

THESIS

**INSECURE ATTACHMENT AND PSYCHOPATHOLOGY IN CHILDREN
AND ADOLESCENTS: A META-ANALYSIS**

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ABSTRACT

Since Bowlby (1958, cited in Bowlby, 1969) originally introduced the theory of attachment it has been written about extensively and a vast amount of research has contributed to the development of the theory. In more recent years research has focused on the possible link between attachment and psychopathology. The major aim of the present meta-analysis was to contribute to this research effort by establishing the magnitude of the effect size for the relationship between attachment security and internalizing psychopathology; and attachment security and externalizing psychopathology, in children and adolescents. Four separate meta-analyses were conducted investigating internalizing and externalizing problems in cross-sectional and prospective studies. A comprehensive literature search was conducted to identify relevant studies for inclusion in the analysis. Identified studies were assessed for eligibility according to stringent inclusion and exclusion criteria. A total of 23 studies contributing 45 effect size correlations, involving 3793 different participants were considered eligible for inclusion. Relevant information was extracted and coded from the studies before the analyses were conducted. For cross-sectional studies the mean effect size correlation for attachment security and internalizing psychopathology was $r = -0.24$ ($k = 14$; $p < 0.01$; 95% CI = -0.31, -0.17). For attachment security and externalizing psychopathology the mean effect size was $r = -0.28$ ($k = 16$; $p < 0.01$; 95% CI = -0.34, -0.21). In terms of prospective studies the mean effect size correlation for attachment security and internalizing psychopathology was $r = -0.17$ ($k = 8$; $p = 0.01$; 95% CI = -0.28, -0.04); and for externalizing psychopathology it was $r = -0.09$ ($k = 7$; $p = 0.02$; 95% CI = -0.16, -0.01). When attachment security and psychopathology were measured concurrently, there was evidence of a negative association for both internalizing and externalizing psychopathology. Although the magnitude of effect was smaller for prospective studies evidence was also found for the predictive validity of a lower level of attachment security in the development of both internalizing and externalizing psychopathology. Theoretical explanations for these findings are presented and the research and clinical implications are discussed in terms of the limitations of the study.

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CHAPTER ONE: INTRODUCTION

1.1 Attachment Theory

1.1.1 Background

Bowlby introduced the concept of attachment in his paper “The Nature of the Child’s Tie to His Mother” (Bowlby, 1958, cited in Bowlby, 1969). He later expanded this work in his trilogy *Attachment and Loss* (Bowlby, 1969, 1973, 1980). Since that time, attachment has been written about extensively and a vast amount of research has contributed to the development of the theory. Attachment theory has also had a significant impact on research into developmental psychology, particularly in relation to social and emotional development across the life-span. Cross-cultural research suggests that attachment is a universally valid construct (van Ijzendoorn & Sagi, 1999) and it has been proposed that it is applicable and valid in a variety of contexts e.g. family, as well as child-care settings (Goossens & van Ijzendoorn, 1990; Howes, 1999).

Attachment refers to the emotional relationship between the infant and their primary care-giver and the infant’s confidence in the ability of the care-giver to provide protection (Bowlby, 1988). A distinction is often made between attachment and bonding. Bonding can be defined as the parents’ emotional tie to the infant usually in the first few hours after birth (Klaus and Kennell, 1976, cited in Shiota et al, 2004), whereas attachment refers to a reciprocal relationship between the infant and care-giver that develops and evolves over time (Erickson & Kurz-Riemer, 2002). Despite this distinction, the two terms are often used interchangeably.

1.1.2 Evolutionary Perspective of Attachment Behaviour

Bowlby’s original ideas on attachment were formulated around an evolutionary perspective (Bowlby, 1969). He proposed that infants have a genetic predisposition to seek proximity to the primary care-giver (the attachment figure) in an attempt to gain greater protection, thereby increasing the likelihood of survival and reproductive

success. Attempts at proximity-seeking (known as the primary attachment strategy) for the purpose of protection seem particularly important for human infants, owing to their prolonged immaturity and helplessness compared to other species (Bowlby, 1969). Proximity-seeking is thought to be an affect-regulation device, designed not only to provide physical protection, but also to provide protection from psychological threats and to alleviate distress (Bowlby, 1973).

Proximity seeking is thought to be achieved by the infant through what are known as 'attachment behaviours'. Attachment behaviours can be either *signaling* (e.g. smiling and vocalization), which show the mother that the child is interested in engaging; or *aversive* (e.g. crying and pleading), which prompt the mother to be close to the child in order to terminate the behaviours (Cassidy, 1999). A third type of attachment behavior involves more active attempts at proximity seeking, such as approaching and clinging (Mikulincer & Shaver, 2007).

According to Bowlby (1969) the goal of the attachment system is to maintain a sense of security. In times of stress (such as separation from the attachment figure), the child's attachment system is thought to be activated, thus triggering attachment behaviours. Contextual factors, such as whether or not the child is ill, hungry or in pain and environmental factors, such as the amount of potential threat to the child, have an effect on the degree to which the attachment system is activated (Bowlby, 1969). When the desired proximity is achieved it is thought that the attachment system is deactivated (although not completely turned off) and the child then engages in activities other than those related to proximity seeking (Bowlby, 1969). Thus, one aspect of the attachment relationship relates to the concept of providing a 'safe-haven' for the infant in times of distress. When the attachment system is deactivated, the attachment figure acts as a 'secure base' from which the infant is able to explore the world and develop a sense of their own character and abilities (Mikulincer et al, 2003). What is required in order to deactivate the attachment system depends on the level of initial activation (Bowlby, 1969).

1.1.3 Internal Working Model and Individual Differences

In a later addition to his work, Bowlby (1973) introduced the idea of ‘working models’ in relation to attachment. He posited that infants do not simply derive a sense of security based on whether or not the attachment figure is physically present, but rather on their appraisal of the availability and responsiveness of the attachment figure. Expectations about the availability of the caregiver and how they are likely to respond are based on the child’s early experiences with them (Bowlby, 1973). The internal working model not only relates to the infant’s expectations of others, but also to their view of themselves; for example, whether or not they view themselves as worthy and competent (Cicchetti et al, 1995). The internal working model is also thought to influence behaviours, particularly with regard to relationships. (Belsky, 2002).

It has also been proposed that internal working models formed in infancy through attachment relationships are the foundation of adult core beliefs (Beck et al, 1979, cited in Dozois et al, 2005). Thus both attachment and cognitive theories suggest that early life experiences are crucial in the development of beliefs and expectations concerning the self and others. These beliefs are thought to influence how subsequent experiences are interpreted and which life events are likely to be experienced as particularly stressful (Dozois et al, 2005).

Ainsworth and Wittig (1969) extended the work of Bowlby by developing a method (known as the Strange Situation Procedure) for assessing the relationship between the infant and the primary care-giver. The Strange Situation Procedure involves activating the child’s attachment system by exposing them to a stressful situation (namely separation from the primary care-giver and interaction with an unfamiliar adult, followed by reunion on two occasions). By observing the behaviour of the infant in these situations it is possible to gain an insight in relation to the child’s attachment representations (Ainsworth and Wittig, 1969).

Based on this work, Ainsworth et al (1978) identified three patterns of infant attachment: secure (B); insecure-avoidant (A); and insecure-resistant (C). Infants classified as secure are observed to be pleased when the primary care-giver returns.

They may seek closeness but are easily comforted by the contact and eventually return to play (Weinfield et al, 1999). Infants classified as insecure-avoidant often show no overt signs of distress when the primary care-giver leaves the room and ignore them upon their return. On some occasions the infant may interact more with the stranger than with the primary care-giver (Weinfield et al, 1999). Infants classified as insecure-resistant (used here interchangeably with insecure-ambivalent) may be overtly distressed when the primary care-giver leaves the room. Upon reunion with the primary care-giver, the infant may seek closeness and then appear to reject it (Weinfield et al, 1999).

A fourth style of attachment was subsequently identified by Main and Solomon (1990, cited in Madigan, 2007), which they labeled as disorganized (D). Infants classified as disorganized appear to lack a coherent attachment strategy to manage their distress (Main and Solomon, 1990, cited in Weinfield et al, 1999). When under stress these infants may exhibit behaviours such as freezing or huddling on the floor (Hennighausen & Lyons-Ruth, 2007).

1.2 Attachment and Emotional Development

1.2.1 Affect / Emotion-Regulation

One useful definition of emotion-regulation (used here interchangeably with affect-regulation) has been provided by Thompson (1994). He defined it as ‘...the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals.’ (Thompson, 1994, pp. 27-28). Fox (1994, cited in Kostiuk & Fouts, 2002) emphasized the importance of regulating emotions in relation to appropriate functioning and the ability to adapt to the ongoing demands of experience.

Differences in attachment style are thought to occur as a result of the interplay between the infant’s internal working model and the resulting strategies that are used to regulate affect. When faced with stressful or potentially threatening situations infants employ attachment behaviours in order to regulate their affect. Attachment behaviours vary depending on the infant’s internal working model (their view of

themselves and others), which develops as a result of repeated interactions with the primary care-giver (Mikulincer et al, 2003).

1.2.1.1 Secure Style

Children who have attachment figures who are available at times of distress; responsive to their needs; and are emotionally attuned, are likely to develop an internal working model of themselves as acceptable and worthy of love and of others as available, responsive and understanding, particularly in times of stress (Pietromonaco & Barrett, 2000; Howe, 2006). Children with these attachment representations are described as securely attached. When the attachment system is activated, these children are confident that the caregiver will respond in a timely, sensitive and appropriate manner (Guttmann-Steinmetz & Crowell, 2006). For securely attached children affect-regulation is achieved by gaining proximity to the care-giver. This is demonstrated in the Strange Situation Procedure, where these children express a certain degree of distress when separated from the care-giver but are easily comforted when they regain proximity (Weinfield et al, 1999).

1.2.1.2 Insecure-Avoidant Style

In the case of children described as having an insecure-avoidant attachment, their primary care-givers are thought to be unable to manage and respond to the emotional demands of others (Howe, 2006). These infants are likely to develop an internal working model of themselves as undeserving and unacceptable and of others as unresponsive and unavailable (Pietromonaco & Barrett, 2000). Using the primary attachment strategy of proximity seeking as a means of affect-regulation is counterproductive, as the attachment figure is experienced as unresponsive or rejecting. Proximity seeking does not lead to a sense of protection and security and may actually increase feelings of vulnerability (Howe, 2006). Instead these infants avoid expressions of distress, neediness and dependency, in an attempt to maximize the availability of the care-giver thereby regulating affect.

1.2.1.3 Insecure Ambivalent / Resistant Style

Children with an ambivalent / resistant attachment style have a mental representation of the caregiver as inconsistent, unpredictable and ineffective at recognizing their needs (Pearce, 2006). It is likely that these infants hold a mental representation of themselves as incompetent at eliciting an appropriate response from the care-giver through proximity seeking (Howe, 2006). Similar to children classified as having an insecure-avoidant attachment style, using the attachment strategy of proximity seeking is not a successful affect-regulation approach for these infants, as there is no assurance that their needs will be met. Instead, these children tend to be very preoccupied with the emotional availability of the care-giver (Howe, 2006) and achieve affect-regulation by behaving in a demanding, angry, needy and pleading manner. This strategy is thought to be aimed at increasing the responsiveness of the inconsistent attachment figure by alerting their attention to the infant's distress, thereby maximizing their availability (Simpson, 1999).

1.2.2 Hyperactivating and Deactivating Strategies

Security-based strategies of affect regulation have been described in terms of primary and secondary attachment strategies. Secure infants are assured that seeking proximity (by acknowledging and displaying their emotions) will result in a protective response that will relieve their distress (Mikulincer et al, 2003). Once their distress has been reduced, these infants are able to turn their attention to exploration, using the attachment figure as a secure base from which to do so (Kobak et al, 1993). Therefore, Main (1990, cited in Kobak et al, 1993) described proximity seeking as a primary attachment strategy. For infants with both avoidant and ambivalent attachment styles, proximity seeking is not an effective strategy of affect regulation. In light of this, these infants use what are known as secondary attachment strategies (Main, 1990, cited in Kobak et al, 1993). The two main secondary attachment strategies involve either deactivation or hyperactivation of the attachment system (Kobak, 1993).

The hyperactivating strategy is characteristic of infants with an insecure-ambivalent attachment style. Care-givers are perceived to be inconsistently responsive; therefore

these infants do not completely abandon proximity seeking as an attachment strategy but rather intensify their proximity seeking attempts in the belief that if they persist in displaying magnified distress then they may be successful in eliciting a response from the attachment figure (Shaver and Mikulincer, 2008). This is an unconscious process based on the infant's internal working model of the availability of the attachment figure. Infants with an insecure-ambivalent attachment style are thought to be hypervigilant to perceived threat. In addition, their attachment system is believed to be in a chronic state of activation making it difficult for them to attend to other activities, such as exploration, even when there are no overt signs of threat (Mikulincer, et al 2003).

Unlike infants with an insecure-ambivalent attachment style, children with an insecure-avoidant attachment style do not have an expectation that the care-giver will be inconsistently responsive but rather that they are unlikely to be responsive at all if they explicitly demonstrate their needs. In order to manage the frustration and distress that is caused by an unresponsive care-giver, the primary attachment strategy of proximity seeking is suppressed. These infants expect to obtain a better outcome if they do not show overt signs of neediness and instead attempt to manage their distress alone (Shaver and Mikulincer, 2008). Again this is thought to be an unconscious process guided by the infant's internal working model. Deactivation of the attachment system is thought to limit the infants' engagement in exploration, as their attention is focused on keeping the attachment system suppressed (Grossmann et al, 1999).

The notion of hyperactivating and deactivating strategies only relates to what are known as organized strategies. Insecure-avoidant and insecure-ambivalent attachment styles are regarded as organized attachment strategies as they represent a means of maximizing access to the care-giver and regulating affect (Cassidy and Mohr, 2001). In contrast, infants classified as having a disorganized attachment do not have a coherent strategy of attachment behaviour (Main and Solomon, 1990, cited in Carlson, 1998). These children grow up in environments where the caregiver exhibits frightened or frightening behaviour. This leaves the infant in an impossible position of expecting the care-giver to provide protection from fear at the same time as experiencing them as the source of their fear (Carlson, 1998). As a result these

infants are unable to develop a systematic strategy to increase the attachment figure's availability (Main and Solomon, 1990, cited in Howe, 2006). These infants have an internal working model of themselves as helpless and the care-giver as unable to provide protection (Solomon and George, 1999, cited in Gubman, 2004). Activation of the attachment system does not result in the desired outcome of maximizing the care-giver's availability (Gubman, 2004). In light of this these infants may display contradictory behaviours such as simultaneous proximity seeking and avoidance, in response to the impossible paradoxical position in which they find themselves (Carlson, 1998).

1.2.3 Sensitivity

As stated above, the dyadic relationship between the caregiver and the infant is crucial to the formation of internal working models. Given that internal working models operate largely at an unconscious level it is important to understand the processes by which they develop and the resulting attachment strategies that are used to regulate affect.

Central to an understanding of how attachment styles develop is the notion of sensitivity or attunement. Maternal sensitivity has been conceptualized in a variety of different ways. One definition provided by Ainsworth et al (1971) is that maternal sensitivity refers to the mother's ability to recognize her infant's signals, to interpret these and to respond in an appropriate manner. Ainsworth et al (1971) found that babies classified as secure were more likely to have mothers with a higher level of maternal sensitivity. Since this time, it has generally been accepted that maternal sensitivity is likely to be a key factor in the development of secure infant attachments (Meins et al, 2001); however, in more recent years this has come into question. For example, the results of a meta-analysis by de Wolff and Van Ijzendoorn (1997, cited in Meins et al, 2001), brought into doubt the strength of the relationship between maternal sensitivity and infant attachment security. Meins et al (2001) suggested that the findings of this and other similar studies may indicate a problem with the way in which the concept of sensitivity has been operationalized, rather than indicating that sensitivity is not an important factor.

Ainsworth's original theory of attachment focused on the interactional component of sensitivity; however in recent years this focus seems to have been lost (Meins et al, 2001). As a result, Meins (1997, cited in Meins et al, 2001) re-evaluated the meaning of sensitivity and argued for a distinction to be made between a mother's responsiveness to her child's physical and emotional needs and her "...capacity or willingness to engage with [her] infant[s] at a *mental* level" (Meins et al, 2001, p.638). In relation to this, Meins (1997, cited in Meins et al, 2001) coined the term 'mind-mindedness', which refers to a mother's tendency "...to treat her infant as an individual with a mind rather than merely as a creature with needs that must be satisfied" (Meins et al, 2001, p.638). Mind-mindedness refers to a specific type of sensitivity, which is concerned with the mothers' ability to read the infants' mental states and changes.

1.2.4 Reflective Function and Mentalization

Related to the theory of mind-mindedness is the concept of reflective function. Reflective function refers to '...the psychological processes underlying the capacity to mentalize... mentalizing refers to the capacity to perceive and understand oneself and others' behavior in terms of mental states, i.e., reflection' (Fonagy et al., 1997, p. 5, cited in Slade, 1999). Put simply, it is the processes by which the care-giver attunes to the infant's state of mind (Field, 1985, cited in Siegel, 2001).

Reflective function can occur both verbally – where the care-giver uses words to describe the child's state of mind (Siegel, 2001); and non-verbally (often referred to as mirroring) where the care-giver pays attention to the moment by moment changes in the child's mental state, reflects on these and then communicates their representation back to the infant (Fonagy, 1999). This process may occur through the care-giver's facial expressions; body language; eye contact; and vocalizations. The care-giver follows the infant's lead and is then part of a process that involves a resonance between their state of mind and that of the infant (Siegel, 2001). Fonagy (1999) proposed that the care-giver's representation ideally should be a modified version of the infant's affect as this allows the infant to experience their emotions in a manageable way; to develop an understanding of their internal state; and to gain an appreciation of the caregiver as a separate thinking being (i.e. to develop the ability to

mentalize). If the care-giver reflects back an unmodified representation of the infant's internal state then the infant may find it difficult to utilize the reflection in order to regulate their affect and to develop a sense of self and other (Fonagy and Target, 1997). Conversely, if the care-giver is unable to form a representation of the infant's internal state or if their representation is too incongruent with the infant's communication then this also may not allow the infant to understand and manage their own and other people's emotions (Fonagy and Target, 1997).

1.2.5 Intergenerational Transmission of Attachment

In terms of understanding differences in care-givers capacity for mentalization, it is useful to consider studies that investigate what is known as the intergenerational transmission of attachment. For example, a study carried out by Slade et al (2005, cited in Allen et al, 2008) found that not only was the attachment security of infants predicted by the mother's capacity for mentalization, but also that the mother's ability to mentalize in relation to her child was predicted by the security of attachment to her own parents. In addition George and Solomon (1999) proposed that care-givers' internal working model of attachment has a significant impact on their interaction with their children.

Main et al (1985, cited in Slade, 1999) developed a way of measuring the attachment representations of adults using a semi-structured interview, known as the Adult Attachment Interview (George et al, 1985, cited in Slade, 1999) and identified three attachment patterns – 'autonomous', 'dismissing' and 'preoccupied'. Main and Hesse (1990, cited in Slade, 1999) later identified a fourth pattern of adult attachment, known as 'unresolved' (in relation to loss or trauma). These adult attachment patterns are thought to be analogous to the infant attachment patterns as measured by the Strange Situation Procedure (Main and Goldwyn, 1984, 1998, cited in Slade, 1999).

The autonomous pattern of attachment is characterized by the adult's ability to coherently reflect on their attachment related memories (Cassidy and Mohr, 2001). These care-givers are able to signal to the infant that they understand their behaviour as intentional and understandable. The child then internalizes this reflection and is able to begin to understand their own psychological experience (Fonagy and Target,

2000, cited in Stern, 2005). Care-givers with an autonomous pattern of attachment, who tend to have the capacity for reflective function and mentalization enable the child to develop a sense of self and other; to make sense of their own and other people's emotions: and to develop the ability to predict the behaviour of others (Atkinson and Goldberg, 2004). These care-givers are likely to have infants with a secure attachment style, as measured by the Strange Situation Procedure (Cassidy and Mohr, 2001).

Adults with a dismissing attachment style tend to minimize their affect (Main et al, 1985, cited in Slade, 1999) and avoid emotional arousal in an attempt to protect themselves from painful experiences (Fonagy and Target, 1997). As a consequence, they may be unable to pay attention to, understand and regulate their infant's emotional state (Fonagy and Target, 1997). Adults with a dismissing attachment representation are likely to have infants classified as having an avoidant style of attachment (Main et al, 1985, cited in Slade, 1999; Cassidy and Mohr, 2001).

Adults with a preoccupied attachment style are typically overwhelmed by affective states relating to their early attachment experiences (Main et al, 1985, cited in Slade, 1999). They may either mirror the infant's emotional state in an exaggerated manner that does not accurately represent the infant's communication; or may be unable to reflect back the infant's affect in a manageable form due to preoccupation with their own emotional experience (Fonagy and Target, 1997). Adults with a preoccupied attachment style tend to have infants with an ambivalent style of attachment (Main et al, 1985, cited in Slade, 1999).

