards both, mother and father. Twin 1 scored 7.5 on coherence, whereas Twin 2 scored a 6 (the CAI transcripts are given as Appendices 5.5 and 5.6). With regards to the perceived quality of their relationship to each other, both twins scored high on the IPPA with scores of 97 for Twin 1 and 99 for Twin 2 out of a maximum of 110.

This family was chosen out of the sample interviewed for the validation study (see Section 3.3.1, p. 91) using the longer PDI (see Appendix 1.1) which included questions about

the parents' relationships with their own parents. This was thought to capture some information about the parents' own history which could shed some light on the relationship between parents and twins. This family constituted a case of extreme discordance of attachment between the twins whereas parents scored moderately on RF. Therefore, the aim of this chapter is to attempt to pinpoint factors which were not captured by the quantitative analysis of the interviews and questionnaires in order to determine the twins' discordant attachment.

5.2 Parents' mentalization of adolescent girls: differences in mother's and father's narratives as possible predictors of discordant attachment

5.2.1 *Comparing mother's narratives for Twin 1 and Twin 2*

Scores on the mother's PDIs for Twin 1 and Twin 2 suggested that she was as reflective when discussing her relationship with each one of the girls. This section aims at looking for patterns which could be overlooked when assigning an overall score to the narrative in order to elucidate the reason behind the twins' discordant attachments.

No patterns were identified throughout the mother's narrative when discussing her relationship with Twin 1. The mother was able to reflect about positive and negative aspects of her relationship with her daughter, as well as mentalize about the family interactions, the influence of each parent's feelings on each other, on each one of the daughters and make links with her childhood experiences with her own parents. An extract representative of these aspects follows:

“How do you handle your angry feelings? I might raise my voice a little but generally I don't have a loud voice, my husband does that, I try and do what my mum always did with it which is, rather than get angry, to withdraw and show her I am very disappointed she acted this way because it is less confrontational and sometimes it works in that she is sorry she has behaved that way“

In contrast, the narrative regarding the mother's relationship with Twin 2 suggests that she was more likely to compare both adolescents before giving an example specific to Twin 2. This is in line with previous findings explaining that parents of identical twins tended to compare their adolescents more than non-identical twins or other siblings in an attempt to promote their differentiation and the de-identification process (McCartney et al., 1990). For example, in the second interview the mother states:

“She is a lot more volatile than her sister, so I recognize I think I am more like her whereas (twin) is more like my husband”, or

“I think she uses me as a confidant in a way that (twin) doesn't”, or

“I think that (adolescent) more than maybe her sisters likes to have each of us on her own”, or

“You know she is every bit as good as (twin) and she can stand on her own two feet, she doesn't have to be the person her sister is”, or

“She was quite mature and I said “just think it through” and she is less hot-headed than (twin) and she can listen a bit more yeah...[...] she is easier to handle than (twin)”, or

“She would say “I want to talk to you” if she is upset so she is quite, you don't have to tease it out quite as much as you do with (twin)”.

It can be argued that the mother was comparing the twins in the narrative about Twin 2 because it was the second interview and she was trying to consciously differentiate between her relationships with the two girls. This trend was also apparent in the narratives of mothers throughout the sample as they were more likely to compare the twins in the second interview rather than the first one, mostly when describing their twins or their relationship. The following extracts illustrate this idea:

Table 30

Examples from the Whole Sample of Mothers' Answers in the Second Interviews

Case	Question	Answer	Overall RF
1	Description of Twin 2	"he um he probably is a bit more open with his sort of er.. affection he's more emotional um, um"	5
	Description of the relationship with Twin 2	"sort of that bit more straight forward you know you'll ask something you'll get the answer so umm....can't really think of an example though. <i>Does that happen in all kind of situations or are there situations where you feel that happens more than others?</i> Umm...I think he's um... a bit sort of more even sort of in his moods um... umm I suppose where maybe he will sort of shove away and hide things, you'll have to go to him whereas (twin) it's sort of there everyone will see it, he's the same with everyone"	
2	Description of Twin 2	"he is just a bit more confident than his brother, not a huge amount and the interesting things is that (twin) often has the edge on academic and sports and stuff but J is more confident with who he is and doesn't take things at heart as mush"	4
	Description of Twin 2	"things don't phase him in the way that they hit home sensitive wise a bit more with (twin) but mmm people who say things to him, he probably doesn't get teased as much as his brother just for, people tend to know which ones to tease and because he is more confident he doesn't get teased, quite laid back really"	
3	Has the most trouble with	"she sometimes plays the role of somebody who is not that confident and I think that's the contrast between her and (twin) because (twin) is more outgoing so she sometimes believes, I don't know whether she really does but she sort of believes that (twin) is mm not more popular but that she has more friends than her, I don't know whether she really believes it, and it's not that she is not as confident but she sometimes acts it..."	6
	Description of the relationship with Twin 2	"(twin) is more self contained and I don't think she does tell anybody sometimes"	
	Pain or difficulty	"she ... hasn't.. doesn't quite now it yet, now ,so she has a bit less self belief than (twin)"	
4	Description of Twin 2	"you have (twin) which so extrovert and (adolescent) who probably has been in her shadow sort of speak but she is not in her shadow, but that's what it feels like, she is very different, I can't... I don't know, just can't explain her...."	5
	Description of Twin 2	"I mean I am sat here and I am thinking I am sounding like she is my favourite but it is not the case, she has always been... (Twin) is very sure of herself but (adolescent) isn't. another adjective for her is nervous, although she can come across as being quite confident when she knows you"	

5	Description of the relationship with Twin 2	“We’re probably the 2 extremes, with the fun and the confrontational side because (twin) and I we don't really confront each other, she is quite happy to accept what I say but I do find (adolescent) challenging...”	4
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The previous extracts illustrate mothers’ tendency to compare the twins when answering the questions the second time, a trend which was not apparent during the first interviews. When discussing their relationship with Twin 1, mothers were more likely to describe him/her, their relationship or specific incidents without comparing the twins’ reactions or feelings.

However, even though, in this case study, the mother was found to recognize differences between both twins, analyzing the twins’ CAI narratives revealed that the mother’s comparison of the two siblings in the second interview is reflected in the twins’ representation of each other. This echoes Burlingham’s (1949) idea that identical twins lack a sense of uniqueness and therefore rely more on mothers’ perceptions of them to form mental representations of themselves. This is apparent in the Twin 1’s CAI as she described Twin 2 as needing more support:

“If there’s something that she wants to do so say for example she wanted to go, she’s quite, I’m more independent than her and she kind of needs my opinion on everything, which is kind of a bit irritating because she’s going to have to learn at some point I’m not going to be there to say, you’re going to have to do that, you’re going to have to do that, you know”

Furthermore, Twin 2’s interview reflects her difficulty to find her place in the family, her identifying with her twin sister or her trying to act differently in order to fit it:

“Well I’m, (twin)’s more, not domineering, she’s more outgoing than me. I’m fine to sit back and just not really do anything. So (twin) makes more friends more easily. She’s more out there and I’m not. So I find it easy if (twin)’s made friends first and then I can kind of be with (twin) and then I’m kind of in there as well so it’s, it’s fine“

These extracts reflect Twin 1’s perception of herself as the “older” sister who protects and takes care of her sibling, whereas Twin 2 described herself as more compliant in order to

please her sister who she compares herself to. This is parallel to the mother's perception of the girls.

The next section aims at analyzing mother's answers for Twin 1 and Twin 2 on these questions in an attempt to link it to the twins' discordant attachment classifications.

5.2.2 *Comparing mother's narratives on specific questions*

When comparing the mother's scores on each question between the narratives relating to Twin 1 and Twin 2, it can be observed that she scored higher when discussing some topics in relation to Twin 1, i.e. close, not close, anger, rejection and loss.

The following are extracts from the mother's answers to the "close" and "not close" questions for each twin:

"Close", Twin 1:

"Mmmmm I would say we are close all the time unless we argue and she is getting better at that, she is less volatile. *Can you think of a specific example when you felt close?* Mmmmm yesterday we were at rehearsal and I got there late and she got to the front of all the others and she was like "oh I love you, it's my mum, she has arrived" you know, she's... Yeah I felt close then, she is not embarrassed to say this is my mum and I love my mum... *How did you feel?* Just warm and mmm yeah I feel very honoured that she isn't embarrassed to own up I am her mum really... *how do you think she felt?* She smiled a lot so I am sure she felt happy...."

"Not close", Twin 1:

"Mmmmm (pause) well it's usually ... arguments over the standard teenage things really, tidy your bedroom and we argue over music practice [...] I don't think I ever don't feel close to her, but of my 3 children she is the one more likely to have an argument with, that's the way she is, she is very passionate, we have arguments about her not eating her meatballs a few nights ago and it all escalates with (adolescent) because she is very dramatic she is a drama queen mmm so it all gets a bit out of proportion but nothing we can't sort out before she goes to bed... [...] in my world something like her not eating her meatballs is not that important and I will let it go, my husband feels that if we let the little things go she will take advantages with the big things so we have to deal with the little things and I often feel that if we disagree we don't have to thrash it out now [...] husband and I were dealing with it in different ways and he needed to deal with it now and I said leave it, let her go upstairs, it doesn't matter, so it's more, more frustration that she is very dogged, and if she, if she believes herself to be right she doesn't let it go.. *How do you think she felt?* mmm

well she ended up getting tearful mmm I think on this occasion she knew she was being silly but ... she doesn't really admit she is wrong mmm so.... I think she was upset on that one yeah... “

“Close”, Twin 2:

“Well on that walk we had a lot of laughs, that was a good moment, mmm I tend to take her to her violin lesson and that's a bit of a her and me time, we tend to choose what type of music we will have in the car so that we can sing very loud so that's the kind of... nice moment in the week when we do that, out time together... *how did you feel?* Very happy, she makes me laugh, good fun, she is fun, not hard work, she is quite, quite an easy girl... *how do you think she felt?* She loves those times together because she says “it's you and me time tomorrow, it's you and me!” I think (adolescent) more than maybe her sisters, likes to have each of us on her own, like sometimes if we are going for a walk and I ask if anyone else wants to come “no don't ask anyone else, it's just you and me” a bit jealous of that, not jealous but she enjoys if it's a moment just her and me”

“Not close”, Twin 2:

“Mmmmm no Not really no... “

When considering answers to these questions, it can be highlighted that the mother is able to provide a more balanced view of her relationship with Twin 1, as she was able to describe and reflect on both, positive and negative, aspects. She acknowledged the fact that there are times when she doesn't feel close, and was able to reflect on the impact of an argument on herself, her daughter and her husband. This trend was not apparent in the answers regarding Twin 2. The mother was more superficial in her description of her mental states and those of her adolescent and was only able to provide positive descriptions in relation to her relationship with her.

The same pattern was found when comparing the mother's answer on the “rejection” and “losing” questions.

“Child rejected”, Twin 1:

“Mmmmm (pause) rejected? (Pause) I don’t know, I actually don’t know if she feels rejected, I don’t think so... mmmmm maybe when her sister got a boyfriend she felt a little bit rejected from (twin)’s world, can’t think of anything else really”

“Child rejected”, Twin 2:

“I don’t... I don’t think so, no... She’s very much in the centre of things you know”

“Losing child”, Twin 1:

“Yes occasionally because she is developing a lot of confidence, not losing but I am watching her take flight which is lovely and what she is supposed to be doing, she organized this concert at school and she was the host for the evening and I watched her up there with the microphone “hello ladies and gentlemen” and I thought waw where did that come from? She is starting to take flight, certainly not losing because we are not less close, certainly not at home but I am watching her develop her own life which is lovely and what she should do”

“Losing child”, Twin 2:

“No... actually no... “

As highlighted in previous answers, the mother is unable to think of instances when Twin 2 felt rejected or whether she feels she is losing her, even though she was able to be moderately reflective regarding these aspects of her relationship with Twin 1.