The infant's internalization of the defensive strategies used by both dismissing and preoccupied attachment figures (who demonstrate a low quality of reflective function) may result in them struggling to make sense of their own and other people's emotions and to develop their own mentalizing abilities (Fonagy, 1999).

The unresolved adult attachment pattern is characterized by confusion and dissociation in relation to attachment related memories, particularly with regard to loss and trauma (Main and Hesse, 1990, cited in Slade, 1999). Care-givers with this attachment pattern are likely to show frightened or frightening behaviour towards the

infant (Main and Hesse, 1990, cited in Lyons-Ruth and Jacobvitz, 1999) and be unable to distinguish their own affective state from that of the infants (Grienenberger et al, 2005, cited in Allen et al, 2008). Adults with this attachment pattern are more likely than other parents to have infants classified with a disorganized attachment in the Strange Situation Procedure (Cassidy and Mohr, 2001). Fonagy and Target (1997) proposed that infants with a disorganized attachment may be hypervigilant to the care-giver's affective state and therefore may develop mentalizing abilities in relation to the attachment figure's behaviour. However, the effort required to focus on and understand the caregiver's behaviour, may leave them without the opportunity to reflect on their own internal states (Fonagy and Target, 1997).

1.3 Assessing Attachment

Since Bowlby's original work a number of methods for measuring the concept of attachment throughout childhood and adolescence have been developed; and with the development of new methods a number of debates in relation to the most optimal way of measuring this construct have emerged. One such debate centers on the issue of whether attachment should be measured categorically or on a continuous scale.

As discussed above the Strange Situation Procedure, developed by Ainsworth et al (1978; Ainsworth and Wittig, 1969) was the initial method for measuring attachment and is appropriate for use with infants aged 9 to 18 months. This method employs a categorical approach and has been used extensively in a broad range of empirical work investigating the theory of attachment. Further categorical systems for conceptualizing attachment have subsequently been developed. For example, Main and Solomon (1990, cited in Madigan, 2007) extended the Ainsworth et al classification system by adding the disorganized category of attachment.

Classification systems have also been developed to conceptualize attachment relationships beyond infancy and into early childhood. For example, Main and Cassidy (1988, cited in Solomon & George, 1999) proposed a system for classifying the attachment styles of 6 year olds. The attachment categories are based on the child's behaviour during the initial period of reunion with the parent after an hour long separation. The classification groups used in the Main and Cassidy system are –

secure, avoidant, ambivalent, controlling and unclassified. A further categorical approach, called the Preschool Assessment of Attachment was developed by Crittenden (1992a, 1992b, 1994, cited in Solomon & George, 1999) and includes six attachment classifications – secure, defended, coercive, defended / coercive, anxious depressed and insecure / other. This system has been used for classifying the attachment strategies used by children between the ages of 21 months and 65 months. In addition, a third classification system for use with children aged 2 ½ to 4 years old was identified by Cassidy, Marvin and the MacArthur Working Group on Attachment (1987, 1990, 1991, 1992, cited in Solomon & George, 1999). This system includes one secure group and four insecure groups – avoidant, ambivalent, controlling, disorganized and insecure / other.

Although categorical systems for measuring attachment have been widely used, in more recent years it has been argued that it is invalid to conceptualize attachment in terms of discrete categories and that instead continuous scales best capture the concept of attachment. In relation to this, Fraley and Spieker (2003) carried out a study investigating whether differences in attachment organization are more consistent with a continuous or a categorical model. They applied taxometric techniques (Meehl, 1973, 1992, cited in Fraley & Spieker, 2003) and conducted MAXCOV analyses (Meehl & Yonce, 1996, cited in Fraley and Spieker, 2003) in order to answer the question of whether infant attachment patterns are characterized by natural types (categories) or continua (dimensions). They used data from the NICHD Study of Early Child Care (NICHD Early Child Care Research Network, 1997) involving 1,139 fifteen-month-old children who were tested with the Strange Situation Procedure. The results indicated that a continuous model better accounted for the distribution of infant attachment patterns than a categorical model. The authors concluded that it was time to rethink the standard models of measurement used in attachment research.

A number of continuous attachment scales have been developed for use with school aged children. Examples of these include the Reunion Rating Scale (Booth and Perman, 1989, cited in Booth et al, 2004); the Parent-Child Reunion Inventory (Marcus, 1988, cited in Cunningham et al, 2004); and the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987, cited in Bosmans et al, 2006). There

seems to have been less progress in terms of developing continuous attachment measures for use with infants. Despite the results of the Fraley and Spieker (2003) study and the increasing number of continuous measures, the debate concerning categorical versus continuous attachment assessments continues and a number of well-established categorical measures continue to be used.

Another issue concerning the measurement of attachment involves the distinction between relation specific attachment assessments and assessments that measure a general attachment state of mind. Infant attachment assessments (e.g. the Strange Situation Procedure) are typically regarded as relationship specific as they measure the child's attachment in relation to a specific person (usually the primary care-giver) (Kerns et al, 2005). Based on repeated interactions with the primary care-giver, the infant gradually develops an internal working model of attachment that guides their interactions with other people in general (including peer relationships and romantic relationships) rather than specifically in relation to a particular person. This is thought to be a gradual process and therefore it is unclear at which point it is meaningful to describe and measure a child's attachment in terms of a general attachment state of mind rather than in terms of a specific relationship. However, it is generally accepted that by adulthood it is valid to measure attachment in terms of a general attachment state of mind and the Adult Attachment Interview (AAI) (Main & Goldwyn, 1984a, 1998a, cited in Hesse, 1999) was designed with this purpose in mind.

Attachment states of mind are assumed to operate to some extent at an unconscious level and therefore the main focus for scoring the AAI is on the process of the interview rather than the content. Three main attachment classifications are derived from the AAI – one secure category termed 'autonomous' and two insecure categories termed 'dismissing' and 'preoccupied'. It is thought that the three categories correspond with the infant categories derived from the Strange Situation Procedure (Crowell et al, 1999). In addition a fourth category – 'unresolved' in relation to loss or trauma can also be assigned to individuals who participate in the AAI and this category parallels the disorganized category in infants (Hesse, 1999). Although the AAI was originally developed as an attachment assessment for use with adults it has also been used to assess adolescents' attachment states of mind. In addition, some

attachment assessments for use in middle childhood have also been designed to measure attachment states of mind rather than an attachment in relation to a specific individual (Kerns et al, 2005).

Several methods for assessing attachment have already been mentioned. It is also briefly worth mentioning that in addition to observational methods, such as the Strange Situation Procedure and interview methods, such as the Adult Attachment Interview a number of other methods for assessing attachment exist. These include self-report questionnaires, such as the Adolescent Attachment Questionnaire (West et al 1998, cited in Elgar et al, 2003); mother-report questionnaires, such as the Parent / Child Reunion Inventory (Marcus, 1988, cited in Cunningham et al, 2004); and verbal responses to a task that are later coded in order to assign an attachment category, such as the Manchester Attachment Story Task (Green et al, 2000, cited in Green et al, 2007).

1.4 Assessing Psychopathology

Psychopathology in children and adolescents is typically conceptualized in terms of internalizing and externalizing disorders (Cicchetti and Toth, 1991). Internalizing disorders consist of emotional problems and are characterized by over-controlled and inner-directed emotions (Merrell, 2003). This term generally refers to problems such as anxiety, depression, social withdrawal, inhibition and somatic complaints (Achenbach and Edelbrock, 1978, 1981; Zigler and Glick, 1986, cited in Cicchetti and Toth, 1991). Externalizing disorders consist of behavioural problems and are characterized by under-controlled and outer-directed behaviour (Merrell, 2003). The type of problems that this term describes includes hyperactivity, aggression, antisocial behaviour and destructive behaviour (Achenbach and Edelbrock, 1978, 1981; Zigler and Glick, 1986, cited in Cicchetti and Toth, 1991). There is a substantial amount of empirical evidence supporting the distinction between internalizing and externalizing problems, particularly by Achenbach and his colleagues (Achenbach and Edelbrock, 1981; Achenbach et al, 1991, cited in Serafica & Vargas, 2006).

Identifying internalizing and externalizing problems in children and adolescents is important as research evidence suggests that they not only affect current functioning

and development but may also have long term implications for psychological well-being (Merrell, 2003). For example, in a prospective study, Olweus (1976, cited in Cicchetti & Toth, 1991) found a positive association between conduct problems in childhood and later psychopathology. Further support for the continuity of externalizing problems comes from a study by Huesmann, Lefkowitz, Eron and Walder (1984, cited in Cicchetti & Toth, 1991), who found that aggressive behaviour at age 6 was predictive of aggression 22 years later. In addition, Campbell et al (1984; 1986, cited in Cicchetti & Toth, 1991) carried out a study investigating the continuity of problems from age 3 to 6 years of age and found evidence of stability across this time period.

There appears to be less clarity about the stability of internalizing problems over time, which may reflect the fact that due to the greater complexities involved in assessing internalizing problems less research has been carried out into this area. Despite this there does exist empirical evidence to suggest that internalizing problems may have long-term implications. For example, Edelbrock and Achenbach (1985, cited in Cicchetti & Toth, 1991) found evidence for the continuity of internalizing problems over a short period of time in a clinical sample of children. In addition, Reinhertz et al (2003) found that children who rated themselves as more anxious and depressed at age 9 were more depressed between the ages of 18 and 26 years. Further, Rubin et al (1989, cited in Mash & Dozois, 1999) found that social withdrawal in combination with a lack of social interaction in childhood was strongly predictive of later internalizing problems. However, the results in this area are mixed and further prospective studies are required in order to provide a clearer picture.

One of the most widely used and thoroughly researched assessments of psychopathology in children and adolescents is the Child Behavior Checklist (CBCL). The CBCL is part of the Achenbach System of Empirically Based Assessments and was designed to measure children's problems based on parents' reports (Achenbach and Rescorla, 2006). There are two versions of the CBCL – one designed for use with children aged 1 ½ -5 years old and another for use with children aged 6-18 years old (Achenbach and Rescorla, 2000; 2001, cited in Achenbach and Rescorla, 2006). Both forms of the CBCL consist of problem items that the parent rates on a scale ranging from 0 (not true) to 2 (very true or often true). The CBCL provides a total problem

score and separate scores for both internalizing and externalizing problems (Nader, 2007). Before the development of the current CBCL described above, there was an earlier version that was designed for use with 4-18 year olds. This version has also been used extensively in the assessment and research of child psychopathology. In addition to the parent-report form the Achenbach System of Empirically Based Assessments also includes the Teacher's Report Form (TRF) for 6-18 year olds and the Youth Self Report (YSR), which is designed for use with 11-18 year olds (Achenbach & Rescorla, 2006).

Another questionnaire method for assessing psychopathology in children and adolescents is the Child Depression Inventory (Kovacs, 1992, cited in Dougherty et al, 2008), which measures self-reported severity of depression in 7-17 year olds. A further measure is the Strengths and Difficulties Questionnaire (Goodman, 1997), which is a brief screening tool that includes 25 items divided into 5 scales, measuring conduct problems, hyperactivity, emotional symptoms, peer problems, and pro-social behaviour. There are three versions – the self-report form, which is for 11-17 year olds; the parent or teacher form for use with 4-11 year olds; and the parent or teacher form for use with 11-17 year olds. Another questionnaire measure is the Eyberg Child Behavior Inventory (Eyberg, 1999). This is a parent-report measure that assesses conduct problems in children and adolescents aged 2-16 years old.

Despite the wide use of the CBCL and other measures that use a questionnaire methodology, some limitations have been raised in relation to the use of questionnaires for the assessment of psychopathology. For example, Achenbach et al (1987, cited in Berger et al, 2005) highlighted the issue that concordance among informants on questionnaire assessments is low – particularly for assessments of adolescents' internalizing problems. As Buist et al (2004) stated one explanation for this is that internalizing problems may be difficult for parents and teachers to recognize due to the fact that they are inwardly directed. However there is also a difficulty with relying solely on self-report measures due to social desirability bias (Swenson & Rose, 2009). In addition, self-report questionnaire pose a difficulty for measuring externalizing problems as the individual concerned may not recognize their behavior as a problem and may therefore show little insight when responding to the questions (Smith et al, 2007).

Berger et al (2005) discussed a further issue in relation to self-report measures when investigating the association between attachment and psychopathology. As children with an insecure-avoidant attachment style employ deactivating strategies for affect regulation, they are unlikely to acknowledge symptoms of distress on self-report questionnaires. Similarly, other people reporting on the insecure-avoidant child's emotional state may not easily be able to make an accurate judgment about how they are feeling. Conversely, insecure-ambivalent children may have a tendency to report more symptoms of distress – either because they do actually experience more difficulties or because they have a tendency to overtly exaggerate their distress in order to alert an inconsistent care-giver to their needs. Despite these issues, self-report measures continue to be the main method used in empirical studies to assess child and adolescents' level of psychopathology.

1.5 Attachment and Psychopathology

1.5.1 Theories about the Association between Attachment and Psychopathology

For a number of years following Bowlby's initial work, attachment theory was mainly utilized in the research domain of developmental psychology (Bowlby, 1988). This is surprising considering that Bowlby's original vision was for his theory to be used to facilitate the understanding and treatment of psychopathology (Bowlby, 1988). It is only in relatively recent years that research into this area has begun to take momentum (Cicchetti and Greenberg, 1991, cited in Cicchetti et al, 1995) and there is now a substantial body of work addressing the issue of attachment and psychopathology. Secure attachments are thought to serve as a protective factor against the development of psychopathology; and insecure attachments are thought to be a risk factor (Kobak et al, 2006). In relation to this, several theories have been proposed.

First, the differing internal working models of securely and insecurely attached children may offer one explanation as to why children with insecure attachments may be more at risk of developing emotional difficulties than children with secure attachments. For example, children with secure attachments are likely to have

internal working models that tell them they are worthy of love and that engender a sense of competence in their ability to manage difficulties. Thus their confidence and self-esteem may act as a protective factor against the development of emotional problems in the context of difficult life circumstances (Pauli-Pott et al, 2007). Conversely, children with insecure attachments tend to have internal working models that are related to anger, mistrust and anxiety (Main, 1995, cited in Greenberg, 1999). As a consequence, there may be a tendency for insecurely attached children to be hyper-vigilant to threat and anxiety-provoking situations, thus increasing their risk of experiencing more anxiety related symptoms (Dallaire and Weinraub, 2007). In addition, internal working models that are characterized by anger may result in an increased risk of reacting in a hostile and aggressive manner in response to difficult situations (Dodge, 1991, cited in Greenberg, 1999).

Second, attachment strategies used in early childhood to regulate affect in response to care-givers who are perceived as emotionally and physically unavailable may, in the long-term, be maladaptive. For example, hyperactivating strategies that employ intensification of distress and hyper-vigilance to threat as a means of increasing the attachment figure's availability may no longer be a useful strategy in later social situations; and may in fact interfere with psychological health (Shaver and Mikulincer, 2008). Consistent with this theory, Brown and Wright (2003) hypothesized that ambivalently attached children would experience more affective disorders due to their tendency to focus excessively on distress. In addition, Kobak et al (2006) suggested that the use of hyperactivating attachment strategies may be associated with anxiety disorders and other internalizing problems. The same theory can be applied to deactivating attachment strategies but may result in different types of psychological difficulties. For example, it has been proposed that children with an insecure-avoidant attachment style may encounter psychological difficulties due to their tendency to unconsciously suppress and misinterpret their feelings and because they are likely to find it difficult to approach others (such as parents, teachers and friends) for support (Mikulincer & Shaver, 2003, cited in Shaver & Mikulincer, 2008). In addition, Brown and Wright (2003) suggested that adolescents with an insecure-avoidant attachment style would exhibit difficulties that minimize overt feelings of distress, such as conduct disorder and substance abuse. Consistent with this theory, Shaver and Hazan, 1993 (cited in Mikulincer, 2008) suggested that

individuals who use deactivating strategies of affect regulation may experience difficulties in the form of hostility and loneliness.

Third, the greater capacity for reflective function shown by securely attached children may be another factor that protects them from developing psychological disorders in the context of stressful life events. For example, the ability to mentalize means that the child has a greater understanding of the emotional states of others and as a consequence other peoples' behaviour is experienced as more meaningful and predictable. Thus, the child learns to flexibly adapt their responses in light of their evaluation of the emotional states of others, in a way that optimizes their sense of well-being (Fonagy and Target, 1997). Without the capacity for reflective function, children may be less able to select the most advantageous response in relation to the behaviour of others. In addition to the benefits of understanding the emotional states of others, the capacity for reflective function also enables the securely attached child to have an understanding of their own emotional states. Without this reflective ability and self-understanding the impact of difficult life circumstances may be felt more intensely, thus leading to an increased risk of psychopathology (Fonagy and Target, 1997).

1.5.2 Evidence for an Association between Attachment and Psychopathology

As detailed above, there exist a number of convincing theoretical arguments for a link between attachment security and psychopathology. However, Cicchetti et al (1995) suggested that the empirical evidence for an association between attachment quality and the subsequent development of behaviour problems (at least in non-clinical samples) is ambiguous.

Some studies involving *low-risk child samples* (e.g. adequate housing, no maternal mental problems, easy infant temperament and few major life stresses) and non-clinical samples have failed to demonstrate a link between attachment security and psychopathology. For example, Bates et al (1985) found that attachment security assessed at 13 months did not predict later behaviour problems at 3 years of age in a non-clinical sample of children. They interpreted these findings in light of the relatively small number of insecurely attached children included in the sample; the

fact that the outcome measure relied on mother-report of behaviour problems rather than employing an observational method; and the fact that the outcome measure may have had limitations in terms of its social relevance. No explanation was offered as to why these factors were considered as potentially contributing to the non-significant results. In addition, it seems a rather weak argument that a significant result may have been obtained if a more socially relevant outcome measure (based on behaviour at 9 years rather than 3 years) was used. Further, the argument that a non-significant result was obtained due to the outcome measure relying on mother-report rather than observational methods does not seem to hold much ground given that similar studies employing this type of outcome measure have yielded significant results. For example, Pierrehumbert et al (2000) carried out a study investigating attachment and behaviour problems in a low-risk sample and found that insecure attachment assessed at one year of age was positively correlated with mother-report of both internalizing and externalizing problems at 5 years of age. In addition, a medium negative correlation between attachment security and mother-reported internalizing and externalizing problems was found in a study by Easterbrooks and Abeles (2000) in a sample of low-risk 8 year old children. Further support for an association between attachment security and psychopathology in low-risk child samples comes from a study carried out by Roelofs et al (2006). They investigated a sample of 10 year old children and found that insecure attachment to the mother was associated with higher anxiety and aggression scores. Interestingly no association was found between insecure attachment and scores on the depression scale.

With regard to *low-risk adolescent* samples, several studies have found a link between attachment and psychopathology. For example, Bosmans et al (2006) carried out a study involving three unique groups of participants (aged 10-12 years; 13-15 years; and 16-18 years) and found negative correlations between attachment security to the mother and externalizing problems for each age group. Empirical evidence also exists to suggest a link between attachment security and internalizing problems in low-risk adolescent samples. One such study was carried out by Buist et al (2004) and demonstrated a negative relationship between concurrent attachment security and internalizing behaviour at age 13 ½ years old. This study also provided evidence that was consistent with the Bosmans et al (2006) study as it found a negative association between attachment security and externalizing problems.

In terms of *high risk child samples* (e.g. poor housing, maternal mental health problems and difficult infant temperament) a number of studies have suggested a link between attachment security and psychopathology. For example, a study carried out by Lyons-Ruth et al (1993) involving a high-risk sample of low-income families found an association between children classified as having a disorganized attachment and later evidence of behaviour problems. Consistent with this finding, a study by Madigan et al (2007), which investigated a high-risk sample involving infants with adolescent mothers, also found a significant positive association between maternal reports of externalizing problems and disorganized attachment. Further, Shaw and Vondra (1995) investigated a sample of low-income families and found a negative relationship between attachment security at 18 months and externalizing problems at 3 years of age. However, inconsistent with the two studies mentioned above the relationship was only evident when all of the insecure groups were combined into one group. Disorganized attachment, insecure-avoidant attachment and insecure-resistant attachment were not independently found to be related to later behaviour problems. This finding may be attributed to the small number of participants included in the study, which may have resulted in the analysis lacking sufficient power to detect any effects at the level of separate attachment groupings.

An additional study by Lyons-Ruth et al (1997) involving a high-risk sample found only a weak negative relationship between infant attachment security and mother-reported internalizing and externalizing problems at age 7 years. There was however a greater association between these variables when teacher-report of behaviour problems was employed rather than mother-report. Further support for a link between attachment security and psychopathology comes from a study carried out by Cicchetti et al (1998). The sample in this study included a high-risk group of mothers with a diagnosis of depression. The results showed a significant positive relationship between insecure attachment and mother-report of both internalizing and externalizing problems. In terms of *high-risk* adolescent groups, Elgar et al (2003) investigated a sample of male young offenders who ranged in age from 15 to 18 years. They found a small to medium positive correlation between insecure attachment and both internalizing and externalizing problems.