Finally, the mother scored higher for Twin 1 when asked to reflect about times she felt angry with her and tended to emphasize the positive aspect and minimize the negative ones in her response regarding Twin 2.

“How did you handle your angry feelings towards (Twin 1)? Mmmmm I very rarely shout but I might.... I might raise my voice a little but generally I don’t have a loud voice, my husband does that, I try and do what my mum always did with is which is rather than get angry, to withdraw and show her I am very disappointed she acted this way because it is less confrontational and sometimes it works in that she is sorry she has behaved that way because she thinks it has upset me but not always, sometimes she thinks “I thought you have done this” “well I have done it!” “ no you haven’t!” those sorts of arguments, here is no lashing out or swearing or anything like that but it might be the “bloody” occasionally but nothing else.... do you think your feelings

affected her? My feelings when I get cross? mm not as much as they have on me, if we do have something, maybe it's something that has just blown up before we have left for school in a huff, I carry that with me during the day she doesn't ... and when she is back she flings her arms around me... "hiii" and it's all gone, she has completely forgotten that she left feeling awkward and sometimes she is just a bit rude in terms of she will sort of "stop overreacting" which I think is rude and she doesn't always realize she is doing that and that affects me more than it does her"

In the extract above, the mother was able to reflect about her reactions, link those feelings to her relationship with her own parents and the effect of the situation on each one involved in the situation, herself, her husband and her daughter. The answer to the same question regarding Twin 2 follows:

"Again sometimes (adolescent) doesn't quite know the art of negotiating so she may say can she go around and see her boyfriend and I will say that's fine but how about you just go around till 6pm and then we pick you up because we are doing this as a family and she might, without computing that instantly be in a huff because she told him she could stay till 9 and when she calms down and thinks it through, then she would say that's fine, because she would have seen him since midday so those sorts of things I get frustrated because we seem to be going through the same ground again... *has it happened recently?* Yesterday (laughs) but actually she was quite good with that because we said we would go and see a film as a family in the evening mmm and so she did initially say "oh but"... and then she was quite mature and I said just think it through and she is less hot-headed than (twin) and she can listen a bit more yeah... quite good at listening... *how did you handle your feelings?* Mmmm (pause) I don't ... I don't tend to... as I said I don't tend to shout, (adolescent) is easier to negotiate with because she is less dramatic than her sisters, she has moans but by and large you can catch it a lot sooner with (adolescent) and just reason with her so it's actually, she is easier to handle than (twin)"

In this extract, the mother gives a general example incorporating positive and negatives aspects of her daughter. However, in contrast to the first answer, when asked to discuss a specific example, she tended to minimize the negatives attributions towards her daughter. This was followed by a repetition of the word "good", "quite good with that", "good listener" which, it can be argued, reflects the mother's lower capacity to think about negative attributions regarding Twin 2.

It can be argued that these markers reflect a skewed view of Twin 2 as mostly positive which stands in contrast with a more balanced view of Twin 1. Providing a balanced view of

a relationship and reflecting about both positive and negative aspects without being overwhelmed, has been found to be a marker of security (Fonagy et al., 1991; Shmueli-Goetz et al., 2008). These mental representations could therefore be transmitted from mother to daughter, thus creating a link between a secure relationship between mother and Twin 1.

It is noteworthy that the mother scored similarly on RF for both twins despite the differences illustrated above. This could be explained by the idea that she scored higher for Twin 2 on the remaining key questions such as relationship affecting development, guilt, child upset and separation. Furthermore, it can be argued that, looking at the overall PDI narratives revealed that the mother is moderately reflective, irrespective of the twin she is discussing. However, given that the sample studied was constituted of identical twins, an in-depth comparison of the answers on each question was conducted, beyond scoring purposes. This shed some light on the mother's representations of each twin and their comparison could be associated with their discordance in attachment security.

5.2.3 *Patterns in the father's narratives*

This section aims at investigating whether the same patterns are found through the father's interviews. A recurrent theme emerged when examining the father's PDI in relation to Twin 1. In addition to the difficulty in providing specific examples in relation to each question, he tended to be controlling of the interview and challenging the questions asked. The first question, "can you choose 3 adjectives that you feel describe (twin)" opened with

"Gosh mmm (laughs) mmmmm precise, mmm how long is your audiotape coz this can take.... I thought this was going to be yes or no answers mmm didn't know I had to think, oh grief"

This answer could either reflect the father's anxiety about answering this sort of question or his reluctance in doing so. Similar statements were used throughout the narratives of this case study, reflecting the father often answering with a mocking or slightly undermining tone

Interviewer: “Has there been a time when you and (twin) did not feel close?”

Father: “Not as close? mmm I don’t know that I can answer that, I don’t know about your definition of what is close!”

Interviewer: “How do you think your relationship with (twin) is affecting her development or personality?”

Father: “Well it has to, doesn’t it? That’s... I am not quite sure what answer you are looking for that one... “

Interviewer: “Can you describe yourself as a parent?”

Father: “Myself as a parent to her? No... I don’t think I can... mmmmm (laughs) gosh!”

Interviewer: “How did you handle your angry feelings?”

Father: “Badly I would have said mmm yes... do I need to expand on that???”

Interviewer: “Are there times when you feel guilty as a parent?”

Father: “Have I felt guilty? Sorry, guilty over what? *Could be anything....* have I ever felt guilty as a parent? (Laughs) what sort of question is that???. Over what???. I drove at 35 miles an hour on a 30 miles limit, hang on don’t record that (laughs) no... Guilty as a parent? In relationship to my daughters? *Yeah....* no... I don’t think so... not aware that I have“

Interviewer: “Do you ever feel like you’re losing (twin) a bit?”

Father:” No?! That’s an odd question again!”

Interviewer: “Is there anyone very important to you who (adolescent) doesn’t know that you wish she was close to?”

Father: “No! what’s that???”

Another trend that emerged through the narrative was the father’s tendency to distance himself from negative feelings and situations. He failed to provide examples regarding times he didn’t feel close to Twin 1 and seemed surprised to be asked whether he ever felt guilty as a parent. However, he was able to provide some answers indicating a reflective stance which justify his moderate RF score on the interview.

In contrast, he was able to answer questions relating to negative situations regarding Twin 2, such as times he didn’t feel close to Twin 2, times he felt guilty, or instances when his daughter might have felt rejected. However, even though a specific example was described in great detail, he was not able to think in terms of mental states.

In that same example, it is noteworthy that the father tended to ask the interviewer to repeat the answers he had given regarding Twin 1 which were then used for Twin 2. This could reflect his struggle to differentiate the twins and a tendency to treat them as a twin unit, a theme which will be discussed in detail later in the chapter.

Fathers' tendency to ask the interviewer to repeat the answers they gave in the first interview or to use the same answer when discussing both twins was recurrent in other fathers' interviews from the whole sample as illustrated in the following extracts:

Table 31

Extracts of Fathers' Answers in the Second interviews Based on the whole sample

Case	Question	Answer	Overall RF
1	Description of the relationship with Twin 2	"Well it would be very annoying if I say the same words as with twin but I think that's what I feel, it is fun, there is bond of trust again I am very proud of the fact it is a trusting relationship and yeah it is loving, there is no questions, that would be the three it still applies"	4
	Relationship affecting development Losing	"Yeah I think it's the same as the answer I gave for (twin) I think ,... her development is guided by, I think both my wife and I are intelligent we are both professional people" "Exactly the same answer, rewind tape for (twin) exactly the same feeling that..."	
2	Description of Twin 2	"(Adolescent) much the same as (twin)... much the same... they are both, they are so alike..."	2
	Description of the relationship with Twin 2	"the same as before really yeah much the same... I mean... I wouldn't .. I couldn't treat one different to the other... you know..."	
3	Description of the relationship with Twin 2	"oh here we go again (laughs) (pause) it's difficult to describe hmm"	2
4	Description of the relationship with Twin 2	"I think I would pick the same 3 adjectives, which were close, affectionate, competitive, I don't think it's very different...."	4
5	Description of the relationship with Twin 2	"yeah well I forgot what I said now but hmm what did I say... I am sorry but it is the same kind of situation I don't have to treat it any differently and I do treat them any way differently because I don't ... they are pretty much the same characters"	3

6	Not close	“ditto the situation a while ago it was something we had to deal with and there was a bit of distance until it got sorted out...”	3
7	Relationship affecting development	“yeah same answer as before really... giving them different experiences hmm I would be worried... ditto the same answer”	2
	Guilty	“ditto the same answer as (twin)”	
	Losing	“yeah same answer as before”	

These extracts illustrate fathers’ lack of differentiation between the twins at times, but could also reflect their impatience or eagerness to finish the interview as most of the examples given in those transcripts were short and not as detailed as in the first interview. Some fathers did use the same words or examples in both narratives but were able to reflect about the twins’ emotions and feelings according to their separate individual needs. These fathers tended to score higher overall on the PDI.

5.2.4 *Markers of disorganization in the father’s and Twin 2’s narratives*

The same dismissive tone of voice and slightly controlling answers found in the father’s narrative about Twin 1 also coloured the second interview. The interview started with

“Do I have to use completely different words?? Could I have notes? Yeah ditto, ditto, ditto...”, “that’s pretty self-explanatory!” and “that’s such an odd question!”

It can be argued that the controlling tone of the father mediated Twin 2’s disorganized classification. Control of the interview and signs of contempt for the interview have been considered as hallmarks of this attachment classification. It reflects a strategy used when defensive exclusion fails and segregated systems of mental representations become apparent, mostly in anxiety-provoking situations (Bowlby, 1980; Hesse & Main, 2000). Literature around determinants of this attachment classification suggests that disorganization in the offspring could reflect disorganization in parental caregiving strategies (Shmueli-Goetz et al., 2008). Information regarding the father’s relationship with his own parents was

gathered through some questions of the PDI. Answers reflect the father's dismissing and distancing strategy, represented for instance, through his answer regarding ways he would like to be like and unlike his father. He stated:

“I would like to be better at expressing my feelings... not necessarily so much to my children but perhaps more to my wife because I am quite a private person in talking about my own feelings and my own self, I just don't like doing it because I think you might waste a lot energy doing it and not actually doing anything about it”

When asked to reflect about his relationship with his mother, the father tended to oscillate between contradictory answers which constitutes a marker of disorganization or preoccupation (Hesse & Main, 2000). When invited to discuss ways in which he would like to be like and unlike his mother he explained:

“Like my mother?? No... I wouldn't say that at all! Well... like my mother ... I don't quite... no, no absolutely not... well yeah she is a lovely lady, she is very special but do I want to be like her? No... I am happy to be who I am... a part of me is like her I am sure, very much like her, but it is to a direct choice no...”