In 1999, van Ijzendoorn et al (1999) carried out a meta-analysis including 12 studies involving 734 participants to investigate the association between disorganized attachment in early childhood and externalizing problems. The combined effect size across all of the studies was $r = 0.29$. The authors suggested that this was a substantial effect size and that disorganized attachment may indeed be considered an important risk factor in the development of childhood externalizing problems.

1.6 Rationale for the Current Study

To the researchers knowledge the van Ijzendoorn et al (1999) study is thus far the only existing meta-analysis that has investigated the relationship between attachment and psychopathology. Ten years have passed since the publication of this study and since then a substantial amount of new research has emerged. Therefore the time has come to update the evidence-base in this area. The major aim of the present study is to extend the van Ijzendoorn et al (1999) meta-analysis by investigating the association between attachment and psychopathology not only in early childhood but also in later childhood and adolescence. Investigating the strength of this relationship systematically by drawing on all the available evidence is important, as it has often been proposed that attachment relationships formed in infancy have long-term repercussions for later emotional development, well being and mental health (Dozier et al, 1999). Therefore, the present study will involve separate meta-analyses to estimate the effect size correlations for studies that employed a cross-sectional design and for studies that employed a prospective design; and will include both child and adolescent samples. It will then be possible to address the important question of whether the relationship between attachment and psychopathology becomes stronger over time, providing crucial evidence for the lasting impact of early attachment relationships.

The van Ijzendoorn et al (1999) meta-analysis focused exclusively on attachment and externalizing problems and to date there has been no attempt to synthesize the available research on attachment and internalizing problems in children and adolescents. The present study aims to bridge this gap by using meta-analytic techniques to investigate the relationship between attachment security and both types of psychopathology.

Attachment security can be regarded as a bipolar dimension with high scores indicating secure attachment and low scores indicating insecure attachment. In contrast to the van Ijzendoorn et al (1999) study the present study will not investigate disorganized attachment in particular but will focus on attachment security as a dimensional construct. This is an angle that thus far has not been investigated meta-analytically.

The van Ijzendoorn et al (1999) meta-analysis combined mother-report, teacher-report and observational methods of assessing problem behaviour; but did not report whether the effect size correlations differed depending on the type of problem behaviour assessment. In order to avoid the error of condensing heterogeneous and incompatible studies into one overall effect size, the present study will employ stringent inclusion criteria that will identify studies with similar or compatible assessment procedures. In addition, detailed moderator analyses will be conducted with the aim of identifying variables that may alter the relationship between attachment security and psychopathology and thus could explain a part of the variation of the observed effect size correlations between studies

When Bowlby originally formulated the theory of attachment, he envisaged that it would be used to inform the diagnosis and treatment of individuals and families with emotional problems. Although in more recent years there have been attempts to apply the theory in this way, for a substantial period of time attachment theory was mainly used in developmental research rather than in applied psychology (Bowlby, 1988). By establishing the magnitude of the effect size for the relationship between attachment security and psychopathology, the present study will re-focus attachment research in the direction that Bowlby originally intended.

1.7 Aims

The main aim of the present study is to use meta-analytical techniques to consolidate the existing empirical research investigating attachment security and psychopathology in children and adolescents. The specific aims of the meta-analysis are the following:

- To establish the magnitude of the effect size correlation for attachment security and both internalizing and externalizing problems measured *contemporaneously* in studies employing a cross-sectional design.
- To establish the magnitude of the effect correlation between attachment security and both internalizing and externalizing problems measured *at a later point in time* using prospective studies. This would make it possible to establish the predictive validity of attachment security regarding the development and manifestation of later behaviour problems.
- To investigate potential moderator variables that may alter the magnitude of the effect size correlations (such as age of the child; gender of the child; and whether the attachment measure used a continuous or categorical scale).

CHAPTER TWO: METHOD

2.1 Selection of Studies

Two electronic databases (PsycINFO® and Medline®) were searched in order to identify studies for inclusion in the meta-analysis. The searches were restricted to studies published between 1978 and January 2009. This decision was taken as there was not a method for measuring attachment prior to 1978. Searches were also limited to studies that were published in the English language as it was beyond the scope of the present thesis to include studies published in other languages.

All searches were conducted within the *title* of the reference. The databases were searched using the word ‘attachment’; the Boolean operator ‘AND’; and words such as ‘psychopathology’, ‘externali*ing’, ‘internali*ing’, ‘behavi* disorder’ and ‘mental health’. For the full list of search terms please refer to Appendix 1, which shows the full search strategy as it was carried out in PsycINFO®. Search terms were initially identified based on the author’s existing knowledge of attachment and psychopathology as well as commonly used words in the existing literature in this area. Further terms were identified using the thesaurus in Word and the thesaurus in PsycINFO®.

The PsycINFO® search was carried out first and produced a total of 282 discrete hits. The Medline® search produced a further 6 discrete hits. Therefore the PsycINFO® and Medline® searches combined produced a total of 288 discrete references. In addition to the studies identified from the computerized data-base searches, all papers that were included in the van Ijzendoorn et al (1999) meta-analysis were identified in order to assess their relevance for inclusion in the present meta-analysis. Some of the studies included in the van Ijzendoorn et al (1999) meta-analysis were already identified from the computerized data-base searches, which left an additional 7 studies that had not already been identified. Therefore the computerized data-base searches combined with the studies from the van Ijzendoorn et al (1999) meta-analysis resulted in a total of 295 discrete references.

The *abstracts* of the 295 references were examined in order to eliminate any studies that were clearly not relevant to the research questions. At this stage of the screening process the inclusion criterion was relatively broad in order to prevent any potentially relevant studies being excluded on the basis of the abstract alone.

The *inclusion criterion* for the abstract screening was as follows:

- Empirical studies that investigated the relationship between child / adolescent attachment and any type of child / adolescent problem, including internalizing problems (depression, anxiety, withdrawal, somatic complaints, obsessive-compulsive disorder, phobias, generalized anxiety disorder, post-traumatic stress disorder); externalizing problems (delinquency, aggression, attention problems, hyperactivity problems, conduct problems); and social functioning problems.

The *exclusion criteria* for the abstract screening were as follows:

- Dissertations / theses.
- Studies that investigated the relationship between child / adolescent attachment and cognitive functioning.
- Adult samples (samples that included participants over the age of 19 years).
- Studies that investigated the relationship between parental attachment and child / adolescent psychopathology.
- Studies that investigated the relationship between parental psychopathology and child / adolescent attachment.

Spreadsheets were created in Excel in order to monitor the decisions made in relation to each study during the screening process and to keep track of the status of each study throughout the procedure (e.g. whether or not the study had been obtained,

printed, had data extracted and so forth). See Appendix 2 for a sample of the spreadsheet described.

Following the abstract screening 97 results were found to be *dissertations* and were therefore *excluded*. Of these 97 dissertations, 3 were not empirical studies; 58 investigated a child or adolescent sample; and 36 investigated an adult sample. 198 studies were *published works* rather than dissertations; however 123 of these were *excluded* on the basis of one of the other criteria. 41 were excluded as they investigated an adult sample rather than a child or adolescent sample; 64 results were excluded as they were not empirical studies (e.g. narrative reviews, theoretical papers, commentary papers, case studies, meta-analyses, book reviews); and 18 were excluded as they investigated an unrelated topic or did not investigate the relationship between attachment and psychopathology in accordance with the inclusion criterion stated above. Therefore on the basis of the abstract screening, a total of 220 results were *excluded*, leaving a total of 75 studies to be *obtained*.

2.2 Extracting Information from the Selected Studies

In preparation for the coding stage four detailed tables were developed in Word in order to record the information extracted from the studies (see Appendix 3 for examples of completed data extraction tables). Each study was given a unique number that was used to identify it throughout the process. The data extraction tables were designed to record information in relation to four content areas: *study characteristics*, *participant characteristics*, *assessment characteristics* (both attachment and psychopathology assessments) and *results*. The type of information extracted at this stage was relatively broad in order to ensure that any potentially relevant variables were not discounted. See Appendix 4 for the full list of information that was extracted from the studies.

During the data extraction process, studies were eliminated if they did not report sufficient data to permit the calculation of an effect size estimate. In addition, if the same sample was used in multiple studies then preference was given to a study if it was also included in the van Ijzendoorn et al (1999) meta-analysis. Otherwise only the most recent study was included. A further 23 papers were *excluded* during the

data extraction process, leaving a total of 52 studies to be *included*. 5 studies were excluded as they did not investigate the relationship between attachment security and psychopathology; 1 study was excluded as it was a thesis; 4 were excluded as they were not empirical studies; 3 did not provide enough information to permit the calculation of an effect size index; 7 were excluded as they investigated an adult sample; 2 studies were excluded as they used the same sample as another study; and 1 study could not be obtained.

2.3 Coding Procedure

A detailed coding scheme was developed and applied to the relevant information extracted from the studies (see Appendix 5). In preparation for the data-analysis a spreadsheet in SPSS was set up in order to record the data from the coding procedure. The coding procedure for each of the content areas is described below.

2.3.1 Study Characteristics

Studies were coded according to whether they used a cross-sectional design (e.g. attachment and psychopathology assessed at the same time point) or a prospective design (e.g. attachment assessed first and psychopathology assessed at a later time point). The time interval between the attachment assessment and the psychopathology assessment was coded as the number of months between the two assessments. For prospective studies, if attachment and psychopathology were assessed at multiple time points then only the effect size corresponding to the longest time period between the attachment assessment and the psychopathology assessment was included.

2.3.2 Participants Characteristics

The number of participants was coded. Gender was coded as the percentage of males in the sample. The age of the sample was coded as the mean age of the children / adolescents at the time of the attachment assessment and their mean age at the time of the psychopathology assessment. Separate codes were assigned to clinical and non-clinical samples. If a study used a sample that consisted of some children /

adolescents that were from a clinical population and others that were not then this was coded as a clinical sample. It was also considered to code the age of the mother; the age of the father; the socioeconomic status of the sample; the birth order of the children / adolescents; the number of siblings; the clinical status of the mother; and the family background. However, this information was missing from the majority of the studies.

2.3.3 Attachment Assessment

The majority of studies stated that they used attachment measures that assessed the level of attachment security rather than the level of attachment insecurity. A small minority of studies used a measure that assessed the level of insecure attachment rather than attachment security. For example the Berger et al (2005) study used a combination of an adapted version of the Adult Attachment Interview and the Q-Set, where each participant received a score on a scale of insecure attachment. Studies that measured attachment in this way were also included in the meta-analysis.

Studies were coded depending on whether a continuous or categorical measure of attachment was used. Examples of measures that assessed attachment on a continuous scale included the Inventory of Parent and Peer Attachment, the Attachment Style Questionnaire and the Separation Anxiety Test. Measures that assessed attachment categorically included the Strange Situation Procedure, the Manchester Attachment Story Task and the Relationship Questionnaire for Children.

In the case of categorical measures the insecure attachment classifications (e.g. insecure-ambivalent and insecure-avoidant) were grouped together thus creating a dichotomy of secure versus insecure attachment. In addition to Ainsworth's infant attachment classifications, a number of other classifications were also included in the present meta-analysis. Secure-autonomous was treated as equivalent to secure; insecure-resistant and insecure preoccupied were treated as equivalent to insecure-ambivalent; insecure-dismissing was treated as equivalent to insecure-avoidant; and disorganized-controlling and unresolved attachment were treated as equivalent to disorganized.

If participants received a score on more than one attachment scale for a particular study then the corresponding effect sizes were averaged in order to obtain a single effect size index.

Different codes were assigned for measures that assessed attachment by observation (e.g. the Strange Situation Procedure); self-report questionnaire (e.g. the Adolescent Attachment Questionnaire); interview of the target person (e.g. the Adult Attachment Interview); mother-report questionnaire (e.g. the Parent / Child Reunion Inventory); and verbal responses to a task (e.g. the Manchester Story Attachment Task).

A distinction has been made in the attachment literature between general internal working models and relation-specific internal working models (Pietromonaco & Barrett, 2000). Therefore studies were coded depending on whether the attachment measure assessed child / adolescent attachment specifically to the mother (e.g. the Strange Situation Procedure) or child / adolescents' general attachment state of mind (e.g. Attachment Style Questionnaire; Adult Attachment Interview).

Very few studies used measures that assessed the specific attachment relationship between father and child; therefore this type of assessment was excluded. A further reason for excluding assessments that measured the father-child attachment relationship is that the mother is usually the child's primary care-giver; therefore the nature of the father-child attachment relationship may be qualitatively different to the mother-child attachment relationship. If a study stated that the assessment measured attachment towards parents but did not state whether this was towards the mother or the father, a decision was taken to code this as attachment specifically towards the mother. This was also the case for studies that combined the results of assessments that measured attachment towards the mother and assessments that measured attachment towards the father.

Assessments that measured attachment to peers or romantic attachment were also excluded; as the majority of studies did not use measures that assessed attachment in this way. Although attachment to peers and romantic attachment become more significant during adolescence it has been argued that parental attachment is still very significant at this stage. For example, when faced with intense stress, adolescents

typically turn to their parents for help. In addition, adolescents' attachment to their parents may be related to their ability to gradually become more independent of them, much in the same way as infants use the attachment figure as a secure base from which to explore the world (Allen and Land, 1999).

2.3.4 Psychopathology Assessment

Psychopathology has typically been defined in the literature in terms of internalizing and externalizing problems (Achenbach and Edelbrock, 1981; Achenbach et al, 1991, cited in Serafica & Vargas, 2006). Therefore separate codes were assigned to internalizing and externalizing problem assessments in order to be able to analyse these two different constructs independently. After further consideration, measures of social functioning were excluded from the analysis as it was decided that investigation of this construct was beyond the scope of the present thesis.

If a study provided an effect size for the relationship between secure attachment and total internalizing problems in addition to an effect size for secure attachment and a specific internalizing problem (e.g. anxiety) then only the effect size corresponding to secure attachment and total internalizing problems was included. The same rule applied in relation to externalizing problems. If a study reported effect sizes for the relationship between attachment security and a number of specific internalizing problems (e.g. anxiety, depression etc.) but did not report an effect size corresponding to attachment security and total internalizing problems, then the effect sizes were averaged in order to produce a total effect size for internalizing problems. The same applied for externalizing problems. Studies were excluded from the analysis if they only reported an effect size for the relationship between attachment security and an overall total psychopathology score (rather than breaking it down into internalizing or externalizing problems).

Only mother-report and self-report of internalizing and externalizing problems were included and separate codes were assigned to these two types of problem assessment. Teacher-report and peer-report of internalizing and externalizing problems were not included. As stated by Cicchetti et al (1995) most studies investigating the relationship between attachment and psychopathology in children and adolescents

rely on mother-report of problems and this was found to be the case during the data extraction stage of the present study. In the case of pre-school children, Goldberg et al (1995) reported that it is parents who spend the most time with their children and are the most likely to bring their problems to the attention of professionals. Further, Achenbach (1991, cited in Pierrehumbert, et al 2000) suggested that while it may be preferable to obtain data from multiple sources, for the purposes of research, parental reports can be the only appropriate source of data. Mother-report was preferred over father-report as mothers are more likely to be the primary care-giver and therefore the person who spends the most time with the child.

Self-report of psychopathology was included in addition to mother-report as it has been argued that certain types of psychopathology (especially internalizing problems) may not readily be recognized by parents (Buist et al, 2004). Similarly, children reporting on their own difficulties may tend to under report or over report depending on (among other factors) their attachment style (Berger et al, 2005). Separate codes were assigned to mother-report and self-report of psychopathology in order to be able to test this as a potential moderator variable in the analysis.

2.3.5 Studies Excluded During the Coding Procedure

During the coding procedure a further 29 studies were *excluded* out of the 52 that were obtained. This left a total of 23 studies to be *included* in the meta-analysis. Table 1 provides the rationale for excluding the 29 studies.

Table 1: Reasons for excluding studies during the coding procedure

Reason for Excluding	Number Excluded
Psychopathology measure was not self-report or mother-report (e.g. teacher-report, social worker-report)	10
Only included effect size for attachment security and total psychopathology rather than attachment security and internalizing or externalizing problems	3
Attachment measure assessed attachment specifically to peers rather than attachment specifically to mother or general attachment state of mind	1
Investigated the relationship between attachment security and social functioning rather than attachment security and internalizing or externalizing problems	2
Impossible to decipher relevant effect size / not enough information provided to calculate a relevant effect size	10
Results for self-report and mother-report of psychopathology were combined	1
Investigated the relationship between disorganized attachment and psychopathology rather than attachment security and psychopathology	2

The flow-chart shown in Figure 1 provides a summary of the study selection procedure, including the number of remaining studies at each stage of the process.

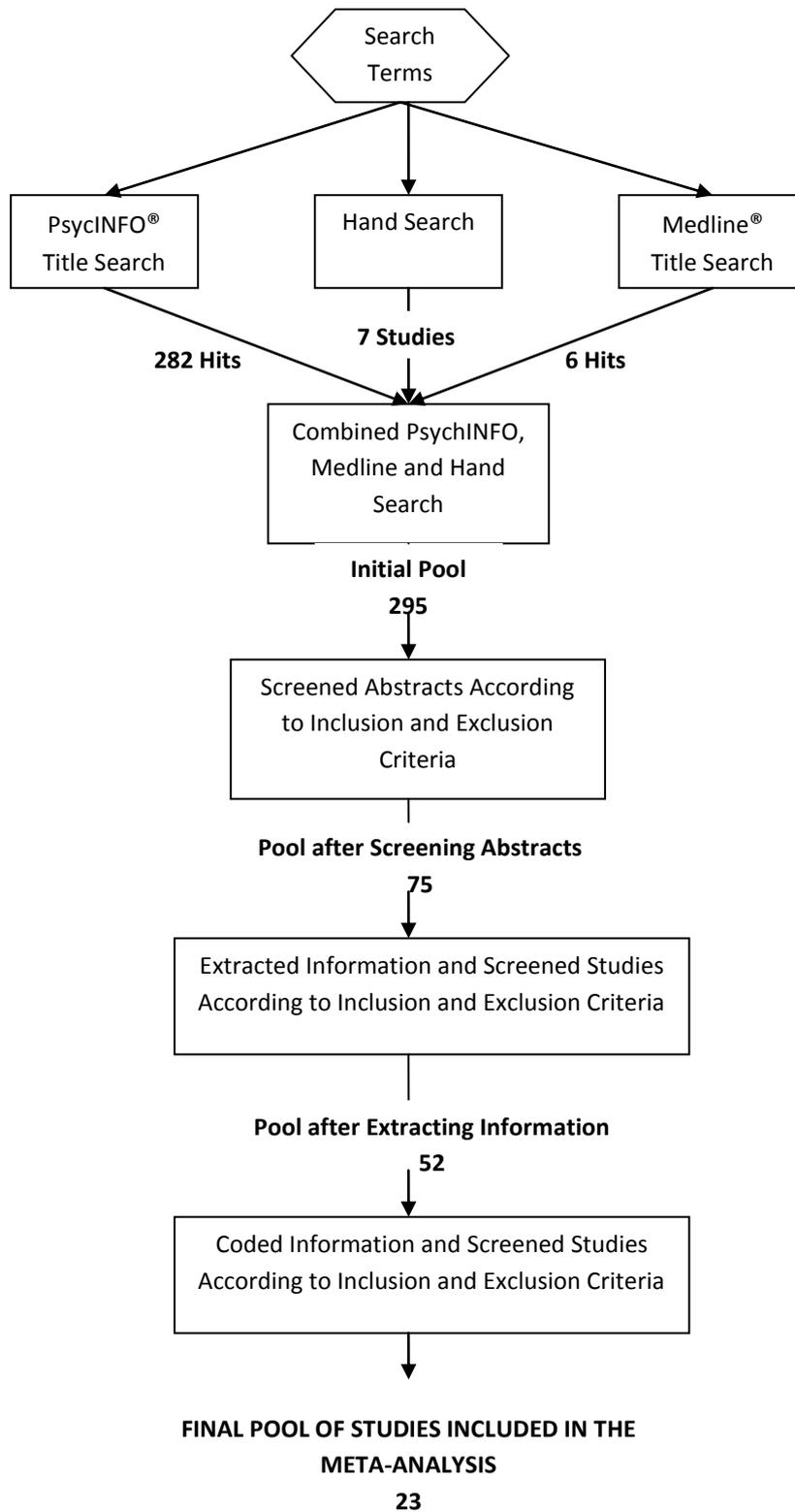


Figure 1: Flow-chart of study selection procedure

2.4 Statistical Analysis

2.4.1 Choice of Effect Size Index

As the overall aim of the present meta-analysis was to investigate the association between attachment security and psychopathology Pearson's r was deemed to be the most appropriate effect size index to use for the analysis as it represents the strength of the relationship between two variables. A further reason for choosing this effect size index rather than any other was that the majority of studies included in the meta-analysis reported Pearson's r in their analyses. Six studies did not report Pearson's r as the effect size index and instead reported Spearman's rho, eta, or a point biserial correlation. These were treated as equivalent to Pearson's r in the analysis.

2.4.2 Calculation of Effect Sizes

Effect sizes were calculated where they were not provided and enough information was reported in the study to enable the computation of one. If means, standard deviations and sample sizes were reported, then this information was entered into the Effect Size Generator in order to calculate Cohen's d . Cohen's d was then converted into Pearson's r using the statistical calculator in the MetaWin program. If an F-score, a t-score or a Chi-Square were reported then the value was entered into the MetaWin calculator programme along with the sample sizes for each group in order to convert these values into Pearson's r .

Some studies that used a categorical measure of attachment reported separate mean psychopathology scores for each attachment classification (e.g. one mean score for secure, one for avoidant, one for ambivalent) but did not report an effect size for the relationship between attachment security and internalizing or externalizing problems. In such cases separate Cohen's d effect sizes were calculated for secure attachment versus each of the insecure classifications that were included in the study. The resulting effect sizes were averaged to produce an overall Cohen's d and then converted into Pearson's r using a standard conversion formula.

2.4.3 Number of Effect Sizes

The 23 studies included in the present meta-analysis contributed a total of 45 effect size correlations that were used in the statistical analysis; 22 were effect sizes for the relationship between attachment security and internalizing problems and 23 were effect sizes for the relationship between attachment security and externalizing problems. 4 studies (17.39%) contributed just one effect size correlation; the majority of studies (16; 69.57%) contributed two effect sizes - one for internalizing problems and one for externalizing problems; one study (4.35%) contributed two effect sizes for internalizing problems that corresponded to independent groups of participants; and one study (4.35%) contributed three effect sizes for externalizing problems that corresponded to independent groups of participants.

All except one study contributed just one effect size per sample per construct. An exception to this was the Berger et al (2005) study which assessed internalizing and externalizing problems in the same sample by both self-report and mother-report. This resulted in two effect sizes per sample for internalizing problems and two effect sizes per sample for externalizing problems. A decision was taken to include all four effect size correlations rather than to exclude this study.

The 45 effect sizes that were included in the meta-analysis involved a total of 3793 different children / adolescents.

2.4.4 Direction of Effect Size Index

For all of the studies included in the meta-analysis a higher score on the psychopathology measure indicated a greater level of psychopathology and for the majority of studies a higher score on the attachment measure indicated a greater level of attachment security. Therefore for most of the studies a negative effect size rather than a positive one reflected a result that was in the anticipated direction, based on the expectation that greater attachment security would be associated with fewer symptoms of psychopathology. For studies where a lower score on the attachment measure indicated a greater level of attachment security the direction of the effect size was altered (e.g. from + to - or from - to +), in order to ensure that all of the effect

sizes were comparable. Therefore in all of the following analyses a *negative* effect size indicates that greater attachment security was associated with fewer symptoms of psychopathology. Thus the larger the value of the negative effect size the greater the strength of association between attachment security and psychopathology.

2.4.5 Statistical Procedure for the Meta-Analysis

A *series* of meta-analyses were carried out in order to investigate the research questions. Separate analyses were carried out to investigate the relationship between attachment security and internalizing problems; and attachment security and externalizing problems. In addition, separate analyses were carried out to investigate the relationship between attachment security and psychopathology in studies with a cross sectional design; and attachment security and psychopathology in studies with a prospective design.

Following standard procedures the effect size correlations were converted into Fisher's Z values and analyses were run on these values. The results of the analyses were then re-transformed into Pearson's r correlations for presentation. Weighted average effect sizes were estimated using the inverse of each study's variance, so that studies with larger sample sizes (and therefore greater precision) contributed more weight to the overall average.

A formal quality assessment of the studies included in the analysis was not performed; however the stringent inclusion and exclusion criteria that were used served as a quality filter. In addition, all of the studies included in the analysis were published in peer reviewed journals, which means that their quality would have been assessed and scrutinised by experts in the field before a decision was taken to publish them. A further reason for not including a quality assessment is that there is no formal definition of study quality in the literature and it has been argued that quality scoring and weighting in general produces biased effect estimates (Greenland & O'Rourke, 2001).

Analyses were carried out using random or mixed effects models rather than a fixed effects model. The assumption of a fixed effects model is that the samples of all

studies included in a meta-analysis are drawn from the same population. Therefore the fixed effects model assumes that there is one true effect size for a given association and that any variation in the distribution of effect sizes is due to sampling error alone (Cohn & Becker, 2003). In light of this when using a fixed effects model it is only possible to make inferences about the set of studies included in the meta-analysis and not about current studies that have been unidentified or studies that will be carried out in the future (Hedges & Vevea, 1998). In contrast, the random effects model assumes that in addition to subject-level sampling error, there is also study-level sampling error related to factors such as the methods used and the context of the research (Cohn & Becker, 2003). The average effect size is assumed to estimate the mean of the distribution rather than to be a true fixed effect. Thus the random effects model allows for inferences to be generalized beyond the studies included in the meta-analysis (Hedges & Vevea, 1998). Random effects analyses are considered to be more conservative than fixed effects analyses as they result in wider confidence intervals around the weighted mean effect size.

Given the variability in the methods, settings and recruitment procedures of studies, it is difficult to conceive of one true effect size in relation to attachment security and psychopathology. It was assumed that not only subject-level sampling error but also study-level sampling error was associated with the effect sizes. Thus, as suggested by Lipsey and Wilson (2001), a random effects model was used in the present meta-analysis.

The Q-statistic was used to investigate the homogeneity of the effect size distributions. While the Q-statistic provides useful information about the likelihood of heterogeneity it may lack sufficient power to detect heterogeneity where only a small number of studies are included in the meta-analysis (Huedo-Medina et al, 2006). Therefore moderator analyses were conducted even where the Q-test produced a non-significant result. For the moderator analyses a mixed effects model was appropriate. This model assumes that any variation in effect sizes beyond subject-level sampling error is accounted for by identifiable systematic study characteristics (moderator variables) in addition to random (and possibly un-measurable) differences (Lipsey & Wilson, 2001).

CHAPTER THREE: RESULTS

The results chapter is divided into 5 main sections corresponding to the major research questions of this meta-analysis. Each section presents the results of a meta-analysis using a select set of studies. A total of four separate meta-analyses were conducted, which are shown in Table 2.

Table 2: The four meta-analyses that were conducted

Meta-Analysis 1	Meta-Analysis 2	Meta-Analysis 3	Meta-Analysis 4
Attachment security and internalizing problems (cross-sectional studies)	Attachment security and externalizing problems (cross-sectional studies)	Attachment security and internalizing problems (prospective studies)	Attachment security and externalizing problems (prospective studies)

For all of the following results descriptive statistics will only be provided for the un-weighted effect size correlations. Inferential statistics will be reported for the weighted effect size correlations.

3.1 Cross-Sectional Studies – Attachment Security and Internalizing Problems

3.1.1 Selection of Studies into the Meta-Analysis

Out of the pool of 23 studies entering the meta-analysis 12 employed a cross-sectional design while contemporaneously measuring attachment security and internalizing problems. In most cases each study only contributed one effect size for this part of the analysis; however in the case of two studies – Berger et al (2005) and Engels et al (2001) - two effect sizes were included (see method section for more details). Therefore a total of 14 effect sizes were included in this part of the analysis. Table 3 shows the fourteen effect size correlations and the study / participant characteristics that were considered as potential moderators. Throughout the results section the symbol ‘N’ will be used to represent the number of participants and ‘K’ will be used

to represent the number of effect sizes. The term ‘participants’ is used to refer to the children / adolescents who were investigated, irrespective of whether or not they were involved in completing the assessment measures. The total N for this part of the analysis was 1832.

Table 3: Selected studies; study / participant characteristics; and effect size correlations (cross-sectional studies; internalizing problems)

Year	Author	Report of Internalizing Problems	Mean Age of Sample in Years	Percentage of Males in the Sample	Attachment to Mother or General Attachment State of Mind (ASM)	Categorical or Continuous Attachment Measure	Number of Participants (N)	Effect Size Index Measure	Effect Size Index (ESI)
2005	Berger at al	Self-report	15.93	53.98	ASM	Continuous	176	r*	-.15
2005	Berger et al	Mother report	15.93	-	ASM	Continuous	149	r	-.01
1994	Booth et al	Mother report	4.30	54.00	Mother	Continuous	79	r	.03
2004	Buist et al	Self-report	13.50	48.60	Mother	Continuous	288	r	-.29
1998	Cicchetti et al	Mother report	1.70	-	Mother	Categorical	126	r	-.37
2004	Cunningham et al	Mother report	8.62	52.38	ASM	Continuous	18	rho [†]	-.48
2000	Easterbrooks and Ables	Mother report	8.00	57.78	Mother	Continuous	45	r	-.38
1993	Easterbrooks et al	Mother report	7.67	57.78	Mother	Continuous	45	r	-.33
2003	Elgar et al	Self-report	16.76	100.00	Mother	Continuous	68	rho	-.23
2001	Engels et al	Self-report	13.00	50.00	Mother	Continuous	252	r	-.31
2001	Engels et al	Self-report	16.50	50.00	Mother	Continuous	256	r	-.28
2006	Roelofs et al	Self-report	10.50	48.10	Mother	Categorical	230	rpb [‡]	-.16
2006	Ronnlund & Karlsson	Self-report	15.50	41.94	ASM	Continuous	62	r	-.32
1990	Speltz et al	Mother report	4.55	-	Mother	Categorical	38	r	-.38
			Mean = 10.89	Mean = 55.87			Total = 1832		

* r = Pearson's Product-Moment Correlation Coefficient

† rho = Spearman's Rank Correlation Coefficient

‡ rpb = Point-Biserial Correlation Coefficient

3.1.2 Descriptive Statistics of the Effect Size Correlations

Figure 2 shows the distribution of the effect size correlations. It can be seen that there were no potential outliers and the distribution of the effect size correlations appeared to be relatively symmetrical, with only modest positive skewness.

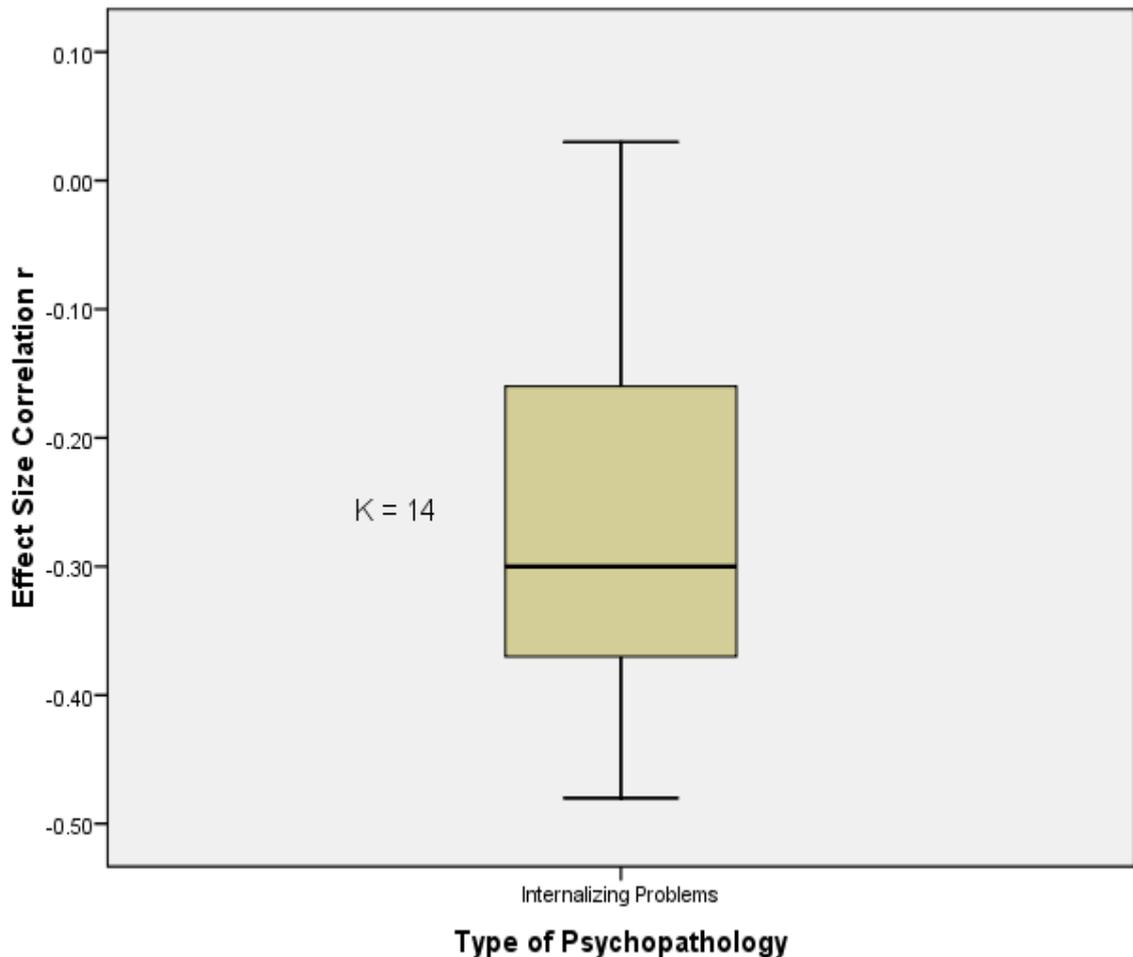


Figure 2: Boxplot showing un-weighted effect size correlations for attachment security and internalizing problems (cross-sectional studies)

Table 4 provides descriptive statistics for the un-weighted effect size correlations and suggests that there was a medium correlation between attachment security and internalizing problems (Cohen, 1988). The median value was similar to the un-weighted mean, which indicated that there was only minimal skewness. This was further confirmed by the skewness statistic which was smaller than +1 and therefore showed only slight positive skewness.

Table 4: Descriptive statistics for the un-weighted effect size correlations (cross-sectional studies; internalizing problems)

Un-weighted Mean Effect Size Correlation	K	N	SD	Minimum	Maximum	Median	Skewness
-0.26	14	1832	0.14	-0.48	0.03	-0.30	0.81

Note. K = number of effect sizes; N = number of participants; SD = standard deviation

3.1.3 Meta-Analysis Results for Attachment Security and Internalizing Problems

Table 5 shows the results of the meta-analysis using a random effects model. The average effect size correlation, weighted for precision was -0.24. This was very similar to the un-weighted mean effect size and indicated that there was a small to medium correlation between attachment security and internalizing problems. This result was reliable, as indicated by the 95% confidence intervals (which did not cross zero) and the statistically significant p-value.

Table 5: Meta-analysis results of 14 weighted effect size correlations for attachment security and internalizing problems (cross-sectional studies)

Random Effects Model					
Weighted Mean Effect Size	-95% Confidence Interval	+ 95% Confidence Interval	Standard Error	Z	p
-0.24	-0.31	-0.17	-10.00	-6.77	<0.01

The Q statistic was used to investigate the homogeneity of the effect size distribution and produced a result that was not statistically significant ($Q = 13.6$; $df = 13$; $p = 0.40$). This suggested that the variability across effect sizes was no more than would be expected from sampling error alone. However, due to the small number of studies included in the homogeneity analysis the Q-test may have lacked sufficient power to detect any further heterogeneity amongst the distribution. Therefore a decision was taken to carry out moderator analyses in order to identify any variables that may have caused variability among the effect size correlations.

3.1.4 Analysis of Moderator Variables

A number of potential moderator variables were investigated and the results of each will be presented in turn.

3.1.4.1 Type of Internalizing Psychopathology Assessment (self-report versus mother-report)

The boxplots shown in Figure 3 suggest a similar distribution of effect size correlations for self-report of internalizing problems and mother-report of internalizing problems. There were no potential outliers for self-report or mother-report and both boxplots showed some evidence of positive skewness (more so for mother-report). There seemed to be a greater interquartile range and overall range of effect size correlations for mother-report compared with the effect size correlations for self-report.

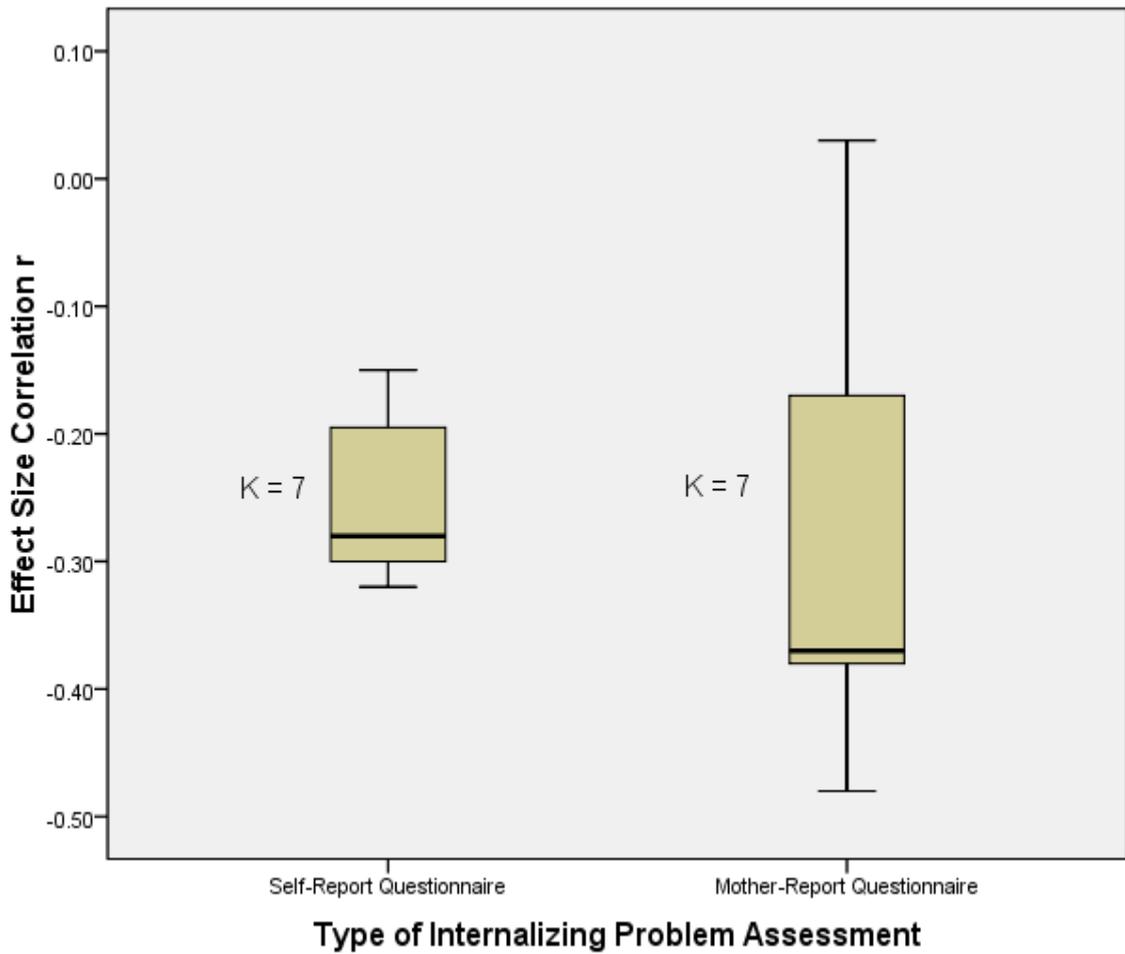


Figure 3: Boxplots showing un-weighted effect size correlations for self-report and mother-report of internalizing problems (cross sectional studies)

Table 6 shows that there was little difference between the un-weighted mean effect size correlations for self-report of internalizing problems and mother-report of internalizing problems but a somewhat larger difference between the median values for the two groups.

Table 6: Descriptive statistics for the un-weighted effect size correlations for self-report and mother-report of internalizing problems (cross-sectional studies)

Type of Internalizing Psychopathology Assessment	Un-weighted Mean Effect Size Correlation	K	N	Standard Deviation	Median	Min.	Max.	Skewness
Self-report questionnaire	-0.25	7	1332	0.07	-0.28	-0.32	-0.15	0.65
Mother-report questionnaire	-0.27	7	500	0.20	-0.37	-0.48	0.03	1.01

Note. K = number of effect sizes; N = number of participants

Table 7 shows that the weighted mean effect sizes for both self-report and mother report were reliable, as indicated by the statistically significant p-values and the 95% confidence intervals which did not cross zero. The means for the two groups were very similar and the 95% confidence intervals overlapped. This suggested that there was not a reliable difference between these mean effect size correlations.

Table 7: Weighted mean effect sizes by type of internalizing psychopathology assessment (cross-sectional studies)

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% Confidence Interval	+95% Confidence Interval	Z	p	K
Self-report	-0.25	-10.00	-0.33	-0.17	-5.87	<0.01	7
Mother-report	-0.22	-10.00	-0.33	-0.11	-3.93	<0.01	7
Total	-0.24	-10.00	-0.30	-0.17	-7.06	<0.01	14

In order to test this further, an inverse variance weighted one-way ANOVA was conducted (Table 8). As suggested by the confidence intervals, the *Q*-between value was not statistically significant, suggesting that the variability in effect sizes was not accounted for by the type of internalizing problem assessment.

The non-significant *Q*-within statistic (Table 8) indicated that the effect size distributions within the two groups were homogeneous. This suggested that the residual variability after considering type of internalizing problem assessment as a potential moderator was no more than would be expected from sampling error alone. Inspection of the *Q* by group results suggested that there was a larger variation within the mother-report group in comparison to self-report group; however this heterogeneity could not be further analyzed due to the relatively small number of effect size correlations.