Next, attention turned to identifying markers of disorganization in Twin 2's CAI narrative. Literature describing disorganized attachment also suggested that disorganized children and adolescents tend to assume a parental role within the relationship (Shmueli-Goetz et al., 2008), a developmental process which has been documented in studies in early childhood (Borelli et al., 2010; Groh et al., 2012; Main & Hesse, 1990; Solomon & George, 2011). This pattern is apparent through Twin 2's CAI transcript as some passages reflect the adolescent's taking care of her parents (Shmueli-Goetz et al., 2008). When Twin 2 was asked to describe her relationship with her mother, she chose the words “friends”. This extract illustrates the example she gave regarding this aspect of their relationship:

“All the time if mum's upset, if she's had an argument with someone or something bothering her at work and you know she'll tell me and whoever else, and it's good. [...] Well if she's, if she's had an argument with, with dad for example, or (twin), if she's had an argument with (twin) she'll usually be quite upset, upset with that. And I can, I can like give her hug and I can say 'you know, it's fine' and stuff like that. I think. I hope I can prove it. *How do you feel?* I feel really, really kind in a way because I can, I show that I love her cos I like hug her and I, yeah I show that I love her yeah. I don't know. *How do you think your mum feels?* I think she feels happy

because, well not happy, happier because I can, I kind of, I'm there for her all the time. And I'm not gonna let her down and I'm not gonna disappoint her"

Other signs of disorganization in the adolescent's narrative included examples reflecting a mismatch between the descriptor of the relationship and the example given. The following extract illustrates the example she gave to describe a time she felt her relationship with her father was fun:

"Well again, the insane questions thing. I always ask stupid questions. And he just makes me laugh cos he's like 'that's a stupid question' and then I realise how ridiculous it is. [...]. *What does dad say?* He just says that's insane and then I just laugh and it's kind of, he laughs as well. *How do you feel?* I feel really happy because he can just tell me like straight to my face that I'm just being ridiculous. And then I understand how dreadful it is and it's just. It's a nice feeling. Yeah. [...] because I know that he wouldn't, if he's straight with me and that he won't say, he won't lie to me in any other area. So I can be reassured that if he's gonna tell me the truth like about that I'm being ridiculous, he, he'll tell me the truth about what he thinks kind of like what I'm wearing or what my act, what I'm doing and. That's, that's reassuring. It's good. *How do you think he feels?* I think he feels a bit irritated because I'm insane so often that it's kind of. I think he thinks I should think about what I'm saying. Which I try to, but it doesn't really work. So I think he is a bit. I think he gets a bit irritated if I ask so many insane questions all the time. So I think I've gotta work on that"

Interestingly, mismatched statements were also highlighted when Twin 2 discussed her relationship with her twin sister. The following extract reflects Twin 2's tendency to act like the parent as well as a lack of differentiation between herself and her twin:

"*Do you support each other?* Yes. I always look out for (twin). For example, I'm really paranoid about her missing the bus. So if it's 10 minutes before the bus comes and she's not there I'll be texting her and calling her like asking her where she is. And she like does the same for me if I'm not there. *How do you feel?* I feel, in a way I feel kind of more paranoid because I, I, she gets quite irritated if I'm, if I'm always kind of 'you know, where are you, what are you doing?' Or. I always ask her opinion on everything and that really irritates her. Cos I've got to kind of like be my own person. But I don't know, I want to be her. Probably. Yeah."

In sum, the mother's narratives, even though scored equally on RF, revealed a different mental representation of each twin. Twin 1 was seen in a more balanced way, acknowledging both positive and negative aspects of the adolescent and the relationship, whereas Twin 2 was mostly described through positive interactions with the mother. It can

therefore be argued that mother's characterization of the child may account, in part, for the adolescent's attachment classification. With regards to the father's influence, the association tended to be more complex. In fact, if taken separately from the mother's interviews and based on markers of disorganization and insecurity identified in the father's narratives, it would have been expected that twins could have been classified as insecure to father. However, Twin 1's CAI reflected a secure attachment to the father. Based on the preliminary analysis in this section, it can be argued that a secure attachment relationship with the mother could mediate a secure attachment to father in adolescence in cases of a more distant relationship to the latter. This mediational link could not be applied for Twin 2 which could, in part, explain the twins' discordant attachment.

5.3 The interplay between parents' characterization of the twins and the twins' perception of themselves and their roles in the family as a predictor of attachment discordance

Fearon and his colleagues (2006) explained that non-shared environmental influences create a complex inter-relationship between family members which can be best elucidated by looking at how family relationships affect each other. Informed by this idea, this section aims at illustrating differences between the twins based on 3 themes: the twins' identification with parents, the twins' perception of their roles in the family and parents' characterization of the twins' and the twinship relationship. It could be hypothesized, based on discussions in Section 5.2, that Twin 1's attachment classification is mostly influenced by the mother's style and coherence of the PDI narrative, whereas Twin 2's is mostly understood by looking at the father's. This section illustrates qualitatively how these differences are apparent in the twins' CAI narratives.

5.3.1 *Twins' identification to parents*

The section aims at describing how the twins' identification with each parent might have affected the development of their personality. This is informed by previous literature as Frank and Cohen (1980) explained that contrasting identifications with parents tend to foster long-term personality differences which are important determinants of discrepancies in twins' behavioural styles during puberty.

For example, in the mother's interview about Twin 2 she stated "I think I am more like her whereas (Twin 1) is more like my husband". Twin 2 makes a similar statement when asked to think of ways her personality has been affected by her parents. She explains

"I haven't got temper from my dad. I'm not very, I don't really shout that often I don't think. I'm more like my mum, (twin)'s more like my dad. Cos I kind of, I, I back down in arguments, I back down more. (Twin)'s just kind of fiery and 'I've gotta be right' and I'm not really like that I don't think. She can be like that so. I think that's more like my mum"

Kolb (1961) presented two possibilities of twins' identification to their parents. He termed one the inverted identification, based on the repression of rivalry and hostile feelings between twins and their parents which, in most cases, results in a lack of personal identity. He suggested the second as everted identification, which can be applied to the case study presented. Kolb (1961) explained that in cases of everted identification, the twins' personal identity develops through their identification to a different parent. This is aided by the parents' pre-existing fantasies which shape the role they perceive each twin should play.

As Twin 2 stated in the narrative, she identifies more with her mother and feels different to her father. It can therefore be argued that she is attempting to act in ways she thinks would please him. For example, when asked to give words describing her relationship with her dad she states that she loves him and illustrated it by giving an example about a handshake they share. When asked how she feels during these times she explains:

"It's kind of a laugh because I don't really do handshakes, I'm not really that type of persona and it's just kind of a bit of fun really. So yeah. It's a bit ridiculous. *How do*

you think dad felt? I think he gets a bit tired of it sometimes. I think, I think it's just something that makes him laugh so. I hope it makes him laugh anyway. Yeah"

This example suggests that Twin 2 is trying to find ways to please her father, even if it includes changing her "persona" in order to make him laugh. This pattern was found throughout the narrative. When asked to give another example explaining why she felt she has a loving relationship with her father, she described the time he got her a gift for her birthday. She felt "really happy cos it shows that he cares about [her] and it shows that he went out and spent money and time". Furthermore, when the interviewer enquired about how she thought her dad felt at that moment she replied "I think he felt happy because I was, I was overjoyed with what he got me and I think he felt that what he had done was worthwhile". This reflects her exaggerated response in order to ensure her dad knows how she felt. Kolb's (1961) idea that parents' wishes shape the roles played by each twin is apparent through Twin 2's narratives. She explains that she chose History and Science as subjects at school. When asked how she thought her father felt about that, she answered:

"I think he felt. I think in a way he felt proud because (twin)'s not doing science. I'm the only one who's doing science and I think it's kind of a letdown for a daughter of 2 doctors not to do science. I think that. So I think he was proud that he could help me choose what I wanted to do and I think he felt kind of fatherly in a way. If that makes sense. Yeah"

In Twin 1's narrative, even though the mother and Twin 2 considered Twin 1 to be more like her father, no clear indications of identification with her father were found. Instead, when looking at the narrative as a whole and more specifically at the questions relating to her parents' effect on the development of her personality and ways in which she considers being like and unlike her parents, Twin 1 presented a more balanced view, reflecting both positive and negative aspects she perceived as similar to her parents. This is mostly apparent in her answer to the question "how do you think your personality has been affected by your parents?". She explained:

“I, I’m always told that when I was younger I never used to argue at all so in some ways that’s either the fact that I’m now more argumentative as a result of just purely growing up or because I’ve been more influenced by my dad. but then that’s just that, I don’t know whether that’s had, had he not been there, not that I don’t want that, but had he not been there, I might not be as argumentative now so possibly to do with that, but both, both my parents are, they’re lovely, they’re nice people, they’re lovely people and they’re kind, they’re funny, they’re genuinely nice and so I think I’m kind of, if I’m anything like that, then I’m fine, I want to be. *So you think they’ve affected in that way then?* Yeah I think I’m, I, like from mum especially she, she’s a calm person and in some, if I’m having an argument I can think what would mum do and then I’d get, I’d become more calm or I’d treat the situation differently.”

Twin 1 used the same style of answer when asked to think of ways she would like to be like and unlike her parents. She repeats that she thinks she is argumentative like her father, which could explain why the mother and Twin 2 perceive her as more similar to her father, but Twin 1 was also able to explain that she would like to be able to “stand back like mum does, stand back, think about it, not argue”.

In sum, it can be argued that Twin 1 is able to identify with both parents and perceive herself in a more balanced way, as reflected by the adjectives used to describe herself and her relationships with her parents. As highlighted in the literature, this reflects a more secure attachment pattern to her parents (Shmueli-Goetz et al., 2008). By contrast, Twin 2 tended to modify her behaviours in order to please her parents or adhere to expectations they have of her. It can be argued that these behaviours do not reflect markers of security of attachment which could explain attachment discordance between the twins. This can be illustrated more clearly by looking at the twins’ perceived roles in the family.

5.3.2 Twins’ perception of their roles in the family

Throughout the CAI narratives in this case study, it can be suggested that the twins’ perceived roles in the family could be influenced by two main factors: their psychological maturity and their perception of the twinship relationship. This section aims at investigating these two themes and attempts to link them to the twins’ discordant attachment status.

Different levels of psychological maturity

Twin 2's answers reveal her susceptibility to play the role of the "younger" twin, in order to get her parents' affection as illustrated in the following extract:

"Last year he [dad] got me, he got me lots of DVDs. I watch quite a lot of DVDs with my dad cos he likes, he kind of likes horror films. I'm not that into horror films, but if he's there holding my hand it's not too bad"

This theme is also apparent in Twin 1's narratives as she explains that she feels she should protect Twin 2 as she is not as independent as an adolescent should be. This is reflected in her discussion of her relationship with her:

"If there's something that she wants to do so say for example she wanted to go, she's quite, I'm more independent than her and she kind of needs my opinion on everything, which is kind of a bit irritating because she's going to have to learn at some point I'm not going to be there to say, you're going to have to do that, you're going to have to do that, you know, if I'm going, if we go to different universities I'm not going to be able to tell her to do everything. So she always seems to need my opinion on everything, which I think she needs to learn"

She also explains that Twin 2 tends to spend more time with their younger sister of 10 whereas she is busier with more "grown-up" activities:

"She's kind of closer to my little sister, but then I don't put, not that I don't put so much of an effort in with (twin), but (twin) spends more time with (younger sister) than she does with me, but then that's, I do more work than (twin) so that's probably affected by that cos I spend my whole time doing business and then I, I don't spend as much time with (younger sister), which is, I want to, but I don't, I genuinely don't have time to do that, I just spend, I was think I seem, I seem to spend my whole time doing business and (twin)'s always with (younger sister)"

In sum, it can be argued that, in this case study, the twins' different levels of psychological maturity could have affected their perceived role in the family, which, in turn, and in conjunction with other factors described in Sections 5.2 and 5.3.1, could account for their discordant attachment to their parents. Twin 1 tended to be more aware of her role in the family and seemed to be pushing for more independence, arguing boundaries with her parents, expressing her opinions even if different than her parents' and exploring new opportunities. By contrast, Twin 2 still appeared in a transition from early puberty to

adolescence and was likely to express her love to her parents in a concrete way, seemingly unable to de-idealize them which is a necessary step in adolescence (Allen, 2008). This echoes previous literature explaining that twins develop at different rates, and the lagging twin's attempt to developmentally catch up may not happen until mid- or late-puberty (Frank & Cohen, 1980).