Table 8: Results of the homogeneity analysis investigating type of internalizing problem assessment as a potential moderator variable (cross-sectional studies)

Analog ANOVA for Type of Internalizing Assessment (Mixed Effects Model)			
	Q	df	p
Between Groups	0.12	1.00	0.73
Within Groups	14.54	12.00	0.27
Total	14.65	13.00	0.33
Self-report Group	2.58	6.00	0.86
Mother-report Group	11.95	6.00	0.06

3.1.4.2 Attachment Figure (assessments that measured attachment specifically to the mother versus assessments that measured a general attachment state of mind)

The boxplots shown in Figure 4 revealed one outlier for attachment to mother and a somewhat larger spread of the effect size correlations for the general attachment state of mind group.

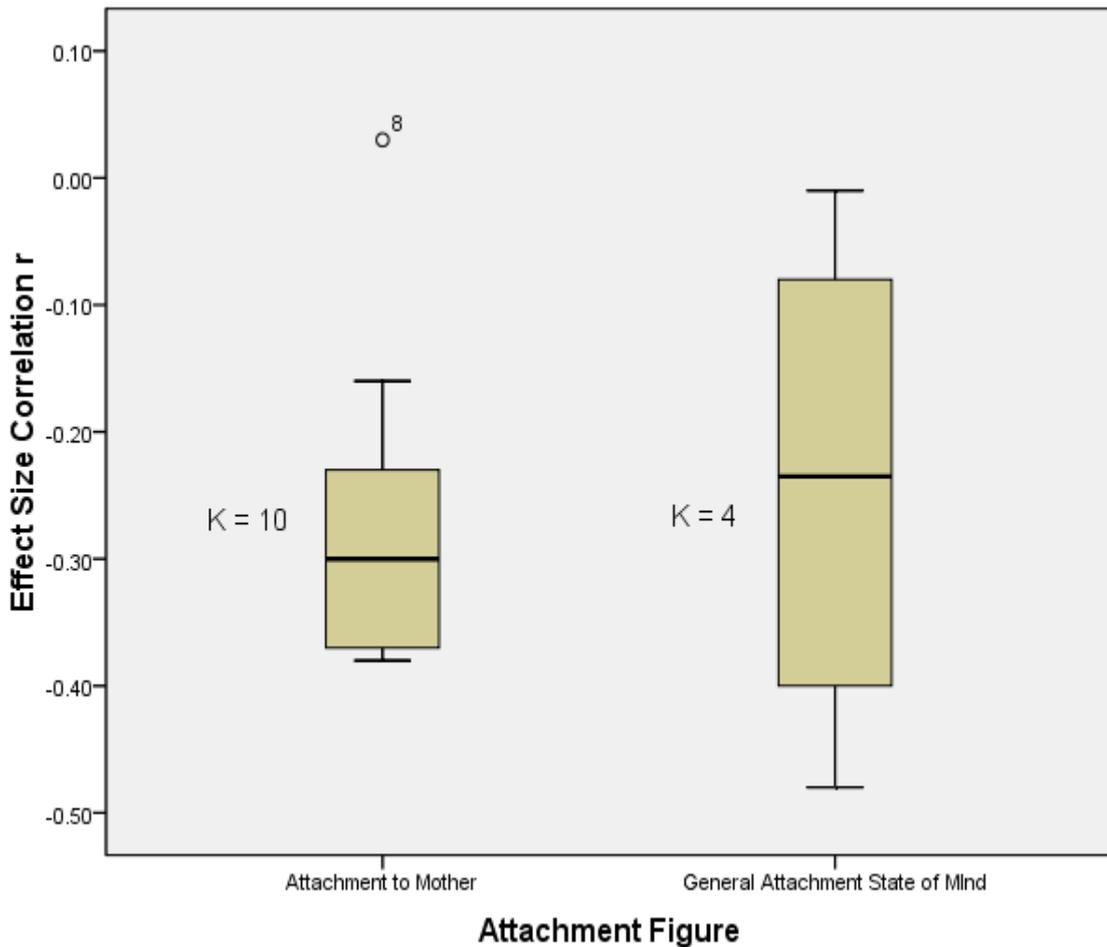


Figure 4: Boxplots showing un-weighted effect size correlations for attachment to mother and a general attachment state of mind (cross-sectional studies; internalizing problems)

Table 9 shows that there was only a slight difference between the un-weighted mean effect size correlation for attachment to mother and the un-weighted mean effect size correlation for attachment state of mind. As the median for attachment to mother was similar to the mean, the outlier did not influence the mean unduly, but caused the distribution to be positively skewed.

Table 9: Descriptive statistics for the un-weighted effect size correlations for attachment to mother and general attachment state of mind (cross-sectional studies; internalizing problems)

Attachment Figure	Un-weighted Mean Effect Size Correlation	K	N	SD	Median	Min.	Max.	Skewness
Attachment to Mother	-0.27	10	1427	0.13	-0.30	-0.38	0.03	1.69
General Attachment State of Mind	-0.24	4	405	0.20	-0.24	-0.48	0.00	-0.11

Note. K = number of effect sizes; N = number of participants; SD = standard deviation

Table 10 shows that both the weighted mean effect size for attachment to mother and the weighted mean effect size for a general attachment state of mind appeared to be reliable. The means for the two groups differed and the inverse variance weighted one-way ANOVA (Table 11) showed that the *Q-between* value was statistically significant at the 10% level ($p = 0.06$). This suggested that attachment figure may be a moderator variable. A larger mean effect size was obtained when using a measure that assesses attachment to the mother rather than a general attachment state of mind. However the 95% confidence intervals for the two means overlapped, which suggested that this result should be interpreted with caution.

As shown in Table 11 the *Q-within* statistic ($p = 0.16$) and the *Q-statistic for each group* were not statistically significant, which suggested a homogeneous distribution within the groups. This indicated that the residual variability after considering attachment figure as a potential moderator was no more than would be expected from sampling error alone.

Table 10: Weighted mean effect sizes by attachment figure (cross-sectional studies; internalizing problems)

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% CI	+95% CI	Z	p	K
Attachment to Mother	-0.27	-10.00	-0.32	-0.21	-8.42	<0.01	10.00
General Attachment State of Mind	-0.15	-10.00	-0.26	-0.04	-2.58	0.01	4.00
Total	-0.24	-10.00	-0.29	-0.19	-8.61	<0.01	14.00

Note. CI = confidence interval

Table 11: Results of the homogeneity analysis investigating attachment figure as a potential moderator variable (cross-sectional studies; internalizing problems)

Analog ANOVA for Attachment Figure (Mixed Effects Model)			
	Q	df	p
Between Groups	3.41	1.00	0.06
Within Groups	16.82	12.00	0.16
Total	20.23	13.00	0.09
Attachment to Mother Group	10.96	9.00	0.28
General Attachment State of Mind	5.86	3.00	0.12

3.1.4.3 Design of Attachment Measure (continuous versus categorical attachment measures)

As shown in Figure 5 the boxplot for continuous assessment measures showed a potential mild outlier whereas there were no outliers for categorical attachment

measures. The distribution of effect size correlations seemed to be relatively symmetrical for continuous attachment measures. In contrast the boxplot for categorical attachment measures indicated that the distribution of effect size correlations was positively skewed. There was a greater overall range of effect size correlations for continuous attachment measures compared with categorical attachment measures. The interquartile ranges seemed to be reasonably similar for both groups.

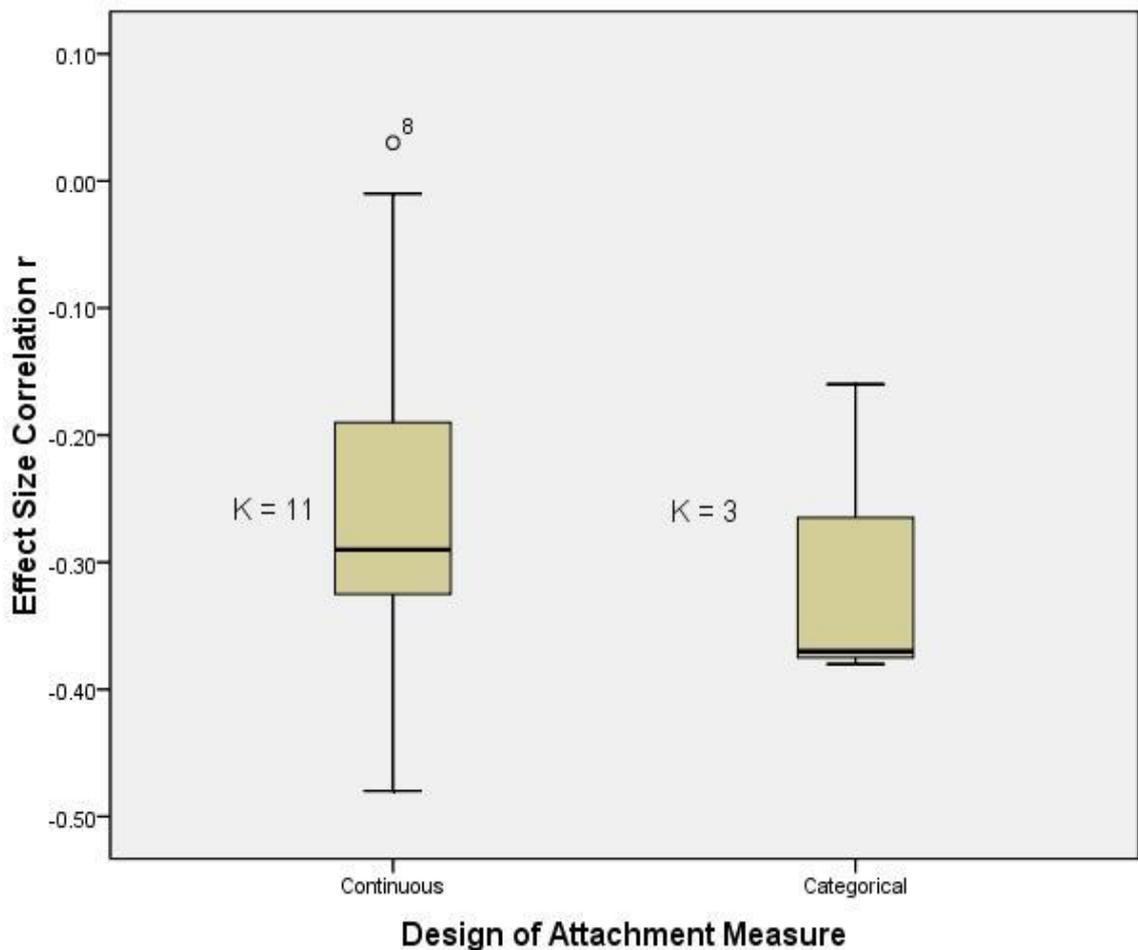


Figure 5: Boxplots showing un-weighted effect size correlations for continuous and categorical measures of attachment security (cross-sectional studies; internalizing problems)

Table 12 shows that there was only a slight difference between the un-weighted mean effect size correlation for continuous attachment measures and the un-weighted mean effect size correlation for categorical attachment measures. In contrast the difference

between the median values for the two groups was more pronounced and, as indicated by the boxplot, the skewness statistic was greater for categorical attachment measures than for continuous attachment measures.

Table 12: Descriptive statistics for the un-weighted effect size correlations for continuous and categorical measures of attachment security (cross-sectional studies; internalizing problems)

Design of Attachment Measure	Un-weighted Mean Effect Size Correlation	K	N	SD	Median	Min.	Max.	Skewness
Continuous	-0.25	11	1438	0.15	-0.29	-0.48	0.03	0.73
Categorical	-0.30	3	394	0.12	-0.37	-0.38	-0.16	1.72

Note. K = number of effect sizes; N = number of participants; SD = standard deviation

Table 13 shows that the weighted mean effect sizes for both continuous and categorical attachment measures were reliable. The means for the two groups were very similar and the 95% confidence intervals overlapped. Hence the *Q-between* statistic (Table 14) was not statistically significant ($p = 0.58$). This suggested that design of attachment measure was unlikely to be a moderator variable. As shown in Table 14 none of the *Q-statistics* were significant ($p > 0.10$) and therefore did not indicate any source of heterogeneity.

Table 13: Weighted mean effect sizes by design of attachment measure (cross-sectional studies; internalizing problems)

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% CI	+95% CI	Z	p	K
Continuous	-0.23	-10.00	-0.30	-0.15	-5.86	<0.01	11.00
Categorical	-0.27	-10.00	-0.40	-0.13	-3.75	<0.01	3.00
Total	-0.24	-10.00	-0.30	-0.17	-6.93	<0.01	14.00

Note. CI = confidence interval

Table 14: Results of the homogeneity analysis investigating design of attachment measure as a potential moderator variable (cross-sectional studies; internalizing problems)

Mixed Effects Model			
	Q	df	p
Between Groups	0.31	1.00	0.58
Within Groups	13.88	12.00	0.31
Total	14.19	13.00	0.36
Continuous Group	11.53	10.00	0.32
Categorical Group	2.35	2.00	0.31

3.1.4.4 Age of Child

The mean age of the distribution at the time of both the attachment security assessment and the internalizing problem assessment across the 14 effect size correlations (n = 1832) was 10.89 years (SD = 5.12). The median age was 11.75 years (minimum = 1.70 years, maximum = 16.76 years).

The Spearman's rank correlation between the mean age of the children and the effect size correlations was moderate ($r_s = 0.44$), yet not statistically significant ($p = 0.12$) possibly due to the small sample size lacking statistical power. A scatterplot (Figure 6) was generated to explore this positive correlation further. It can be seen that the

scatter of the data points was considerable, thus ruling out a strong relationship. The linear relationship between the two variables appeared weak and the shape of the scatterplot was somewhat irregular. The value of R Square Linear suggested that only 6% of the variance in the effect size correlations was accounted for by participants' mean age at the time of assessment.

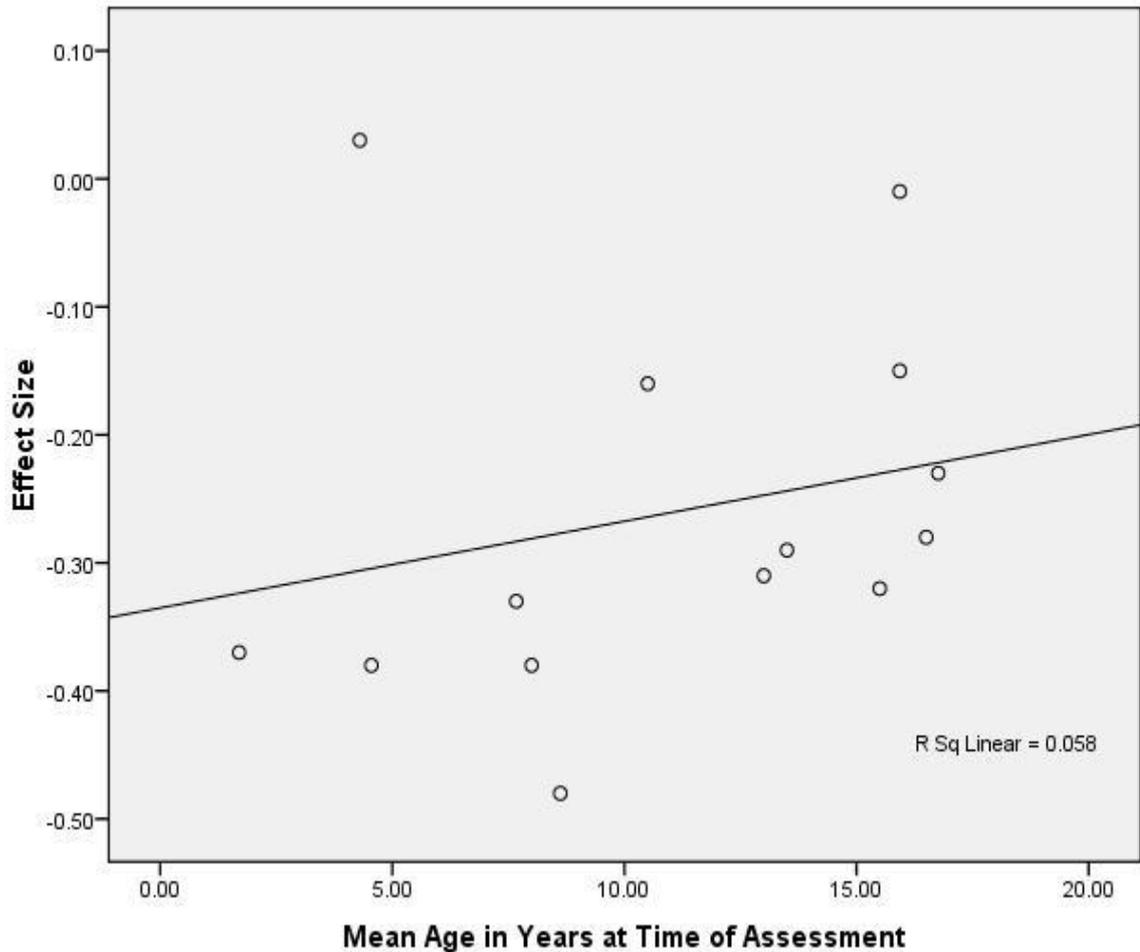


Figure 6: Scatterplot showing the relationship between mean age in years at time of assessment and 14 effect size correlations (cross-sectional studies internalizing problems)

3.1.4.5 Gender of Child

Gender of child was coded as the percentage of males in the sample. In the current selection of studies, there were three missing values for this variable. The mean percentage of males in the studies across 11 effect size correlations (n = 1519) was

55.85% (SD = 15.33). The median percentage of males was 52.38% (minimum = 41.94%, maximum = 100%).

The Spearman's rank correlation coefficient was calculated in order to establish the strength of association between the gender of the child and the effect size correlations. The results of this analysis showed that Spearman's $r = -0.02$, suggesting that there was an extremely small rank correlation. The p-value of the association was not statistically significant ($p = 0.95$), suggesting that there was not a reliable relationship between percentage of males and the effect size correlations. These results strongly suggested that gender was not a potential moderator variable and therefore a decision was taken not to carry out any further analyses on this variable.

3.1.4.6 Year of Publication

The mean year of publication across the 14 effect size correlations ($n = 1832$) was 2001 (SD = 5.17). The median year of publication was 2002 (earliest year = 1990; latest year = 2006).

Spearman's $r = 0.36$, suggesting a medium positive rank correlation between year of publication and the effect size correlations. The p-value of the association was not statistically significant ($p = 0.20$), suggesting that this was not a reliable relationship. Given the non-significant result, year of publication could not reliably be considered a potential moderator and therefore a decision was taken not to carry out any further analyses on this variable.

3.2 Cross-Sectional Studies – Attachment Security and Externalizing Problems

3.2.1 Selection of Studies into the Meta-Analysis

Out of the pool of 23 studies entering the meta-analysis 13 employed a cross-sectional design while contemporaneously measuring attachment security and externalizing problems. In most cases each study only contributed one effect size for this part of the analysis; however the Berger et al (2005) study contributed two effect sizes and the Bosmans et al (2006) study contributed three effect sizes (see method section for

more details). Therefore a total of 16 effect sizes were included in this part of the analysis. Table 15 shows the 16 effect size correlations and the study / participant characteristics that were considered as potential moderators. The total N for this part of the analysis was 1817.

Table 15: Selected studies; study / participant characteristics; and effect size correlations (cross-sectional studies; externalizing problems)

Year	Author	Report of Externalizing Problems	Type of Attachment Assessment	Mean Age of Sample in Years	Percentage of Males in the Sample	Attachment to Mother or General Attachment State of Mind (ASM)	Categorical or Continuous Attachment Measure	Number of Participants (N)	Effect Size Index Measure (ESI)	Effect Size Index (ESI)
2005	Berger et al	Self-report	Other	15.93	53.98	ASM	Continuous	176	r	-0.22
2005	Berger et al	Mother-report	Other	15.93	-	ASM	Continuous	149	r	-0.13
2006	Bosmans et al	Self-report	Self-report	11.00	-	Mother	Continuous	116	r	-0.32
2006	Bosmans et al	Self-report	Self-report	14.00	-	Mother	Continuous	237	r	-0.32
2006	Bosmans et al	Self-report	Self-report	17.00	-	Mother	Continuous	96	r	-0.40
1994	Booth et al	Mother-report	Observation	4.30	54.00	Mother	Continuous	79	r	-0.08
2004	Buist et al	Self-report	Self-report	13.50	48.60	Mother	Continuous	288	r	-0.29
1998	Cicchetti et al	Mother-report	Observation	1.70	-	Mother	Categorical	126	r	-0.30
2004	Cunningham et al	Mother-report	Other	8.62	52.38	ASM	Continuous	18	rho	-0.81
2000	Easterbrooks and Abeles	Mother-report	Other	8.00	57.78	Mother	Continuous	45	r	-0.40
1993	Easterbrooks et al	Mother-report	Observation	7.67	57.78	Mother	Continuous	45	r	-0.39
2003	Elgar et al	Self-report	Self-report	16.76	100.00	Mother	Continuous	68	rho	-0.28
2006	Roelofs et al	Self-report	Self-report	10.50	48.10	Mother	Categorical	230	rpb	-0.20
2006	Ronnlund & Karlsson	Self-report	Self-report	15.50	41.94	ASM	Continuous	62	r	-0.02
1995	Solomon et al	Mother-report	Observation	5.88	-	Mother	Categorical	44	r	-0.18
1990	Speltz et al	Mother-report	Observation	4.55	-	Mother	Categorical	38	r	-0.47
				Mean = 10.68	Mean = 57.17			Total = 1817		

3.2.2 Descriptive Statistics

Figure 7 shows the distribution of the effect size correlations. It can be seen that there was a potential mild outlier representing an unusually low negative effect size correlation. Excluding the potential mild outlier, the distribution of the effect size correlations appeared to be relatively symmetrical with only modest positive skewness.