The twins' perception of the twinship relationship

Following from the ideas presented in the previous section, differences in the way the twins perceive their relationship with each other and asserting their individuality can be considered to affect their development and their perceived role in the family. From a family system perspective, the sibling comparison theory posits that, alongside the impact of the quality of the parent-adolescent relationship, in adolescence, siblings regard each other as a basis for comparison and self-evaluation which affects their development and adjustment (Feinberg et al., 2000).

This is apparent in Twin 2's narratives, mostly when asked to describe herself. She explained:

“Well I'm, (twin)'s more, not domineering, she's more outgoing than me. I'm fine to sit back and just not really do anything. So (twin) makes more friends more easily. She's more out there and I'm not. So I find it easy if (twin)'s made friends first and then I can kind of be with (twin) and then I'm kind of in there as well so it's, it's fine“

She then added:

“How do you think your friends feel when you are being funny? I don't know. Well, I like, they, I'm quite well known in my form kind of thing. Me and (twin), they always think me and (twin) are cute together. So I think they find me and (twin) funny in that kind of way. I think. Yeah. Some ways it's a bit irritating because I want to be an individual, but I love (twin) so much so it's kind of, it's fine. I don't mind being with her. “

These two extracts illustrate Twin 2 being torn between wanting to be her own person but needing to be with Twin 1 in order to be appreciated by friends at school. Furthermore,

when asked to describe ways she would like to be like and unlike her mother, she emphasized that she “want[s] to be [her] own person”. She continues “I don’t know. I. No not really. I love my mum, but I don’t really, I don’t want to be her. I don’t, I don’t, no. That sounds really harsh doesn’t it”. It can therefore be argued that Twin 2 is striving to individuate from both her mother and her twin in order to assert her own individual identity away from the twin relationship but is still struggling to be independent from her sister (Watzlwik, 2009).

It is important to emphasize that, previous studies investigating twins’ perceptions and the effects of twinship through interviews have highlighted the subtlety in which the ambivalence towards the twinship can be expressed (Jourard, 1968; Kozlak, 1978). In a study investigating twins’ perceptions of twinship using interviews and questionnaires, Kozlak (1978) reported no indication of blurred ego boundaries between the twins. However, he highlighted that these processes are largely unconscious and could therefore be expressed in more subtle ways that were not emphasized through the interviews used. The ambivalence can be seen through Twin 2’s narratives through her attempt to assert her individuality from Twin 1 but also her attempts to define herself in relation to Twin 1 as more “domineering” and “confident”. This echoes Akerman and Suurvee (2003) and Watzlawik (2009) notion that identical twins tend to derive more self-confidence from their sibling relationship than fraternal twins do. Kozlak (1978) and Jourard (1968) explained that the ambivalence as well as other conscious or unconscious processes such as denial or repression can possibly affect the twins’ responses and should be taken into account when explaining the twins’ perceptions of the twinship. For instance, Kozlak (1978) found that, even though signs of identity confusion were highlighted in the sample of twins interviewed, the twins tended to minimize similarities between them.

A glimpse of these processes can be found at the end of Twin 2’s interviews as she was directly asked to describe and comment on her relationship with her twin. She explained:

“Do you support each other? Yes. I always look out for (twin). For example, I’m really paranoid about her missing the bus. So if it’s 10 minutes before the bus comes and she’s not there I’ll be texting her and calling her like asking her where she is. And she like does the same for me if I’m not there. How does that make you feel? I feel, in a way I feel kind of more paranoid because I, I, she gets quite irritated if I’m, if I’m always kind of ‘you know, where are you, what are you doing?’ Or. I always ask her opinion on everything and that really irritates her. Cos I’ve got to kind of like be my own person. But I don’t know, I want to be her. Probably. Yeah”

In this extract, Twin 2 is seen as playing a parental role towards her sister but also acknowledging that struggle in that she wants to be her own person but also “be” Twin 1. This example presents a clearer picture of Twin 2’s perception of the twinship and the struggle she has to separate from her sister and de-identify from her mother.

When examining Twin 1’s narrative, a somewhat similar image of the twinship emerges: Twin 1 feels more independent and explains that Twin 2 is constantly coming to her for approval and verification, as illustrated in the extract in Section 5.2.1, she explained that she felt Twin 1 should be less reliant on her and attempt to take initiatives without waiting for her approval or encouragement. This relates to the previously discussed ideas that Twin 2 is treated like or behaves like the younger twin.

Looking at other CAI narratives, most twins explained that they have a good supportive relationship and “hang out” with each other. They were able to provide a balanced description of times when they argue, moments they spend together and others when they do their separate activities. However, some twins described their sibling as “annoying” or “we’re not like twins [...] we argue all the time”. These statements (see Table 32) were followed by examples illustrating a struggle to separate from each other and being “clingy” or having one’s own circle of friends and activities.

Table 32

CAI Extracts from the Whole Sample Reflecting Twins’ Struggle to Separate from Each Other

Case	Twin	CAI extracts: twins' relationship
1	1	<p><i>“how do you get on with your twin?</i> Not well at all. We're not like twins. [...] we have the same friends and we go out together but we don't get on at all. <i>Do you argue quite a lot?</i> Yeah. About everything. We're nearly always arguing its quite annoying. [...] Shout at each other. Sometimes gets violent. [...] and we just say little comments to annoy each other and then that gets all of us annoyed so I suppose we do it for ourselves but then it doesn't really help us in the long run so. <i>Do you ever support each other or look out for each other?</i> [...] not usually, if something dangerous has happened we usually be against each other not sticking up for each other. <i>Do you hang out at all?</i> Erm well we do spend time together, I think that's why we get so annoyed with each other. [...]. <i>Do you have different rooms or do you share?</i> Yeah we've got different rooms, I think that's better, we've got our own space and then we. Whenever we go out we kind of, we usually almost always go out with the same people. [...] so I think he gets quite annoyed at that, that I'm friends with, cos he was friends with them first, he was saying oh I was friends with them first, you can't be their friend, they don't like you when I know they do like me and that gets me, that's quite annoying (inaudible) it's ok but yeah we can go out with each other”</p>
	2	<p><i>“How do you get on?</i> Mmmmm alright I suppose, arguing a lot but... <i>what kind of stuff do you argue about?</i> Everything. Little things, big things... yeah.... <i>and do you think that you support each other?</i> Mmmmm usually like, if someone at school starts like, maybe picking on him or... one of my mates says something, sometimes I can see that he's getting upset or worried or something so I just say “stop it like leave him alone” but... not really anything apart from that. <i>So do you hang out together?</i> [...] yeah my mates, I hang out with them and sometimes... and sometimes he's just like, comes over to them... this is like in year 7, they'd be somewhere and he'd come over and then ... if we go out with them he'll come along as well and... same a bit... because it's quite annoying, he always comes out with us, even if we're doing homework he asks “oh can I come, or help?” so like, it's annoying, he's quite clingy but... I feel as if they're my friends, they're on my side of the year, they're in my class just... [...] it's not hard but it's like... annoying... I'm not being compared but it's like.... they always group us together like, I'm a twin whatever....”</p>
2	1	<p><i>“How do you get on with your twin?</i> Like a love hate erm, actually it's a lot more towards the hate side but yeah. <i>do you argue?</i> Yeah we-we can just like feel annoyed by each other's presence really erm. <i>What things annoy you?</i> Er it's like, it's like as soon as he disagrees about a certain thing like me or him the other person will like always find a way to criticise them we have to, and he can just become so annoying and stuff and like, say he's going to get a (inaudible) and I'll say pick me up one up as well and just purposely not get one and annoy me and, and then we'll get into an argument over that or something. [...] <i>Do you support each other?</i> Erm not that much to be honest. <i>Do you hang out?</i> No, like different sets of friends and everything so. [...] <i>Different sets of friends?</i> Yeah. <i>See friends separately?</i> Erm yeah erm well occasionally we talk and stuff but that's it.”</p>

Through these examples, it can be argued that the proximity between twins and their inability to have their separate groups of friends and activities directly affects their relationship together as they are trying to assert their individuality in adolescence.

The next section aims at investigating the parents' characterization of their twins and their relationship in order to illustrate similarities or differences which could predict the attachment discordance between the twins.

5.3.3 Parents' characterization of the twins and the twinship relationship

Schachter (1976; 1985) presented the sibling de-identification theory which may go some way in elucidating observed differences in parents' characterization of their twins. She explained that parents' description of siblings' relationships with parents based on a dichotomy of personality traits can be beneficial in decreasing sibling rivalry and conflict. However, it can become detrimental if these poles are taken to the extreme or form the basis of a self-fulfilling prophecy (Schachter, 1985; Schachter, Shore, Feldman-Rotman, Marquis & Campbell, 1976). Comparing the descriptors used by parents and twins to describe their relationship did not flag any dichotomies in the first instance. However, when considering the parents' overall narratives and descriptions of the twins discrepancies could be observed.

For instance, Twin 1 was described by her mother as being "impulsive" and "impetuous" and gave examples of her challenging authority and her parents' opinion. She explained these behaviours as being "standard teenage things". Her answer to the question "do you ever feel like you're losing her a bit" summarizes her view of Twin 1's development and characteristics as she stated:

"Yes occasionally because she is developing a lot of confidence, not losing but I am watching her take flight which is lovely and what she is supposed to be doing [...] She is starting to take flight, certainly not losing because we are not less close, certainly not at home but I a watching her develop her own life which is lovely and what she should do"

She also added

“I will wait with excitement her life really because she just, she will fly more than her sister because she is.. she aims high she wants to be a barrister, she jumps into everything 100%”

These extracts show that the mother perceives Twin 1 as being more confident than Twin 2 to try new experiences which is reflected in the twins’ narratives as previously elaborated on (see Section 5.3.2). In fact, in the interview about Twin 2, the mother starts comparing her daughters emphasizing that Twin 2 is more “cautious” and retreats “if she is out of her comfort zone”. She further explained that she is less confident and has fewer friends and is more likely to follow her sister’s footsteps.

When describing what gives her the most difficulty or pain as a parent of Twin 2 and times when she worries about her, the mother answers:

“The same issue I think just watching her sometimes get to the edge and say “oh I can’t do it it’s a bit new” when I know she can, so turning down opportunities occasionally when really it’s well in her capabilities but she doesn’t go for it, she might come home and say they were doing auditions for something and I would say “did you go for it?”, “Oh no!”, “why? Why not?”, “I didn’t think I am good enough”, that after all these years you think, I thought I got that message across to her that she is good enough but she ... hasn’t.. doesn’t quite now it yet, now ,so she has a bit less self belief than (Twin 1)”

“Mmmm I think she is little bit more dependent on people around her so maybe when she goes off to university she will miss (Twin 1) and home more than vice versa so I think I would worry about those sorts of things when she is forced to be on her own I think she needs a bit more support“

It is interesting to note that the mother did not feel as if she was losing Twin 2. It can therefore be argued that the mother considers Twin 1 as being more forward in her development and separation-individuation process than Twin 2. The question remains however, whether the twins’ different developmental levels affect the parents’ characterization of them or whether, as Schachter (1976; 1985) described, the parents’ mental representations of the twins and their relationship influence the girls’ behaviours.

Finally, focusing on differences between the parents’ descriptions, it is interesting to note that the mother was able to differentiate between the twins in the examples given more

than the father did. There was a higher frequency of “the girls” in the father’s narratives. It can therefore be argued that, because Twin 2 was shown to want to please dad more, she unconsciously identified with him and the “unit” view of the twinship which might explain why she has more trouble individualizing. In contrast, Twin 1 was able to see the positive and negative aspects of her father and her relationship with him therefore, even if he treats them as a unit, she is able to find her own individual identity.

The idea that fathers were more likely to treat twins as a unit whereas mothers perceived them as individuals with separate needs was repeatedly found throughout the sample. These extracts (see Table 33) illustrate fathers’ tendency to do shared activities with both twins together and their inability to separate the twins’ individual needs by referring to them as “they” rather than giving twin-specific examples. In contrast, mothers’ narratives contained less references to “they” and were more focused on each twin’s emotions and feelings.

Table 33

Extracts from the Whole Sample of Fathers’ Answers Illustrating Their Tendency to Treat Twins as a “Unit”

Case	Question	Answer
1	Close	“Mmmm not particularly... mmmmm but I mean they are both, both of them I went to a foreign trip with them to (area) as part of a team, my wife didn’t go but I went with them so that was quite a good time with them, shared time with them... [...] <i>what made it close?</i> Shared experience really mmmmm doing stuff together new experiences together yeah.... <i>he felt?</i> mmmmm yeah I think, I think they... I think they felt it was significant for them, mmm a bit of an adventure yeah... <i>you felt?</i> It was good, it was good to go with them to see them mature ad do something more grown up and cope well with some difficult situations”
2	Close	“Mmm at Christmas the time we went to (place), I am sorry I have to use the same answer because yeah I don’t spend as much time with them outside the holidays, my wife has more time but at Christmas time I always take more time off so my wife is still working but I have an extra 3 or 4 days with them, just me and (adolescent) and (twin) and we went to Brighton and followed the pier... <i>you felt?</i> It was great! [...] <i>why do you consider this a time you felt close?</i> [...] mmm it’s just not enough time together really so every moment I can have with M and her sister is bonus”

3	Not close	“hmmm (pause) I think it’s.. there could be an issue with the exams coming up and there is work to be done and come on guys, you can do this and there could be a bit of friction there where they should be putting in the work but they are not... a bit of a sticking point... <i>you feel?</i> it’s difficult you feel sort off ogre-ish, making them doing it, obviously you want the best for them the best for G so it’s one of those things he needs to get through. <i>why don’t you feel close?</i> hmmm it’s just you know subject comes up the work has to be done and creates friction it’s not good is it? They don’t want to do what you ask them to do and it can be a bit of a trial ”
<hr/>		
4	Losing	“ <i>how does he feels about it?</i> I don’t know if they thought about it a lot, they are just thinking about the progression between GCSE and A level so what they are thinking about is less about leaving home and more about what A level you take and what career follows on from that and I think they are starting to think about that, with D it is quite clear to him that he will do math and science and his only question mark is whether he continues with German because the German teacher keeps telling him... I mean all his life he has been wanting to do math and science from very young so I think he is quite confirmed in that ”

Through these extracts it can be argued that fathers spend less individual time with their twins. One father’s answer to the “close” question summarizes this idea:

“hmmm recently? (pause) well silly thing me and her hmm (twin) was out with her mum so me and her had to go buy some food, it’s stupid but we went to get food for dinner so yeah... giving her opinion and stuff... this weekend so yeah... us together... *why did you feel close?* I think mainly because, because they are twins they are mainly together they tend to be together when we go out, it’s not many times when we go out as individuals... individually so there isn’t many occasions because a lot of their hobbies are the same.. *you felt?* yeah it’s different quite good, a bit unique... not very often (laughs) *she felt?* glad, she was glad to get out of the house and do something (laughs) yeah just something fun to do together recently”

In sum, this chapter first looked at some aspects of the parents’ narratives which could have mediated the twins’ discordant attachment. It was hypothesized that a secure attachment to the mother could mediate a secure attachment to the father in situations where the twin described a more distant relationship to the latter. Then, the chapter focused on the twins’ narratives, identifying differences in the twins’ identifications to their parents and their perception of their role in the family, highlighting their effect on discordant attachment. The

chapter closed on an overview of the parents' and twins' characterization of the twinship relationship and their influence on each other and the twins' attachment classifications.

The next chapter will present a summary and a general discussion of the findings before mentioning some of the limitations of this study and present ideas for future research.

Chapter 6: General Discussion

Some of the main tasks of adolescence are the development of autonomy, identification with aspects of parents and peers and the process of identity formation (Erikson, 1956). These changes are accompanied by major cognitive and emotional developments which can be overwhelming for the adolescent, leading him/her into a state of instability (Somerville et al., 2010). It has been suggested that parental mentalization facilitates the healthy passage through adolescence as it might help parents understand the changes occurring in the adolescents leading to a better understanding of feelings and thoughts underlying their behaviours (Benbassat & Priel, 2011). An important limitation of the current literature is the dearth of studies investigating parental mentalization about their older children. Ensink et al. (submitted) found a significant moderate association between mothers' RF scores measured using the PDI and attachment in middle childhood, and Benbassat and Priel (2011) looked at this association in adolescence and found a strong correlation between parents' and adolescents' RF scores. However, no research to date has investigated the association between parental or adolescent RF and adolescent attachment or the nature of parental RF influences on attachment during adolescence. Behavioural genetics studies have highlighted an important shared environmental influence of similar constructs to parental RF, such as parental sensitivity, on attachment, but contradictory results have been found with regards to the non-shared nature of maternal sensitivity (Fearon et al., 2006; Roisman & Fraley, 2008). It is noteworthy that both these studies were conducted in infancy.

Based on the above findings and limitations in the literature, this study was undertaken with four aims: a) to examine whether parental RF has a shared influence on attachment in adolescence, b) to explore whether there are additional shared family factors that directly influence parental RF c) to investigate whether there is a non-shared influence of

parental RF, peer and twin relationships on adolescent attachment, and d) to identify child-specific factors that might explain twins' discordant attachment to a parent.

In order to investigate these, the PDI had to be shortened in order to be less demanding in terms of time and focus requirements given that each parent had to complete the interview twice, once about each twin. In addition, the wording of the questions was changed in order to be more appropriate for parents of adolescents rather than younger children. Some prompts were also added to help parents focus on the specific twin in question, when possible, instead of discussing their relationships with both twins during one interview. Other researchers have devised a shorter version of the PDI, for parents of adolescents, resulting in high inter-rater reliability and Cronbach's alpha coefficients (Benbassat & Priel, 2011). However, this version of the PDI was only available in Hebrew. Examining psychometric properties of the shorter PDI version devised for this study revealed high internal consistency of .85 between the questions and high inter-rater reliability between the author and two other trained raters with ICC coefficients between .72 and .95. In order to further validate the short PDI, results yielded by this interview were compared quantitatively with those of a longer, already validated version of the PDI which was used on a sample matched on child's gender, family income and ethnicity. No significant differences were found between the scores yielded by both interviews, thus providing initial support to the reliability and validity of the shorter PDI (see Chapter 3 and Appendix 4).

Having established the suitability of the shortened PDI, and in light of the design limitation that parents were consistently interviewed about the first-born twin first, the interviews' order effect was analyzed. No significant differences were expected to be found between a parent's scores for each twin as these would reflect the effect of birth order which was not deemed to be influential in the case of identical twins. Contrary to our expectations, analyses revealed that fathers tended to score significantly lower on RF on the second

interview. This was suggested to reflect the fathers' loss of focus due to the length of the interviews; as described in Chapter 4, fathers' answers in the second interviews were more likely to be shorter or a repetition of answers given in the first interview. This trend was apparent through the qualitative analysis of fathers' second PDI narratives, presented in Chapter 5, as they were more likely to ask the interviewer to repeat the answers they gave in the first interviews and they tended to give shorter answers during the second interviews. However, the interview order effect was found to be small; fathers' scores were therefore included in the analysis but this limitation is taken into account when discussing the results.

Interestingly, it can be argued that, consistent with the case study analysis in Chapter 5, birth order might be associated with parents' characterization of their twins. As shown in Chapter 5, the second-born twin was perceived by both, her mother and the first-born twin, as being the "younger sister", less independent and needing more support. Moreover, the mother's characterization of her relationship with each twin was found to be associated with the twins' perceptions of themselves and each other. Whilst this is based on a single observation and therefore must be interpreted cautiously, it would be of interest in future studies to conduct a full behavioural genetics study investigating the proportion of genetic and environmental factors influencing parents' differentiation of identical twins, that is their perception of the first-born twin as the eldest and the second-born twin as the youngest, and how, in turn, this affects the twins' perceptions of themselves and parental mentalization.

Before discussing the influence of parental reflective functioning capacities on adolescent attachment security, it is important to highlight that low variability was found in the twins' overall attachment classifications with most insecure twins classified as dismissing. This is in line with previous studies showing that avoidant/dismissing is the most common form of organised, insecure attachment in adolescence (Ammaniti et al., 2000; Weinfield et al., 2004), and highlighting a shift from secure to insecure-dismissing

attachment during this stage of development explained as reflecting adolescents' attempt to separate from parents and gain more independence from the family (Allen, 2005; Ammaniti et al., 2000; Weinfield et al., 2004). Alternatively, the lack of variability could also be a product of the nature of attachment classifications as a categorical variable that is more crude as a measure. Other studies have highlighted that one of the limitations of categorical variables is that they limit variability in the results and suggested this can be overcome by using a dimensional scale (Royston et al., 2005; Vitaro et al., 2009). Furthermore, as elaborated on in Chapter 3, scores on coherence had been previously found to have the strongest relationship with overall attachment classifications (Main et al., 1985; Fonagy et al., 1991). Informed by the above considerations, attachment security was hence measured through the coherence scale of the CAI yielding a larger range and differentiation of scores. In addition, attachment was measured on the IPPA continuous scale, yielding attachment scores to mothers, fathers, peers and twin. It is noteworthy that adolescent coherence and IPPA scores to mother and father were not found to be significantly correlated, which could suggest that the CAI and the IPPA tap into potentially different dimensions of attachment. It can be suggested that the CAI coherence scale measures the quality of the adolescent's narrative in relation to attachment figures focusing on reflectiveness, spontaneity and comprehensibility of the narrative when discussing both negative and positive aspects of their relationships. In contrast, the IPPA investigates how well these figures serve as sources of psychological security based on the statements provided in the questionnaire rather than the adolescent's description of their relationships using their own words.