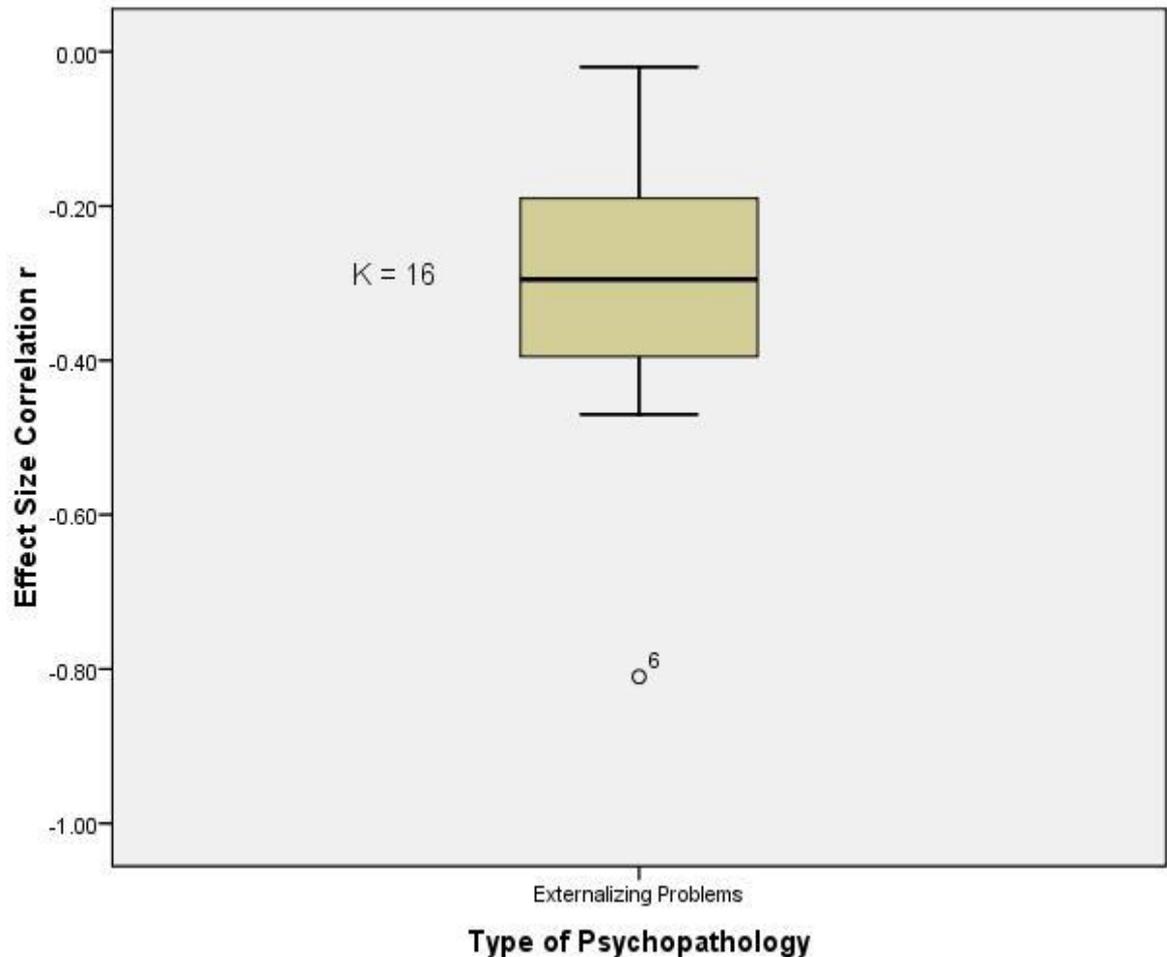


Figure 7: Boxplot showing un-weighted effect size correlations for attachment security and externalizing problems (cross-sectional design; externalizing problems)

Table 16 provides descriptive statistics for the un-weighted effect size correlations and suggests that there was a medium correlation between attachment security and externalizing problems. The median value was the same as the un-weighted mean and the skewness statistic showed that the outlier caused the distribution to be slightly negatively skewed.

Table 16: Descriptive statistics for the un-weighted effect size correlations (cross-sectional studies; externalizing problems)

Un-weighted Mean Effect Size Correlation	K	N	SD	Minimum	Maximum	Median	Skewness
-0.30	16	1817	0.18	-0.81	-0.02	-0.30	-1.22

Note. K = number of effect sizes; N = number of participants; SD = standard deviation

3.2.3 Meta-Analysis Results for Attachment Security and Externalizing Problems (Cross Sectional Studies)

Table 17 shows the results of the meta-analysis using a random effects model. The average effect size correlation, weighted for precision was -0.28. This was very similar to the un-weighted mean effect size and again indicated that there was a medium correlation between attachment security and externalizing problems. This result was reliable, as indicated by the 95% confidence intervals (which did not cross zero) and the statistically significant p-value.

Table 17: Meta-analysis results of 16 weighted effect size correlations for attachment security and externalizing problems (cross-sectional studies)

Random Effects Model					
Weighted Mean Effect Size	-95% Confidence Interval	+ 95% Confidence Interval	Standard Error	Z	p
-0.28	-0.34	-0.21	-10.00	-7.86	<0.01

The Q statistic was used to investigate the homogeneity of the effect size distribution and produced a result that was not statistically significant ($Q = 20.14$; $df = 15$; $p = 0.17$). This suggested that the variability across effect sizes was no more than would be expected from sampling error alone. However, due to the small number of studies included in the homogeneity analysis the Q-test may have lacked sufficient power to detect any further heterogeneity amongst the distribution. Therefore a decision was taken to carry out moderator analyses in order to identify any variables that may have caused variability in the effect size correlations.

3.2.4 Analysis of Moderator Variables

A number of potential moderator variables were investigated and the results of each will be presented in turn.

3.2.4.1 Type of Externalizing Psychopathology Assessment (self-report versus mother-report)

The boxplots (Figure 8) revealed one potential mild outlier for self-report of externalizing problems and a somewhat larger spread of the effect size correlations for the mother-report group.

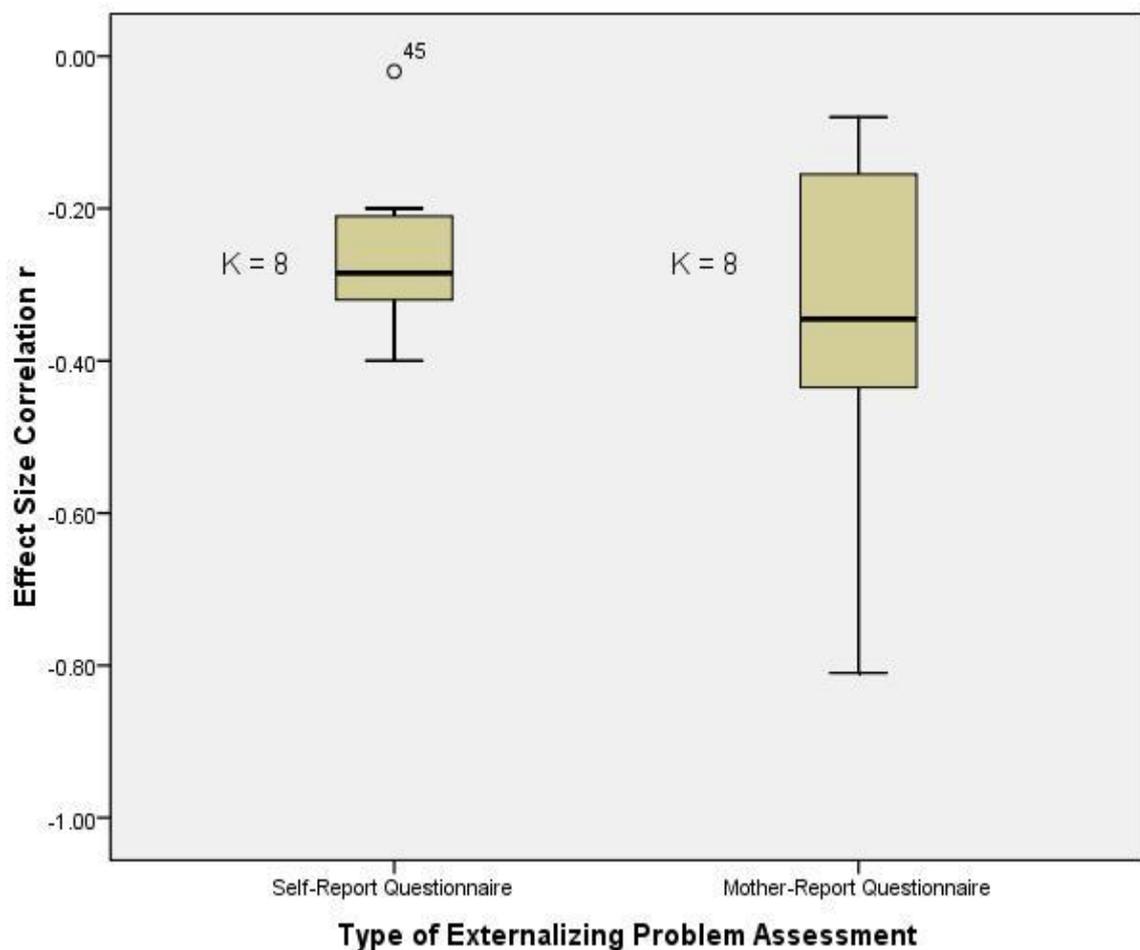


Figure 8: Boxplots showing un-weighted effect size correlations for self-report and mother-report of externalizing problems (cross-sectional studies)

Table 18 shows that there was a difference between the un-weighted mean effect size correlations for self-report of externalizing problems and mother-report of externalizing problems. As the median for self-report of externalizing problems was similar to the mean, the outlier did not influence the mean unduly, but caused the distribution to be positively skewed.

Table 18: Descriptive statistics for the un-weighted effect size correlations for self-report and mother-report of externalizing problems (cross-sectional studies)

Type of Externalizing Psychopathology Assessment	Un-weighted Mean Effect Size Correlation	K	N	Standard Deviation	Median	Min.	Max.	Skewness
Self-report questionnaire	-0.26	8	1273	0.11	-0.29	-0.40	-0.02	1.27
Mother-report questionnaire	-0.35	8	544	0.23	-0.35	-0.81	-0.08	-1.04

Note. K = number of effect sizes; N = number of participants

Table 19 shows that the weighted mean effect sizes for both self-report and mother report were reliable, as indicated by the statistically significant p-values and the 95% confidence intervals which did not cross zero. The means for the two groups were very similar and the 95% confidence intervals overlapped. This suggested that there was not a reliable difference between these mean effect size correlations.

Table 19: Weighted mean effect sizes by type of externalizing assessment (cross-sectional studies)

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% Confidence Interval	+95% Confidence Interval	Z	p	K
Self-report	-0.27	-10.00	-0.33	-0.21	-8.15	<0.01	8.00
Mother-report	-0.27	-10.00	-0.36	-0.18	-5.83	<0.01	8.00
Total	-0.27	-10.00	-0.32	-0.22	-10.02	<0.01	16.00

In order to test this further, an inverse variance weighted one-way ANOVA was conducted (Table 20). As suggested by the confidence intervals, the *Q*-between value was not statistically significant, suggesting that the variability in effect sizes was not accounted for by the type of externalizing problem assessment.

The significant *Q*-within statistic ($p = 0.02$) (Table 20) suggested that the residual variability after considering type of externalizing problem assessment as a potential moderator was more than would be expected from sampling error alone. Inspection of the *Q*-statistic for each group showed that the self-report group was homogeneous and the statistically significant *Q*-within value was caused by heterogeneity within the mother-report group.

Table 20: Results of the homogeneity analysis investigating type of externalizing problem assessment as a potential moderator variable (cross-sectional studies)

Analog ANOVA for Type of Externalizing Assessment (Mixed Effects Model)			
	Q	df	p
Between Groups	0.01	1.00	0.92
Within Groups	26.21	14.00	0.02
Total	26.22	15.00	0.04
Self-report Group	7.11	7.00	0.42
Mother-report Group	19.10	7.00	0.01

3.2.4.2 Type of Attachment Assessment (observation of behaviour; self-report questionnaire; other)

Due to the small numbers for each type of attachment assessment it was necessary to group the assessment types into broader categories in order to carry out the moderator analysis on this variable. Three groups were created – assessments that measured attachment by observing the child / adolescent’s behaviour (e.g. the Strange Situation Procedure); assessments that measured attachment by using a self-report questionnaire (e.g. the Inventory of Parent and Peer Attachment); and a third group that used a different means to measure attachment than the two already mentioned (e.g. interview of the target person; mother-report questionnaire; child / adolescents’ verbal responses to a task).

As shown in Figure 9 the boxplots revealed one potential mild outlier for self-report questionnaire assessment, which represented an unusually high negative effect size correlation. There were not potential outliers for either the observation of behaviour group or the ‘other’ group. The spread of effect size correlations was largest for the ‘other’ group.

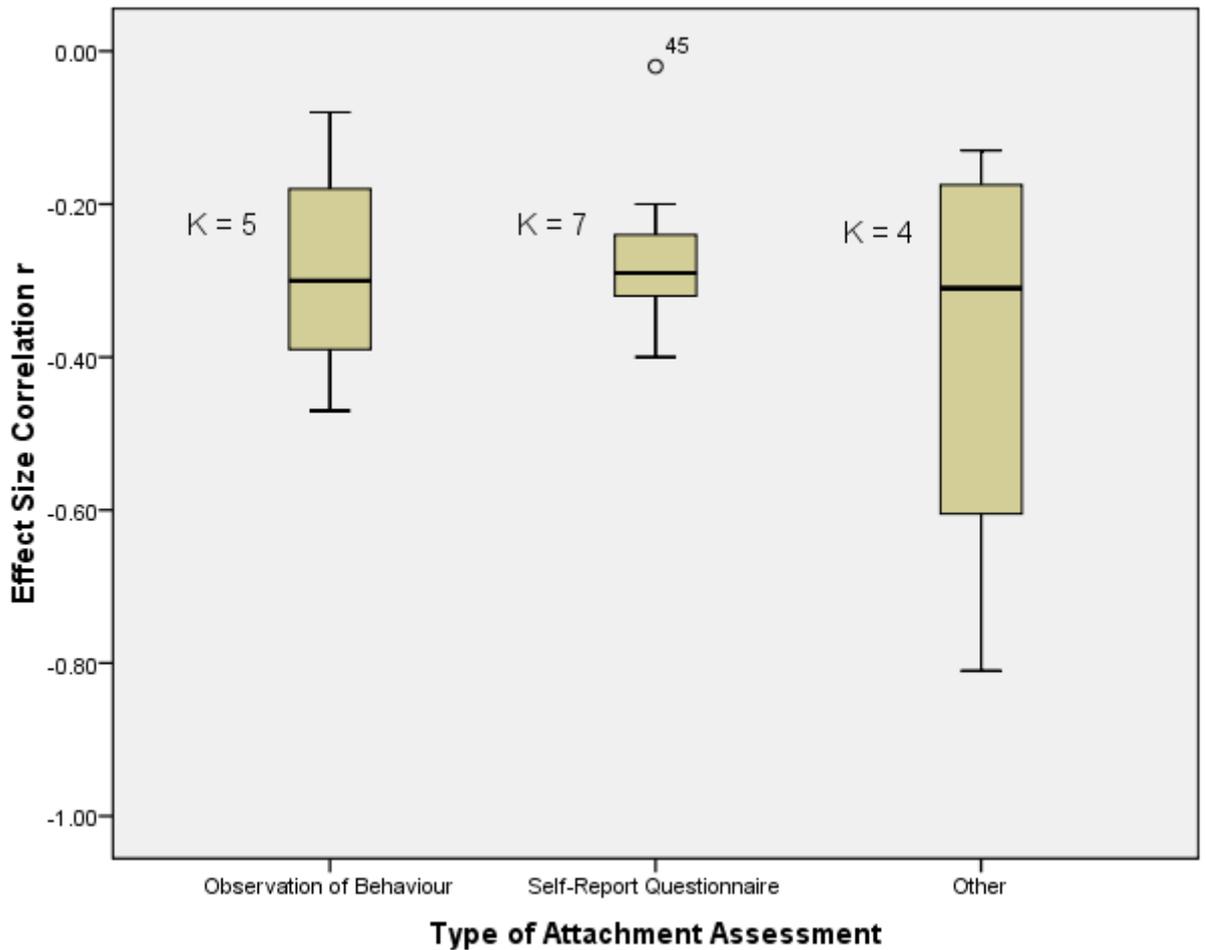


Figure 9: Boxplots showing un-weighted effect size correlations for type of attachment assessment (cross-sectional studies; externalizing problems)

Table 21 shows that ‘other’ attachment assessments had the largest un-weighted mean effect size. The un-weighted mean effect sizes for observation attachment assessments and self-report attachment assessments were very similar. As the median for self-report attachment assessments was similar to the mean, the outlier did not influence the mean unduly, but caused the distribution to be positively skewed. The distribution of effect sizes for observation attachment assessments was symmetrical and there was evidence of negative skewness for ‘other’ attachment assessments.

Table 21: Descriptive statistics for the un-weighted effect size correlations for type of attachment assessment (cross-sectional studies; externalizing problems)

Type of Attachment Assessment	Un-weighted Mean Effect Size Correlation	K	N	Standard Deviation	Median	Min.	Max.	Skewness
Observation of behaviour	-0.28	5	332	0.16	-0.30	-0.47	-0.08	-0.21
Self-report questionnaire	-0.26	7	1097	0.12	-0.29	-0.40	-0.02	1.44
Other	-0.39	4	388	0.30	-0.31	-0.81	-0.13	-1.25

Note. K = number of effect sizes; N = number of participants

Table 22 shows that the weighted mean effect sizes for observation attachment assessments; self-report attachment assessments; and ‘other’ attachment assessments were all reliable. The means for the three groups were very similar and the 95% confidence intervals overlapped. Hence the *Q-between* value (Table 23) was not statistically significant ($p = 0.26$). This suggested that type of attachment assessment was unlikely to be a moderator variable.

The *Q-within* statistic (Table 23) was not statistically significance ($p = 0.14$). This suggested that the residual variability after considering type of attachment assessment as a potential moderator was no more than would be expected from sampling error alone. Nevertheless inspection of the *Q-statistic for each group* showed evidence of heterogeneity within the ‘other’ attachment assessment group.

Table 22: Weighted mean effect sizes by type of attachment assessment (cross-sectional studies; externalizing problems)

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% Confidence Interval	+95% Confidence Interval	Z	p	K
Observation of behaviour	-0.27	-10.00	-0.41	-0.13	-3.65	<0.01	5.00
Self-report questionnaire	-0.27	-10.00	-0.37	-0.17	-5.20	<0.01	7.00
Other	-0.30	-10.00	-0.43	-0.14	-3.72	<0.01	4.00
Total	-0.28	-10.00	-0.35	-0.21	-7.36	<0.01	16.00

Table 23: Results of the homogeneity analysis investigating type of attachment assessment as a potential moderator variable (cross-sectional studies; externalizing problems)

Analog ANOVA for Type of Attachment Assessment (Mixed Effects Model)			
	Q	df	p
Between Groups	0.07	2.00	0.96
Within Groups	18.49	13.00	0.14
Total	18.56	15.00	0.23
Observation of Behaviour Group	3.66	4.00	0.45
Self-report Questionnaire Group	3.89	6.00	0.69
Other Group	10.93	3.00	0.01

3.2.4.3 Attachment Figure (assessments that measured attachment specifically to the mother versus assessments that measured a general attachment state of mind)

The boxplots in Figure 10 show that there were no potential outliers in either group. The boxplot for attachment to mother appeared relatively symmetrical whereas the boxplot for attachment state of mind seemed negatively skewed. There was a somewhat larger spread of effect size correlations for the attachment state of mind group compared with assessments that measured attachment to mother.