6.1 The nature of the influence of parental RF on adolescent coherence

Contemporary thinking in attachment research has suggested that factors influencing attachment security and insecurity are located in dimensions of parental caregiving

behaviour, and research in infancy has focused on maternal mentalization and similar constructs as the key components affecting maternal behaviour in the development of attachment (Braungart-Rieker et al., 2001; Fearon et al., 2006; Fonagy et al., 1991; Meins et al., 2001; Slade et al., 2005; de Wolff & van Ijzendoorn, 1997). Studies using the Adult Attachment Interview have suggested that these patterns of maternal behaviour may be shared by children in the same family because they are guided by a parent's internal working model of attachment (van Ijzendoorn et al., 1995). Furthermore, parental mentalizing capacities are thought to be based on parents' representations of their own attachment experiences and not necessarily affected by child-specific factors. This was clearly illustrated in Fonagy et al.'s (1991) prospective study wherein maternal and paternal RF, assessed before the child's birth, were found to predict infant attachment at 1 year of age. Other studies consistently found an association between parental RF, coded on AAI narratives discussing parents' own attachment experiences or on the PDI discussing the ongoing parent-child relationship, and attachment in infancy and childhood (Grienenberger et al., 2005; Slade et al., 2004; Slade et al., 2005). The above findings clearly converge in highlighting the importance of the role of parental mentalization in shaping children's early attachment relationship with that parent. However, would the same hold true for attachment in adolescence?

In an attempt to address this question, the first hypothesis of the current study was that parental RF has a shared influence on adolescent attachment. Thus, correlations were run between parents' mean RF scores and mean adolescent coherence scores first, and between parents' mean RF scores and mean IPPA scores towards mothers and fathers second. As expected, a significant moderate correlation of $r = .33$ for mothers and $r = .31$ for fathers was found between mean parental RF and mean adolescent attachment coherence only. Moreover, mean RF parental scores were found to predict mean coherence scores, with maternal RF

scores explaining 11% of the variance in adolescent coherence and paternal RF explaining 9% of that variance.

This echoes findings from infancy suggesting that maternal sensitivity was found to be governed by shared environmental influences, as mothers were likely to be as sensitive or insensitive to both twins (Fearon et al., 2006; Roisman & Fraley, 2008). Even though parental sensitivity and parental RF have been compared, it is important to highlight that these two constructs are slightly different in at least two ways. Firstly, sensitivity is coded based on observations of parent-child interactions whereas RF is based on parents' narratives discussing their own attachment relationships, in the case of the AAI, or their relationship with their child, in the case of the PDI. Secondly, as noted in Chapter 4, the construct of sensitivity usually refers to global positive features like cooperation, acceptance or contingent responsiveness (Grienberger et al., 2005) whereas the construct of RF includes a cognitive process, perspective-taking and understanding beliefs, as well as an affective process, regulating and containing emotions (Fonagy & Target, 1997). Therefore, not only does RF refer to parents' understanding of the feelings underlying children's behaviours, but it also includes parents' ability to tolerate ambivalent or painful affect (Fonagy et al., 1991). Despite the differences between the two constructs, results of this study converged with previous studies (Fearon et al., 2006; Roisman et al., 2008) in finding a shared influence of parental RF on adolescent coherence. These results are in line with attachment theory suggesting that parental mentalization is guided by parents' own internal working model of attachment based on their own childhood experiences with caregivers (Fonagy et al., 1991; van Ijzendoorn, 1995). This could be explained by Fonagy et al.'s (1991) positing that mentalizing capacities develop within the context of a secure attachment relationship as it allows for meaning to be given to affective experiences as well as a re-presentation of that experience in a regulated manner. It can therefore be argued that parental mentalizing capacities are in part based on

the nature of the parent's own attachment experiences and that this parental capacity is later likely to be shared by children in the same family.

From a psychoanalytic perspective, Burlingham (1946) emphasized the need for mothers to identify with each twin differently, based on their individual needs, focusing on the twins' separateness. She theorized that creating a one-to-one relationship with each one of the twins facilitates a clear delineation of their personas, a necessary step in order to maximize their potential achieving autonomy and own identity (Burlingham, 1952). This idea perhaps further explains the shared nature of maternal RF as it can be suggested that a mother would receive similar ratings on both interviews if her narratives were reflective of the specific needs and beliefs of the child in question. However, it is interesting to highlight that even if a mother scores similarly on RF for both twins, in-depth qualitative analysis of the narratives of the case study reflected the mother's different representation of each twin, which, it was hypothesized could, in part, explain attachment discordance between the twins (see Section 5.2.2). It is noteworthy that this was only based on the analysis of one case study and further research is necessary to establish the interaction between parental mentalizing capacities, parents' representations of their twins and twins' attachment security more conclusively.

When both, maternal and paternal RF scores were entered in the model, they were found to explain 14% of the variance in adolescent coherence, thus predicting more of the variance than each variable alone. More interestingly, mothers' and fathers' mentalizing capacities were found to partially have an independent effect on shared coherence and predict approximately the same proportion of the variance. This echoes previous studies investigating parental differential treatment suggesting that mothers' influence on adolescent behaviours is different to fathers' (Buist et al., 2002; Caspi et al., 2004; Grossmann et al., 2002; Patterson et al., 1994; Sheehan & Noller, 2002). More specifically, Caspi et al. (2004) found that

maternal differential expressed emotion could account for additional variation in children's differential outcomes than paternal expressed emotion, Grossmann et al. (2002) highlighted that mothers provided soothing in times of distress whereas fathers provided sensitive support, Sheehan and Noller (2002) emphasized that differential parenting could be based on adolescents' expectations of guidance rather than affection from fathers, Buist et al. (2002) discussed the idea that adolescents turned to mothers when in need of emotional support and Feinberg and Hetherington (2001) reported that different levels of parental warmth were found to predict depressive symptoms in the case of fathers only suggesting that siblings were more sensitive to differences in fathers' parenting rather than mothers' because of fathers' relatively lower level of contact with children (Feinberg & Hetherington, 2001). Taken together, these findings highlight that mothers' and fathers' behaviours as well as adolescents' expectations of their parents differ. In this regard, it can be suggested that mothers and fathers could influence different parts of the shared coherence between the twins and highlight the need to further study the specific roles of mothers and fathers in shaping specific dimensions of adolescent attachment.

It is noteworthy that a moderate significant correlation of $r = .41$ with an effect size of .17 was also found between mothers' and fathers' RF scores suggesting that mothers' and fathers' scores are partially similar. Several interpretations may account for this finding. Firstly, focusing on parental characteristics, van Ijzendoorn and Bakermans-Kranenburg (1996) have found that, in a meta-analysis of 33 studies, partners tended to have similar attachment classifications. It can therefore be expected that partners may also show similar mentalizing capacities which could explain the correlation found between maternal and paternal RF scores. These important associations need further study looking specifically at the association between maternal and paternal attachment, maternal and paternal RF and adolescent attachment. This could further elucidate the hypothesis proposed in the case study

suggesting that a secure attachment relationship to mother could mediate a secure attachment to father if the relationship to the latter is perceived as more distant. Secondly, Lewis and Lamb (2003) suggested that paternal behaviour is likely to be affected by maternal behaviour which could explain part of the correlation found between maternal and paternal RF scores. This is in line with previous studies suggesting that maternal and paternal influences on adolescents are distinct but nevertheless related (Buist et al., 2002; Patterson et al., 1994). Thirdly, looking at adolescent characteristics, it can be suggested that shared genes could partly explain this correlation. In fact, identical twins share their genetic makeup and behavioural genetic research has suggested that adolescents' influence on parents is mostly genetic (Plomin et al., 2001). Thus, could the findings of this study be taken as further evidence of this, suggesting that identical twins' genetic influence on parents could partly explain the correlation between mother' and fathers' RF scores? However, further studies using a full behavioural genetics model, including identical and non-identical twins, are necessary to test this hypothesis.

Investigating whether other shared factors may account for the above findings, factors that are obligatorily shared between the twins, such as adolescent gender, parental education, family income and the number of siblings in the family (Cutting & Dunn, 1999; Fearon et al., 2006; Pears & Moses, 2003), were investigated in order to study whether the association between parental RF and adolescent coherence remained when these covariates were added in the model. Results suggested that, similarly for mothers and fathers, parental RF and adolescent gender were found to be significant predictors in the overall model. This significant association may go some way to support the importance of parental mentalization in fostering secure attachment. Fonagy (1997) suggested that parental RF capacities allow them to explore their own mind and that of the child and understand behaviours in terms of mental states. This, in turn, is thought to foster the infant's development of a secure

relationship with the parent, as well as support the development of their own mentalising capacities.

In keeping with the findings of several previous studies reporting gender differences in adolescent attachment using both the AAI and other self-report questionnaires (Doyle et al., 2009; Kenny, 1990; Kobak et al., 1993; Rice, 1990), adolescent gender was found to be a significant predictor of coherence in this study, with girls scoring higher on coherence than boys. However, this is at odds with the findings of a meta-analysis of 33 studies, reporting no gender differences in attachment classifications, albeit in adulthood assessed using the AAI (van Ijzendoorn & Bakermans-Kranenburg; 1996). So how could these seemingly different findings be reconciled? Could one interpretation be that, in adolescence, differences between parent-girl and parent-boy relationships are pronounced and lessen with age? Few studies have looked at gender differences in attachment. However, Doyle et al. (2009) and Furman et al. (2002) reported that, in adolescence, girls have been found to show greater concern for interpersonal relationships. Alternatively, could this difference reflect the different methodologies used? The AAI primarily elicits representations of past attachment relationships whereas the CAI, used in this study, measures representations of current attachment relationships, in the here and now. This is clearly an important consideration and further research is needed to establish this more conclusively.

It is also interesting to highlight that, when taken independently, maternal education was found to be significantly associated with adolescent coherence, but this relationship disappeared when maternal education was entered in the full model. The significant correlation between the two variables echoes previous findings suggesting an association between maternal education, child attachment and theory of mind in infancy and childhood (Campbell et al., 2004; Cutting & Dunn, 1999; Pears & Moses, 2003). As elaborated on in Chapter 4, it has been suggested that maternal education was associated with the amount of

time mothers spent with their children explaining causes of behaviours and underlying emotions and feelings (Dunn et al., 1991; Pears & Moses, 2003), which was found to affect children's own understanding of emotions and beliefs and feeling talk (Dunn et al., 1987; Jenkins & Astington, 1996), which, it can be suggested, is related to coherence. It can however be hypothesized that other factors could be influencing the relationship found between maternal education and adolescents' coherence scores based on a trend highlighted by the interviewers and the case study analysis (Chapter 5). It can be argued that, in attempting to highlight differences between twins, mothers tended to use a wider range of mental state descriptors. This, taken together with Rosenblum et al.'s (2008) reports that maternal education was associated with mothers' ability to verbalize awareness of mental states, could suggest a relationship between maternal education and mothers' mentalizing capacities, which in turn could influence adolescent coherence. Importantly however, when additional shared variables were entered into the model, such as maternal RF and adolescent gender, maternal education did not remain a significant predictor of adolescents' coherence scores. This could suggest that maternal RF tends to provide overlapping predictions to maternal education, echoing previous findings in infancy reporting an association between maternal education and mothers' ability to verbalize awareness of infant mental states (Rosenblum et al., 2008).

In order to test for this, the second aim of this study was to investigate whether any of the shared family factors had a direct influence on maternal RF. However, interestingly, none of the factors included were found to be influencing parental RF. This sets aside the above-mentioned hypothesis that maternal education could be associated with parental RF, thus partly explaining the relationship between maternal education and adolescent coherence. The lack of an association between maternal RF and maternal education contradicts Rosenblum et al.'s findings in infancy reporting an association between maternal education and mothers'

verbalizing of mental states. This could be explained by the different measures used in the two studies as Roseblum et al. (2008) relied on the quantity of mind-minded comments as well as the use of mental state language when interacting with the child whereas this study looked at a more global score of mentalizing capacities based on mothers' narratives about her relationship with her adolescent. Future studies are therefore needed in order to directly investigate the interaction between maternal RF, maternal education and adolescent coherence and shed further light on this association in adolescence.

In sum, findings suggested that both, maternal and paternal RF, taken independently or with shared family factors, predicted part of the shared variance in coherence in adolescence, suggesting that parents' capacity to mentalize about important developmental changes is shared between the twins. In addition, twins' gender was found to affect coherence with girl twin pairs more likely than boy twin pairs to score high on coherence.

Interestingly, results using IPPA scores as a measure of attachment yielded different findings as non-significant relationships were found between mean parental RF and mean IPPA scores for both mothers and fathers. It was suggested that this could be explained by the nature of the measures used as answers on self-report questionnaires tend to be more limited than those elicited by semi-structured interviews that are open-ended. It was argued that answers on the CAI were more likely to tap into twins' unconscious processes, thus providing more insight into their internal working models of attachment and a better understanding of the adolescent's description of the interactions between himself and parents. It was hypothesized that coherence scores were therefore more likely to be significantly associated with parental RF, a construct based in parents' own internal working models of attachment, as described in narratives of attachment relationships (Fonagy et al., 1991). Some extracts of the case study analysis shed further light on this idea, highlighting similarities in the PDI and CAI narratives, between the mother's and the first twin's balanced descriptions of themselves

and their relationships, which are signs of moderate to high parental RF and adolescent coherence. Furthermore, the lack of a significant correlation found between mean attachment coherence scores and mean IPPA scores to parents, could further suggest that the two scores represent different dimensions of attachment, which could also explain the discrepancy between findings based on the two different measures.

Having established that there are shared influences of parental RF on adolescent coherence, the third aim of this study was to investigate whether parental RF had a non-shared influence on adolescent security. One of the two only studies (Fearon et al., 2006; Roisman & Fraley, 2008) looking at the nature of the influence of maternal sensitivity, a similar construct to RF (see pp. 170-171), on infant attachment found that it partly constituted a non-shared influence on attachment (Fearon et al., 2006). Fearon and his colleagues reported that, in instances of discordant attachment, maternal sensitivity was found to be negatively correlated to attachment security, suggesting that mothers' sensitivity to one twin but not the other led to insecurity in the twin receiving higher levels of sensitivity (Fearon et al., 2006). However, as elaborated on in Section 1.2.5, Roisman and Fraley (2008) failed to find a similar association. In this study, given Fearon et al.'s (2013) findings that non-shared influences play a large role in affecting attachment, it was expected that, differences in parental RF would predict differences in coherence suggesting non-shared influences of parental RF on adolescent coherence.

Results showed that, even in cases of extreme discordance in coherence or parental RF scores, differences in parental RF scores, both mothers' and fathers', were not a source of non-shared environmental influences on adolescent attachment, measured using both, the CAI coherence scale and IPPA scores to mothers and fathers. These results were similar for both, boys and girls. It is noteworthy that cases of extreme discordance were based on 10% of

the sample, thus 10 cases only, and further studies using a larger sample are needed to establish this more decisively.

Comparing these results with Fearon et al.'s (2006), differences could be explained by the measures used. Parental sensitivity was based on observations of mothers' accurate interpretation and response to the infant's signals whereas RF was based on coding narratives representing the overall mother-adolescent relationship. It can therefore be argued that ratings of interactions are more likely to highlight mothers' different responses to each twin. In addition, other studies finding a significant effect of differential parenting focused on concepts such as parenting styles or the favouring of a sibling (Brody, 1998; Feinberg et al., 2000), and were based on the twins' perceptions of parents' behaviours, which could be more appropriate tools to pinpoint differences between maternal behaviours towards twins than parental RF. It was beyond the scope of this research to investigate parental favouring of twins and its impact on twins' attachment and twin relationships; however, some of the PDI narratives revealed that some parents tended to favour or identify with one twin and described their relationship with that twin as "closer". It would be interesting for future research to address this by operationalizing parents' favouring of a twin and exploring its association to family relationships.

An alternative interpretation explaining the lack of an association between the difference in parents' mentalizing capacities about each twin and the difference in twin's coherence could be explained by the high correlation of $r = .53$, with an effect size of .28 found between mothers' RF scores for each twin and a correlation of $r = .45$ and an effect size of .20 between fathers' RF scores. This shows a high similarity between a parent's RF scores about each twin which could suggest that differences between a parent's RF scores were too small to be captured.

It is important not to lose sight of the fact that Fearon et al. (2013) highlighted that a large proportion of the variance in adolescent attachment can be explained by non-shared environmental influences. Fearon et al. (2006) emphasized the need to understand how differences in attachment security between children in the same family arise. This is in line with developmental studies suggesting the increased role of peers and other child-specific influence as the adolescent is moving away from the family in an attempt to seek independence and assert his/her individuality (Allen, 2008; Blos, 1967; Steinberg, 1988; Scott et al., 2011). In this regard, part of the third aim was to investigate whether peer relationships and differences in the quality of the twins' relationships to each other had a non-shared influence on adolescent coherence. Furthermore, the last aim of this study was to attempt, through a case study analysis, to pinpoint child-specific factors that could explain discordant attachment.

6.2 Non-shared influences explaining discordance of attachment

Before discussing the case study, part of the third aim of this study was to investigate whether differences in the twins' peer relationships and their perception of the quality of their relationship to each other constituted a non-shared influence on adolescent coherence. The hypothesized non-shared influence of peer relationships was based on previous studies suggesting that adolescents tend to spend more time away from the family, establishing close relationship with their peers, as they become more autonomous from parents (Allen, 2008; Steinberg, 2001). Other scholars have suggested that peers provide support to the adolescent as s/he identifies and spends time with people who have shared ideas and goals, enabling the young adult to try new roles and identities within the group (Brandt, 1977), highlighting that some adolescents might turn to peer if they feel less secure to parents (Nickerson & Nagle, 2005). The hypothesized association between differences in twins' attachment security and

differences in the quality of the twins' relationship to each other was based on previous studies suggesting the congruence hypothesis proposing that a positive or negative relationship with parents was likely to promote a corresponding positive or negative relationship respectively between siblings (Boer et al., 1992; Brody & Stoneman, 1995; Dunn, 1992). Other studies have put forward the sibling comparison theory (Feinberg et al., 2000; 2003). Looking at the interaction between the quality of the parent-sibling relationships and the quality of the siblings' relationship with each other, Feinberg et al. (2003) showed that, if an adolescent perceived his/her sibling as being more negatively parented, he was more likely to demonstrate more positive adjustment. Similarly, adolescents who perceived parents to be harsher towards them than to their siblings tended to exhibit more externalizing behaviours which in turn accentuated differential treatment (Richmond et al., 2005).

However, contrary to stated expectations, peers were not found to have a non-shared influence on adolescent security and differences in the quality of the twins' relationship to each other were not found to affect differences in coherence. As alluded to in Chapter 4, it can be argued that identical twins are more likely to turn to each other for emotional support and understanding rather than to peers. Furthermore, Plomin et al. (2001) had highlighted that peers are likely to have a non-shared influence on twins if they had different set of friends. However, this was not measured in this study, which could have influenced the results. Extracts of the CAIs in Chapter 5 could shed some light in relation to this idea suggesting that the proximity between the twins tended to affect their inability to have separate groups of friends or activities, which, at times, could affect their relationship to each other as they are trying to assert their individuality. It can therefore be argued that identical twins are less likely to have separate groups of friends which could explain why peers were not found to have a non-shared influence on twins. The lack of a significant association between the quality of peer relationships and the quality of the twins' relationship to each other could

further support this idea. However, it is noteworthy that the sample in this study focused on identical twins, and it would be interesting for future studies to investigate whether similar results would be found with non-identical twins.

Two further interpretations can be put forward to explain these findings. Firstly, this study looked at identical twins' relationships rather than siblings' relationships, an important distinction that may have affected the results. Theoretically, twins share a more complex and unique relationship than non-twin siblings suggesting that they may develop a stronger bond from infancy, irrespective of the quality of their relationships with parents (Burlingham, 1952). Burlingham (1949) postulated that twins tend to lack a sense of uniqueness as, through cases studies, she noted that twins were likely to look in each other for parts they felt were missing in them. Orr (1941) further theorized that twins tend to have difficulties separating from each other and attempt to recreate the "twinship" relationship by looking for a "twin" in new situations faced alone. This was further identified in this study as non-significant associations were found between twins' scores regarding their relationship to each other and their attachment scores to parents.

Secondly, the findings may more simply reflect differences in methodology used to assess parent-adolescent relationships. Previous studies that have found an association between parent-adolescent, siblings and peer relationships (Bank & Kahn, 1982; Boer et al., 1992; Bossard & Boll, 1956; Brody & Stoneman, 1995; Dunn, 1992) have tended to use self-report questionnaires assessing mutuality, conflict resolution and other aspects of the parent-child relationship. However, the current study very specifically assessed adolescents' attachment organization through narratives about their current attachment relationships with caregivers and through self-report questionnaires yielding an overall continuous score of attachment. It can therefore be hypothesized that some dimensions of attachment, such as conflict resolution could be associated to the quality of the twins' relationship with each other

and to peers. Future work, using the same sample, could investigate the association between the conflict resolution dimension of the CAI and the quality of the twins' relationship with each other or peer relationships measured by the IPPA in order to test this hypothesis. In addition, using other measures investigating sibling relationships, such as the Sibling Relationship Interview (SSI; Stocker & McHale, 1992) could shed more light on twins' representations of their relationships with their sibling, their parents and the association between them. The case study analysis provided initial support to this theory as it highlighted the interaction between the "second" twin's difficulty in separating from her twin and her relationships with both parents.

Alternative interpretations illustrated by the case study could be put forward in an attempt to explain twins' discordant attachment to a given parent. Firstly, it can reflect the twins' different level of psychological maturity and individuation process from parents. Even though studies have shown that the onset of puberty in identical twins is mostly governed by genes, non-shared environmental influences were also found to be influential on development and timing of puberty (Ge et al., 2007; Mustanski, et al., 2004). However, testing this hypothesis was beyond the scope of this study and was only observed through the analysis presented in the case study. This analysis illustrated that the first twin interviewed exhibited more signs of psychological maturity than the second twin interviewed as she was more aware of her role in the family, pushed for her independence by arguing boundaries with her parents, expressed her opinions even if leading to arguments with parents and was more likely to explore new opportunities. The second twin, by contrast, tended to show more signs reflecting the transition from early puberty to adolescence as described by Allen (2008), as she was likely to express her love to her parents in more concrete ways and seemed unable to de-idealize them. It was therefore suggested that the twins' level of psychological maturity could affect the level of proximity between them and their parents, and, in turn, affect their

attachment classifications to them. Longitudinal research could look at the impact of psychological maturity on attachment security in singletons or twins, at different stages of adolescence, in an attempt to shed more light on the association between levels of psychological maturity and twins' discordant attachment to a parent.