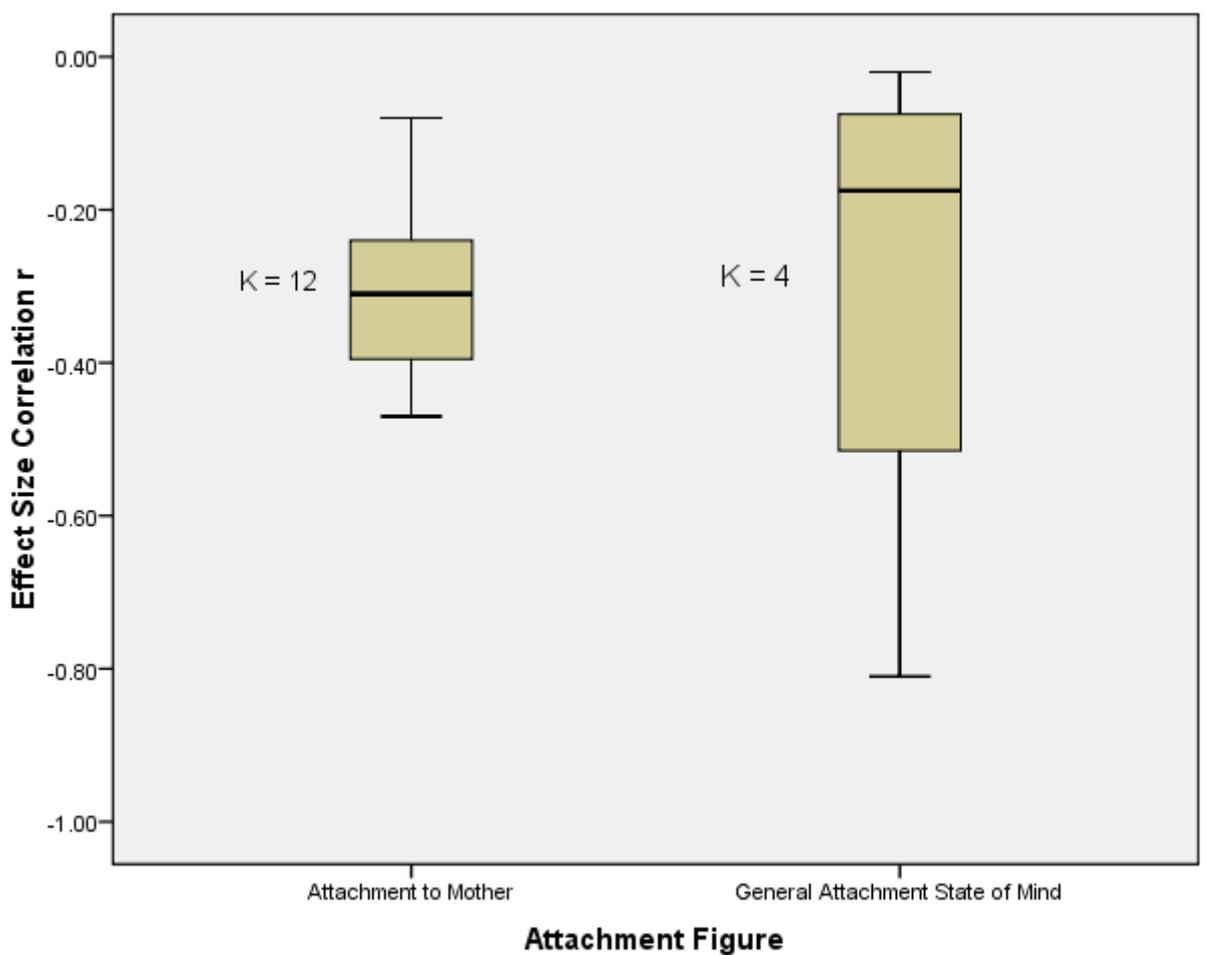


Figure 10: Boxplots showing un-weighted effect size correlations for attachment to mother and a general attachment state of mind (cross-sectional studies; externalizing problems)

Table 24 shows that there was no difference between the un-weighted mean effect size correlations for assessments that measured attachment to mother and assessments

that measured a general attachment state of mind. As indicated by the boxplot the distribution for general attachment state of mind was negatively skewed.

Table 24: Descriptive statistics for the un-weighted effect size correlations for attachment to mother and general attachment state of mind (cross-sectional studies; externalizing problems)

Attachment Figure	Un-weighted Mean Effect Size Correlation	K	N	Standard Deviation	Median	Min.	Max.	Skewness
Attachment to Mother	-0.30	12	1412	0.11	-0.31	-0.47	-0.08	0.56
General Attachment State of Mind	-0.30	4	405	0.35	-0.18	-0.81	-0.02	-1.68

Note. K = number of effect sizes; N = number of participants

Table 25 shows that the weighted mean effect size for attachment to mother and the weighted mean effect size for general attachment state of mind were reliable. The means for the two groups differed and therefore as shown by the results of the inverse variance weighted one-way ANOVA (Table 26) the *Q-between* value was statistically significant at the 10% level ($p = 0.07$). This suggested that attachment figure may be a moderator variable. A larger mean effect size was obtained when using a measure that assesses attachment to the mother rather than a general attachment state of mind. However, the 95% confidence intervals for the two means overlapped, which suggests that this result should be interpreted with caution.

As shown in Table 26 the *Q-within* value was statistically significant ($p = 0.02$) which suggested that the residual variability after considering attachment figure as a potential moderator was more than would be expected from sampling error alone. Inspection of the *Q-statistic for each group* showed that the group of assessments that measured attachment to mother was homogeneous and the statistically significant *Q-*

within value was caused by heterogeneity within the group of assessments that measured a general attachment state of mind.

Table 25: Weighted mean effect sizes by attachment figure (cross-sectional studies; externalizing problems)

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% CI	+95% CI	Z	p	K
Attachment to Mother	-0.29	-10.00	-0.34	-0.24	-11.02	<0.01	12
General Attachment State of Mind	-0.19	-10.00	-0.28	-0.09	-3.83	<0.01	4
Total	-0.27	-10.00	-0.31	-0.22	-11.52	<0.01	16

Note. CI = confidence interval

Table 26: Results of the homogeneity analysis investigating attachment figure as a potential moderator variable (cross-sectional studies; externalizing problems)

Analog ANOVA for Attachment Figure (Mixed Effects Model)			
	Q	df	p
Between Groups	3.31	1.00	0.07
Within Groups	26.46	14.00	0.02
Total	29.78	15.00	0.01
Attachment to Mother Group	10.88	11.00	0.45
General Attachment State of Mind	15.58	3.00	<0.01

3.2.4.4 Design of Attachment Measure (continuous versus categorical)

The boxplots shown in Figure 11 revealed one potential mild outlier for continuous attachment measures that represented an unusually low negative effect size correlation. Excluding the potential outlier, the spread of effect size correlations appeared to be similar for both groups.

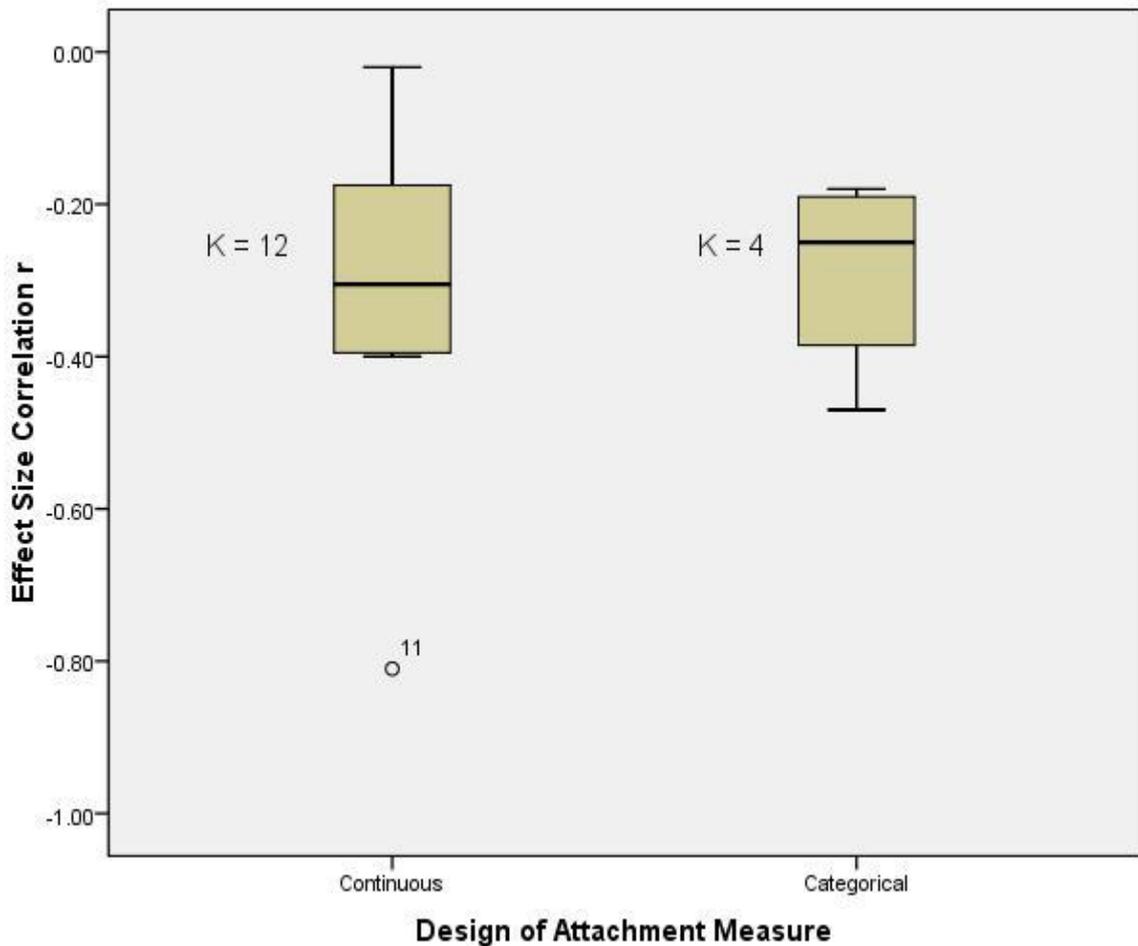


Figure 11: Boxplots showing un-weighted effect size correlations for continuous and categorical measures of attachment security (cross-sectional studies; externalizing problems)

Table 27 shows that there was only a slight difference between the un-weighted mean effect size correlations for continuous and categorical attachment measures. Given that the median value for continuous attachment assessments was similar to the mean, the outlier did not seem to have a large impact on the mean, but did cause the

distribution to be negatively skewed. The distribution for categorical attachment measures was also negatively skewed.

Table 27: Descriptive statistics for the un-weighted effect size correlations for design of attachment measure (cross-sectional studies; externalizing problems)

Design of Attachment Measure	Un-weighted Mean Effect Size Correlation	K	N	Standard Deviation	Median	Min.	Max.	Skewness
Continuous	-0.31	12	1379	0.20	-0.31	-0.81	-0.02	-1.12
Categorical	-0.29	4	438	0.13	-0.25	-0.47	-0.18	-1.19

Note. K = number of effect sizes; N = number of participants

Table 28 shows that the weighted mean effect sizes for the continuous and categorical attachment measures were reliable. The means for the two groups were almost identical and the 95% confidence intervals overlapped. Hence the *Q-between* value (Table 29) was not statistically significant ($p = 0.78$). This suggested that design of attachment measure was unlikely to be a moderator variable.

As shown in Table 29 the *Q-within* value was statistically significant ($p = 0.02$) which suggested that the residual variability after considering design of attachment measure as a potential moderator was more than would be expected from sampling error alone. Inspection of the *Q-statistic for each group* showed that the categorical group was homogeneous and the statistically significant *Q-within* value was caused by heterogeneity within the group that used continuous attachment assessments.

Table 28: Weighted mean effect sizes by design of attachment measure (cross-sectional studies; externalizing problems)

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% CI	+95% CI	Z	p	K
Continuous	-0.27	-10.00	-0.33	-0.22	-9.15	<0.01	12.00
Categorical	-0.26	-10.00	-0.35	-0.16	-4.84	<0.01	4.00
Total	-0.27	-10.00	-0.32	-0.22	-10.35	<0.01	16.00

Note. CI = confidence interval

Table 29: Results of the homogeneity analysis investigating design of attachment measure as a potential moderator variable (cross-sectional studies; externalizing problems)

Analog ANOVA for Design of Attachment Measure (Mixed Effects Model)			
	Q	df	p
Between Groups	0.08	1.00	0.78
Within Groups	26.95	14.00	0.02
Total	27.03	15.00	0.03
Continuous Group	23.85	11.00	0.01
Categorical Group	3.10	3.00	0.38

3.2.4.5 Age of Child

The mean age of the distribution at the time of both the attachment security assessment and the externalizing problem assessment across the 16 effect size correlations (n = 1817) was 10.68 years (SD = 5.01). The median age was 10.75 years (minimum = 1.70 years, maximum = 17.00 years).

The Spearman's rank correlation coefficient was calculated in order to establish the strength of association between the mean age of the children and the effect size correlations. The results of this analysis showed that Spearman's $r = 0.13$, which suggested a weak correlation. The p-value of the association was not statistically

significant ($p = 0.63$), suggesting that there was not a reliable relationship between the mean age of the children and the effect size correlations. These results strongly suggested that age was not a potential moderator variable and therefore a decision was taken not to carry out any further analyses on this variable.

3.2.4.6 Gender of Child

Gender of child was coded as the percentage of males in the sample. In the current selection of studies, there were seven missing values for this variable. The mean percentage of males across the 9 effect size correlations ($n = 1011$) was 57.17% ($SD = 16.83$). The median percentage of males was 53.98% (minimum = 41.94%, maximum = 100%).

The Spearman's rank correlation coefficient was calculated in order to establish the strength of association between the percentage of males in the sample and the effect size correlations. This analysis was carried out excluding the study that consisted of a sample of 100% males. The results showed that Spearman's $r = -0.52$, which indicated a medium negative rank correlation between the percentage of males in the sample and the effect size correlations. However the p-value of the association was not statistically significant ($p = 0.19$) and should therefore be interpreted with caution.

A scatterplot (Figure 12) was generated to explore this negative correlation further. There appeared to be a certain degree of variance in the distribution of the data points, including one potential mild outlier and one extreme outlier. Excluding the extreme outlier (which was the study consisting of a sample of 100% males) there was a medium linear relationship between the percentage of males and the effect size correlations ($r = -0.43$). However, possibly due to lack of power, the p-value indicated that the linear correlation was not reliable ($p = 0.29$) and should therefore be interpreted with caution.

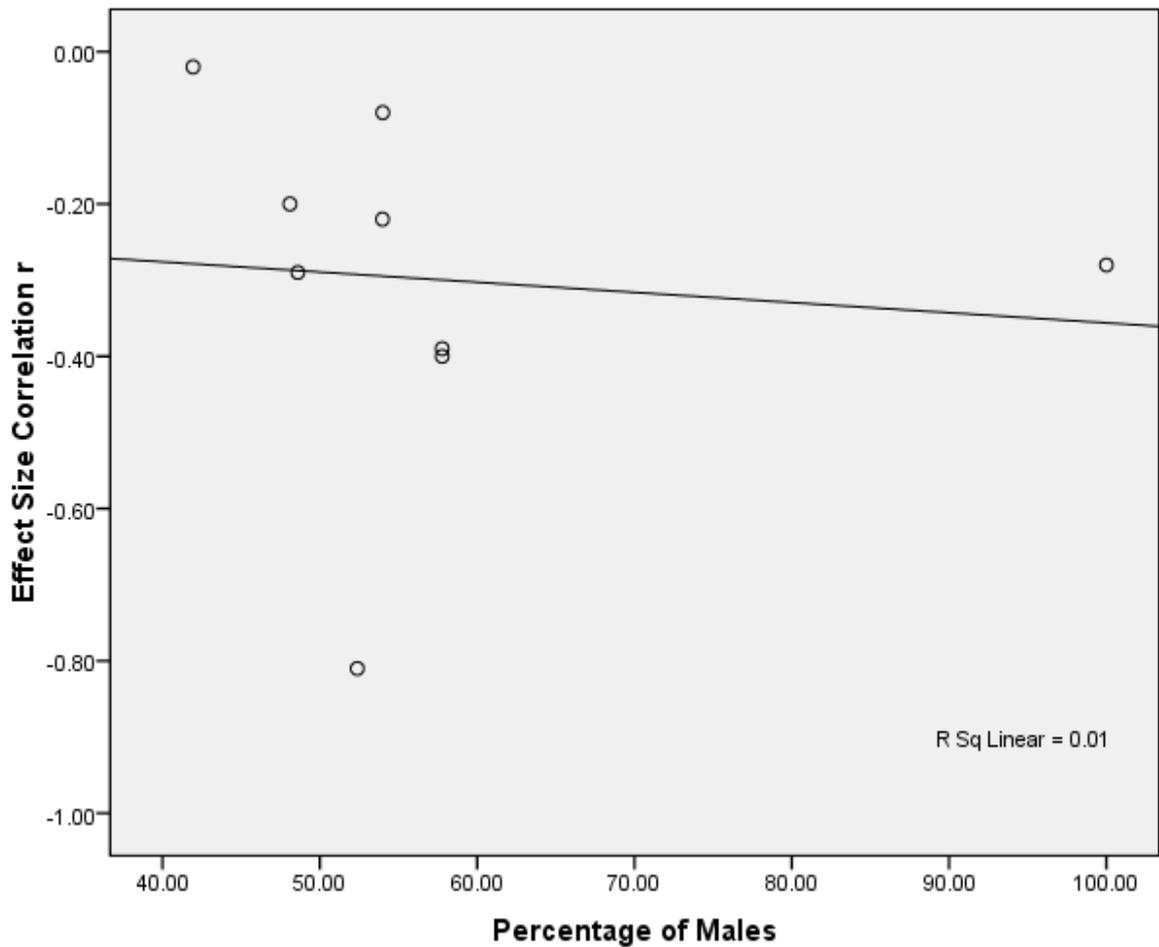


Figure 12: Scatterplot showing the relationship between percentage of males and 9 effect size correlations (cross-sectional studies; externalizing problems)

Table 30 shows the regression coefficients from an inverse variance weighted simple linear regression analysis investigating percentage of males as a potential moderator variable. The potential extreme outlier was excluded from this analysis. The Beta value of -0.39 can be interpreted as showing a medium linear relationship between the percentage of males and the effect size correlations. However, possibly due to lack of power, the *Q-model* statistic (Table 31) shows this relationship was statistically unreliable.

The *Q-residual* statistic (Table 31) was significant at the 10% level, which suggested that the variability after considering percentage of males as a potential moderator was greater than would be expected from sampling error alone.

Table 30: Regression coefficients for analysis investigating percentage of males as a potential moderator variable (cross-sectional studies; externalizing problems)

Random Intercept, Fixed Sloped Model							
	B	SE	-95% Confidence Interval	+95% Confidence Interval	Z	p	Beta
Constant	0.68	0.69	-0.67	2.03	0.99	0.32	<0.01
Percentage of males	-0.02	0.01	-0.04	0.01	-1.39	0.16	-0.39

Table 31: Results of the homogeneity analysis investigating percentage of males as a potential moderator variable (cross-sectional studies; externalizing problems)

Random Intercept, Fixed Slopes Model			
	Q	df	p
Model	1.94	1.00	0.16
Residual	10.73	6.00	0.10
Total	12.67	7.00	0.08

3.2.4.7 Year of Publication

The mean year of publication across the 16 effect size correlations ($n = 1817$) was 2001 ($SD = 6$). The median year of publication was 2004 (earliest year = 1990; latest year = 2006).

The Spearman's r rank correlation coefficient was calculated in order to establish the strength of association between year of publication and the effect size correlations. The results of this analysis showed that Spearman's $r = 0.16$, suggesting a very small positive rank correlation between year of publication and the effect size correlations that was statistically unreliable ($p = 0.55$). Given the small and non-significant result, year of publication could not reliably be considered as a potential moderator and therefore a decision was taken not to carry out any further analyses on this variable.

3.3 Prospective Studies - Attachment Security and Internalizing Problems

3.3.1 Selection of Studies into the Meta-Analysis

Out of the pool of 23 studies entering the meta-analysis 8 employed a prospective design while contemporaneously measuring attachment security and internalizing problems. Table 32 shows the 8 effect size correlations and the study / participant characteristics that were considered as potential moderators. Each study contributed only one effect size for this part of the analysis and the total N was 1716.

Table 32: Selected studies; study / participant characteristics; and effect size correlations (prospective studies; internalizing problems)

Year	Author	Mean Age of Sample at Time of Attachment Assessment (Years)	Mean Age of Sample at Time of Internalizing Problem Assessment (Years)	Time between Attachment Assessment and Internalizing Problem Assessment (Months)	Sample Size (N)	Effect Size Index Measure	Effect Size Index
2007	Allen et al	14.29	15.22	11.16	160	r	-0.26
2003	Burgess et al	1.17	4.00	33.96	114	r	-0.06
2006	Edwards et al	1.00	2.17	14.04	176	r	-0.21
1995	Goldberg et al	1.00	2.50	18.00	141	r	-0.34
1996	Hubbs-Tait et al	3.67	4.50	9.96	27	r	-0.14
1997	Lyons-Ruth et al	1.50	7.00	66.00	43	rpb	-0.08
2004	McCartney et al	1.25	3.00	21.00	1015	r	0.01
2000	Pierrehumbert et al	1.75	5.00	39.00	40	r	-0.25
		Mean = 3.20	Mean = 5.42	Mean = 26.63	Total = 1716		

3.3.2 Descriptive Statistics of the Effect Size Correlations

Figure 13 shows the distribution of the effect size correlations. It can be seen that there were no potential outliers and the distribution of the effect size correlations appeared to be symmetrical, with no evidence of positive or negative skewness.