Secondly, it can be argued that adolescent identical twins have a complex relationship to negotiate. Burlingham (1946) explained that adolescent identical twins should not only de-identify from parents and infantile ties, but also strive for differentiation from their twin in order to mark their individuality, thus emphasizing differences between them. Some of these aspects have been reflected in the CAI extracts presented in Chapter 5. For instance, some narratives revealed that twins who felt strongly about wanting to be perceived as separate from the twin-unit tended to perceive their twin as "annoying" and were more likely to have their own separate circle of friends. It can therefore be hypothesized that, in these instances, non-shared environmental influences, such as differences in twins' perceptions of each other, play a larger role, thus affecting the parenting they receive which, in turn, could impact the attachment relationship (Caspi et al., 1992; Kiang & Furman, 2007; Plomin et al., 2001).

In sum, the above discussion explored some of the non-shared environmental factors which could explain twins' discordant attachment to a parent. It was suggested that the interaction between different non-shared environmental factors, such as twins' level of psychological maturity, twins' de-identification from each other and from their parents and their perception of the twinship relationships could explain twins' discordant attachment in adolescence. However, this study was exploratory and based on a single case study which could provide a basis for future research identifying other non-shared environmental influences explaining attachment in adolescence.

Before concluding this chapter, the following section discusses some of the limitations of this study and suggests considerations for future research.

6.3 Limitations and further considerations

This study was the first to investigate the association between parental RF and attachment in adolescence. Results are in line with some findings in infancy highlighting the shared nature of parental mentalizing capacities on shaping their children's attachment. The strengths of the study first lie in the analysis of both mothers' and fathers' narratives about each twin. Secondly, Royston et al. (2005) highlighted the importance of measuring attachment dimensionally, as well as categorically. They argued that one of the limitations of using categorical variables is the lack of variability between the groups and the loss of information and power. However, even though continuous measures of attachment in adolescence were available (Armsden & Greenberg, 1987; Kerns, Schlegelmilch, Morgan & Abraham, 2005), results remain inconsistent with regards to their concurrent validity with traditional measures of attachment such as the Strange Situation and the AAI (Shmueli-Goetz et al., 2008). In addition, these measures are based on questionnaires which do not provide as in-depth information as attachment interviews. The CAI was therefore chosen as it provides both, a categorical approach providing broad attachment classifications and a continuous approach through the attachment dimensions. Thirdly, keeping in mind limitations highlighted in previous studies (Asbury et al., 2003; Caspi et al., 2004), this research relied on interview measures rather than self-report questionnaires, which allowed for a qualitative case study analysis. The in-depth analysis of the narratives pinpointed specific non-shared factors influencing adolescent twins' discordant attachment, not measured quantitatively. However, some important limitations are noteworthy, underscoring the importance of interpreting the findings with caution.

Firstly, the sample was formed of identical twins and analysis had to be run twice, separately for each twin. It was expected that no differences would be found between parents' scores for each twin; however, this was not consistently found in the analysis. This can be

attributed to the nature of the design whereby mothers were able to maintain their reflective stance throughout both interviews whereas fathers tended to be less reflective during the second interview because of time and focus requirements. Furthermore, based on the case study analysis, it can be argued that the mother, more so than the father, could have been influenced by the probes during the first interview, encouraging her to think about both, positive and negative aspects of their relationship with that twin. It can be suggested that this influenced her differentiating more between the twins and providing a more balanced view of the relationship when asked to reflect about her relationship with the other twin in the second interview. This was further identified when looking at patterns within the mothers' second narratives in the whole sample, revealing that they tended to differentiate between their relationships with each twin, whereas fathers were more likely to treat them as a unit. Mothers tended to compare the twins in the second interviews in an attempt to differentiate between them, and tended to provide a more balanced view of their relationship with that twin. However, further research is necessary in order to elucidate this interesting finding.

Secondly, parents' were consistently interviewed about the first-born twin first. The finding of a significant but small difference between fathers' interviews about each twin could reflect the effect of birth order, a variable initially not deemed to be influential given that the sample was formed of identical twins. It is noteworthy to highlight that, some parents, albeit a minority, did differentiate between the younger and older twin in the PDI narratives (see Chapter 5). To date, few research studies, if any, have investigated the impact of MZ twins' birth order on parental perceptions of the twins. Therefore, future research should counterbalance the influence of the order effect by interviewing parents about the first-born child first in half of the sample and the second-born child first in the other half. It would also be of interest to qualitatively analyze the PDI interviews in order to investigate

the association, if any, between parents' differentiation between "older" and "younger" twins and the twins' attachment classifications and their perceptions of each other.

This study attempted to highlight child-specific influences that might have affected discordant attachment between the twins. Fearon et al. (2013) reported that, in adolescence, genes and non-shared environmental influences explained the variance in twins' attachment, whereas shared environmental influences were not found to be influential during this stage of development. A third limitation related to the measures of non-shared environmental influences used in this study which were restricted by the design of the larger TEDS study. The qualitative analysis presented in Chapter 5 illustrated some child-specific variables which were not the focus of the current study but may nevertheless be important factors in explaining twins' discordant attachment organization. It was argued that, in line with previous studies (Allen, 2008; Burlingham, 1945; Leonard, 1961; Neyer, 2002), twins' perceptions of their roles in the family, their descriptions of themselves and relationships in a balanced way, their identification with parents and their twin, as well as the level of de-identification with them could partially explain the twins' discordant attachment to parents. Future research could include other variables such as parents' and adolescents' psychopathology or trauma (Deklyen & Greenberg, 2008; Rosenstein & Horowitz, 1996), which have been found to affect attachment organization (Richmond et al., 2005; Updegraff et al., 2005) and parents' mentalizing capacities (Grienenberger et al., 2005; Sharp et al., 2006). It would also be interesting to investigate the interaction between maternal and paternal variables and their impact on twins' attachment and adolescent adjustment.

Additional non-shared environmental influences could include parents' favouring of a twin as analysis of some of the PDI narratives revealed that some parents tended to favour one twin or describe their relationship with one twin as "closer" than the relationship with the other. Based on previous studies identifying the negative impact of parents' favouring of a

twin on the psychological adjustment of the other (Brody, 1998; Sheehan & Noller, 2002), future research could look at the interplay between parents' favouring of a twin, twins' attachment to parents and the quality of twins' relationship with each other.

In addition, some studies have highlighted the effect of the child's temperament in facilitating or impeding the development of a secure attachment relationship (Belsky & Rovine, 1987; Frodi, 1983; Rothbart & Derryberry, 1981; Van den Boom, 1989). Most dimensions of temperament have been found to be genetically influenced (Edelbrock, Rende, Plomin & Thompson, 1995); however, recent behavioural genetics findings have documented the importance of environmental factors on temperament (Saudino, 2005). Studies have also shown that child characteristics such as temperament may disrupt the parents' capacity to engage with them on a mental level (Sharp & Fonagy, 2008; Thomas, Chess & Birch, 1968). Taken together, these findings highlight the importance of evaluating the possible role of adolescent temperament on attachment and parental RF.

A fourth limitation concerns the reliability and validity of some of the measures used. For instance, it is important to note that, even though psychometric properties of the CAI have been established with a sample of children between 8 and 12 years of age, more research is needed to fully validate it for adolescents above 12 years of age. In order to overcome this limitation, a longitudinal study design might be adopted to see whether attachment classifications change at different stages of adolescence and whether this affects the association between attachment, coherence and parental RF (Ammaniti et al., 2000). Alongside a rigorous and systematic validation of the CAI for adolescence, future research is needed to further establish the validity of the shorter PDI. For instance, studies could investigate the association between parents' scores on the short PDI coded on RF and parents' attachment classifications based on the AAI narratives or infants' attachment classification based on the SSn as these associations have been found to be highly significant

in other studies (Grienenberger et al., 2005; Slade et al., 2005). Furthermore, with regards to limitations of the other measure used, the IPPA was adapted to be used to investigate the relationship between twins but was only validated to be used to assess the quality of adolescent-parent and adolescent-peer relationships.

A fifth limitation concerns the sampling method used in the current study. The sample was chosen based on convenience sampling and participants were self-selected as consent needed to be given before parents could be interviewed. It can be argued that parents who perceived having more conflictual and difficult relationships with their adolescents were less likely to participate. This could have resulted in a skewed distribution of attachment patterns in the sample as less than 10% of adolescents were classified as preoccupied or disorganized. This could also be interpreted looking at the sample demographics. The sample was not composed of a high-risk clinical population or low SES families who, based on previous studies, are more likely to have children classified as disorganized (Lyons-Ruth, 1996; van Ijzendoorn et al., 1999). Future research might focus on purposive sampling in order to ensure a wider range of attachment classifications within the sample or make sure that RF scores reflect the normal distribution found in the general population.

Finally, regarding the sample demographics, more than half of the sample had a high SES which limits the generalizability of the findings to high-risk samples. Furthermore, it would be of interest to replicate these results in a sample of singletons rather than twins in order for the results to be more generalizable. This would also allow researchers to differentiate between results influenced by the twin design and those that are caused by the developmental changes occurring in adolescence. It would also be interesting to conduct a full behavioural genetics study comparing results between MZ and DZ twins in order to investigate the role of heritability in influencing parental RF given that genes were found to be the main factor in explaining adolescents' influence on parents (Plomin et al., 2001).

6.4 Conclusions

In summary, the current twin study represents a unique study and the first of its kind to examine the relationship between maternal and paternal mentalization and adolescent attachment. The association between parental reflective functioning and adolescent attachment provided some support for predictions of attachment theory. Shared environmental effects of parental reflective functioning were found to correlate significantly with the shared variance in adolescent attachment coherence. Thus, the similarity between twins' coherence scores was partially explained by consistencies in their experience of parental reflective functioning. However, an influence of shared genes on adolescent coherence was also suggested given the moderate correlation found between twins' coherence scores. Examining maternal and paternal RF separately, strong associations were found between mothers' and fathers' RF scores, which were found to, partially independently, influence twins' coherence at the family level only. This suggests similarities between maternal and paternal RF scores but also highlights the importance of both mothers' and fathers' mentalizing capacities in determining their twins' attachment coherence. The current study had failed to identify non-shared environmental influences of parental RF on adolescent coherence and the need for a full behavioural genetics study including MZ and DZ twins was suggested. In addition, peers were not found to have a non-shared influence on twins, which was explained by the complexity of the twinship relationship and the hypothesized unique bond shared between them. The qualitative case study highlighted the potential importance of a number of non-shared factors that may account for the adolescent twins' discordant attachment patterns with their parents. The twins' level of psychological maturity, their possible de-identification from each other and from their parents, their perception of the twinship relationships and the parents' description of each twin were all considered and the need for future research suggested. Research into the specific causes and

effects of non-shared environmental influences on development is still in its infancy, and further work is clearly needed to identify other factors that might account for the sizable discrepancies in adolescents' attachment relationships in the family.

In conclusion, this study was the first to investigate the relationship between parental RF and adolescent attachment and provided initial findings supporting the shared influence of parental RF on adolescent security. The challenge for future research would be to replicate these findings using a full behavioural genetics method in order to differentiate between shared and non-shared environmental influences on adolescent attachment as well as the effect of shared genes during this stage of development.

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