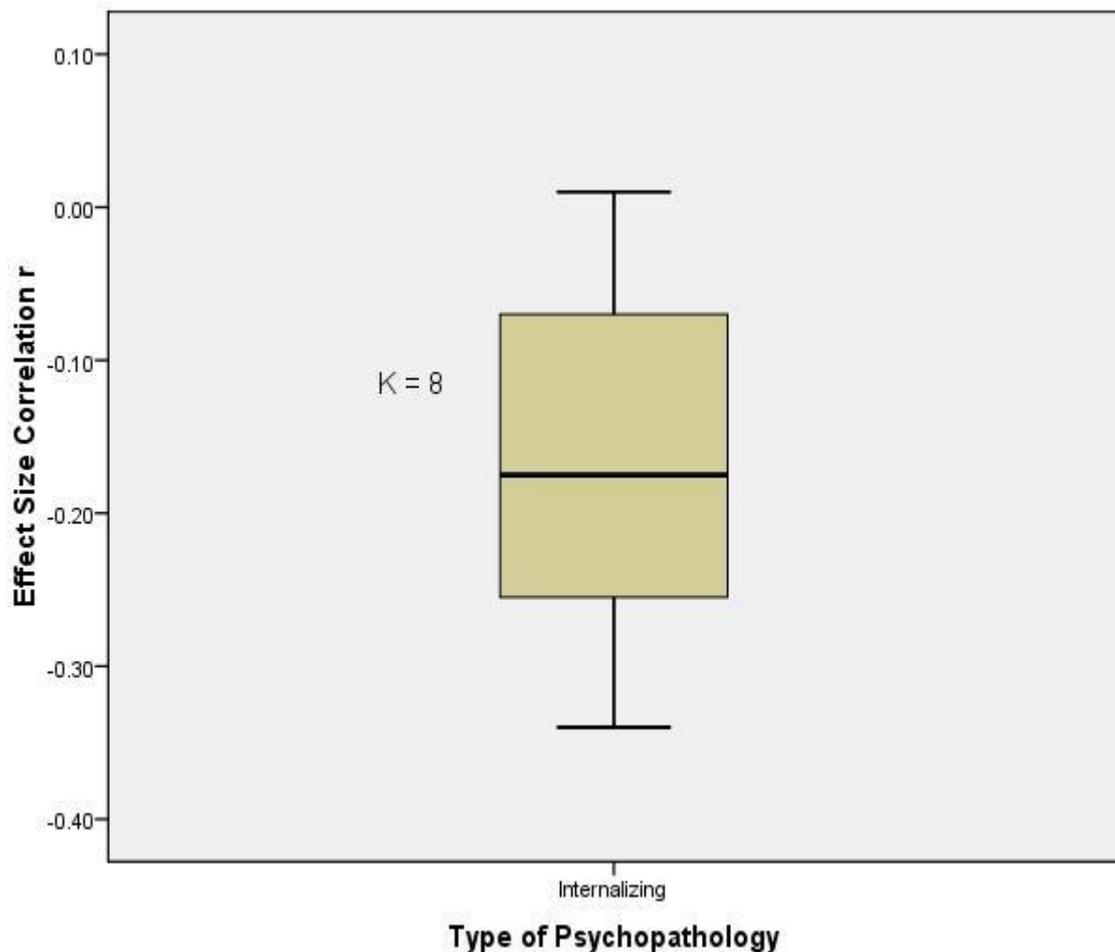


Figure 13: Boxplot showing un-weighted effect size correlations for attachment security and internalizing problems (prospective studies)

Table 33 provides descriptive statistics for the un-weighted effect size correlations and suggests that there was a small correlation between attachment security and internalizing problems. The median value was almost identical to the un-weighted mean and the distribution was not skewed in either direction.

Table 33: Descriptive statistics for the un-weighted effect size correlations for attachment security and internalizing problems (prospective studies)

Un-weighted Mean Effect Size Correlation	K	N	SD	Minimum	Maximum	Median	Skewness
-0.17	8	1716	0.04	-0.34	0.01	-0.18	0.07

Note. K = number of effect sizes; N = number of participants; SD = standard deviation

3.3.3 Meta-Analysis Results for Attachment Security and Internalizing Problems

Table 34 shows the results of the meta-analysis using a random effects model. The average effect size correlation, weighted for precision was -0.17. This was identical to the un-weighted mean effect size and again indicated that there was only a small correlation between attachment security and internalizing problems. This result was reliable, as indicated by the 95% confidence intervals (which did not cross zero) and the statistically significant p-value.

Table 34: Meta-analysis results of 8 weighted effect size correlations for attachment security and internalizing problems (prospective studies)

Random Effects Model					
Weighted Mean Effect Size	-95% Confidence Interval	+ 95% Confidence Interval	Standard Error	Z	p
-0.17	-0.28	-0.04	-10.00	-2.63	0.01

The Q statistic was used to investigate the homogeneity of the effect size distribution and produced a result that was not statistically significant ($Q = 3.88$; $df = 7$; $p = 0.79$). This suggested that the variability across effect sizes was no more than would be expected from sampling error alone. Nevertheless a decision was taken to carry out moderator analyses in order to identify any variables that may have contributed to variation in the effect sizes correlations.

3.3.4 Analysis of Moderator Variables

The group frequencies for all of the categorical variables were uneven, which meant that it was not possible to carry out any moderator analyses on these variables. A

number of potential continuous moderator variables were investigated and the results of each will be presented in turn.

3.3.4.1 Age of the Child at the Time of the Attachment Assessment

The mean age of the distribution at the time of the attachment assessment across the 8 effect size correlations ($n = 1716$) was 3.20 years ($SD = 4.56$). The median age was 1.38 years (minimum = 1.00; maximum = 14.29).

The Spearman's r rank correlation coefficient was calculated in order to establish the strength of association between the mean age at the time of the attachment assessment and the effect size correlations. The results of this analysis showed that Spearman's $r = -0.06$, suggesting there was very little evidence of a correlation. In addition, the p -value of the association ($p = 0.89$) suggested that there was not a reliable relationship between the two variables. These results strongly suggested that the mean age at the time of the attachment assessment was not a potential moderator and therefore a decision was taken not to carry out any further analyses on this variable.

3.3.4.2 Age of the Child at Time of the Internalizing Problem Assessment

The mean age of the distribution at the time of the internalizing problem assessment across the 8 effect size correlations ($n = 1716$) was 5.42 years ($SD 4.25$). The median age was 4.25 years (minimum = 2.17; maximum = 15.22).

The Spearman's r rank correlation between the mean age at the time of the internalizing problem assessment and the effect size correlations was extremely small (-0.07) and statistically unreliable ($p = 0.87$). Therefore no further analyses were carried out on this variable.

3.3.4.3 Time Interval between Attachment Assessment and Internalizing Problem Assessment

The mean time interval between the attachment assessment and the internalizing problem assessment was 26.64 months ($SD = 19.04$) across the 8 effect size

correlations (n = 1716). The median time interval was 19.50 months (minimum = 9.96; maximum = 66.00).

The Spearman's rank correlation coefficient was calculated in order to establish the strength of association between the time interval and the effect size correlations. The results of this analysis showed that Spearman's $r = 0.33$, suggesting that there was a small to medium, yet statistically unreliable positive rank correlation ($p = 0.42$).

A scatterplot (Figure 14) was generated to explore this positive correlation further. There appeared to be a substantial amount of variance in the distribution of the data points. Furthermore, the coefficient of determination was $r^2 = 0.11$, which means that only 11% of the variation in effect sizes can be explained by the number of months between the attachment assessment and the internalizing problem assessment.

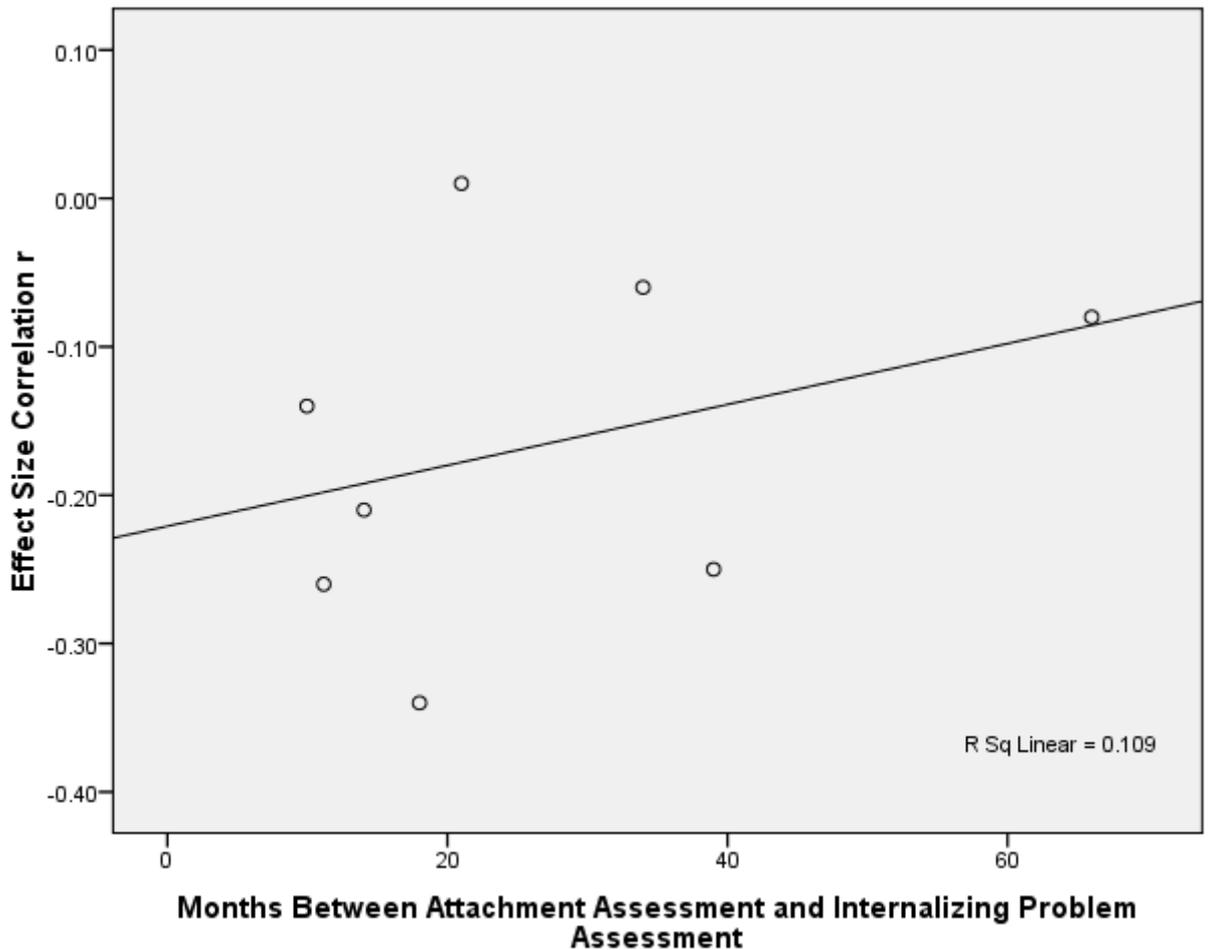


Figure 14: Scatterplot showing the relationship between the number of months between the two assessments and 8 effect size correlations (prospective studies; internalizing problems)

3.3.4.4 Year of Publication

The mean year of publication across the 8 effect size correlations ($n = 1716$) was 2001 ($SD = 5.00$). The median year of publication was 2002 (earliest year = 1995; latest year = 2007).

The Spearman's r rank correlation between the year of publication and the effect size correlations was small (0.14) and not statistically significant ($p = 0.74$). Given these results the year of publication could not reliably be considered a potential moderator and therefore no further analyses were carried on this variable.

3.4 Prospective Studies – Attachment Security and Externalizing Problems

3.4.1 Selection of Studies into the Meta-Analysis

Out of the pool of 23 studies entering the meta-analysis 7 employed a prospective design while contemporaneously measuring attachment security and externalizing problems. Each study contributed only one effect size for this part of the analysis. Table 35 shows the 7 effect size correlations and the study / participant characteristics that were considered as potential moderators. The total N for this part of the analysis was 1492.

Table 35: Selected studies; study / participant characteristics; and effect size correlations (prospective studies; externalizing problems)

Year	Author	Mean Age of Sample at Time of Attachment Assessment (Years)	Mean Age of Sample at Time of Externalizing Problem Assessment (Years)	Time between Attachment Assessment and Externalizing Problem Assessment (Months)	Sample Size (N)	Effect Size Index Measure	Effect Size Index
2003	Burgess et al	1.17	4.00	33.96	114	r	-0.14
2006	Edwards et al	1.00	2.17	14.04	176	r	-0.16
1996	Hubbs-Tait et al	3.67	4.50	9.96	27	r	-0.25
1997	Lyons-Ruth et al	1.50	7.00	66.00	43	rpb	-0.01
2004	McCartney et al	1.25	3.00	21.00	1015	r	-0.01
2000	Pierrehumbert et al	1.75	5.00	39.00	40	r	-0.22
1996	Shaw et al	1.00	4.75	45.00	77	rpb	-0.16
		Mean = 1.62	Mean = 4.35	Mean = 32.71	Total = 1492		

3.4.2 Descriptive Statistics of the Effect Size Correlations

Figure 15 shows the distribution of the effect size correlations. It can be seen that there were no potential outliers and the distribution of the effect size correlations appeared to be relatively symmetrical.

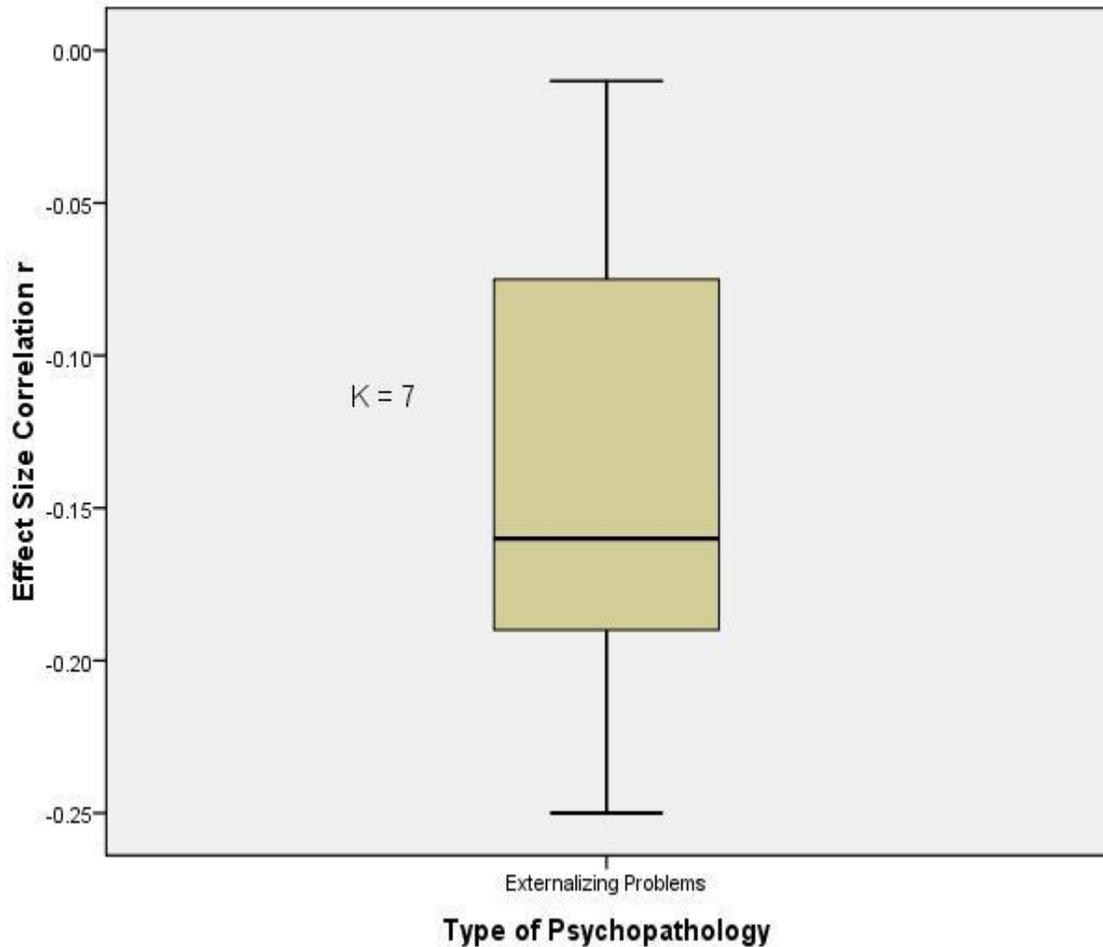


Figure 15: Boxplot showing un-weighted effect size correlations for attachment security and externalizing problems (prospective studies)

Table 36 provides descriptive statistics for the un-weighted effect size correlations and suggests that there was a small correlation between attachment security and externalizing problems. The median value was almost identical to the un-weighted mean and the distribution was not skewed in either direction.

Table 36: Descriptive statistics for the un-weighted effect size correlations for attachment security and externalizing problems (prospective studies)

Un-weighted Mean Effect Size Correlation	K	N	SD	Minimum	Maximum	Median	Skewness
-0.14	7	1492	0.09	-0.25	0.00	-0.16	0.52

Note. K = number of effect sizes; N = number of participants; SD = standard deviation

3.4.3 Meta-Analysis Results for Attachment Security and Externalizing Problems

Table 37 shows the results of the meta-analysis using a random effects model. The average effect size correlation, weighted for precision was -0.09. This was slightly higher than the un-weighted mean and indicated that there was an extremely small negative correlation between attachment security and externalizing problems. The statistically significant p-value indicates that this result was reliable, however zero lies just outside of the 95% confidence interval and therefore some caution is necessary when interpreting this association.

Table 37: Meta-analysis results of 7 weighted effect size correlations for attachment security and externalizing problems (prospective studies)

Random Effects Model					
Weighted Mean Effect Size	-95% Confidence Interval	+ 95% Confidence Interval	Standard Error	Z	p
-0.09	-0.16	-0.01	-10.00	-2.29	0.02

The Q statistic was used to investigate the homogeneity of the effect size distribution and produced a result that was not statistically significant ($Q = 4.53$; $df = 6$; $p = 0.60$). This suggested that the distribution was homogeneous. However, due to the small number of studies included in the homogeneity analysis the Q-test may have lacked sufficient power to detect any heterogeneity amongst the distribution. Nevertheless a decision was taken to carry out moderator analyses in order to identify any variables that may have caused additional heterogeneity other than that already accounted for by the model.

3.4.4 Analysis of Moderator Variables

The group frequencies for all of the categorical variables were uneven, which meant that it was not possible to carry out any moderator analyses on these variables. A number of potential continuous moderator variables were investigated and the results of each will be presented in turn.

3.4.4.1 Age of the Child at the Time of the Attachment Assessment

The mean age of the distribution at the time of the attachment assessment across the 7 effect size correlations ($n = 1492$) was 1.62 years ($SD = 0.94$). The median age was 1.25 years (minimum = 1.00; maximum = 3.67).

The Spearman's r rank correlation between mean age of the children at the time of the attachment assessment and the effect size correlations was small to medium ($r_s = -0.33$), yet statistically unreliable ($p = 0.47$) possibly due to the small sample size lacking statistical power. Given the unreliable result, no further analyses were carried out on this variable.

3.4.4.2 Age of the Child at the Time of the Externalizing Problem Assessment

The mean age of the distribution at the time of the externalizing problem assessment across the 7 effect size correlations ($n = 1492$) was 4.35 years ($SD = 1.55$). The median age was 4.50 (minimum = 2.17; maximum = 7.00).

The Spearman's r rank correlation between the mean age at the time of the externalizing problem assessment and the effect size correlations was extremely small (-0.06) and statistically unreliable ($p = 0.91$). Therefore no further analyses were carried out on this variable.

3.4.4.3 Time Interval Between the Attachment Assessment and the Externalizing Problem Assessment

The mean time interval between the attachment assessment and the externalizing problem assessment was 32.71 months (SD = 19.59) across the 7 effect size correlations (n = 1492). The median time interval was 33.96 months (minimum = 9.96; maximum = 66.00).

The Spearman's rank correlation coefficient between time interval and the effect size correlations was moderate ($r_s = 0.44$), yet statistically unreliable ($p = 0.33$) possibly due to the small sample size lacking statistical power. A scatterplot (Figure 16) was generated to explore this positive correlation further. It can be seen that the scatter of the data points was considerable and the shape of the scatterplot was rather irregular. There appeared to be only a modest linear relationship between the two variables. The coefficient of determination was $r^2 = 0.20$, indicating that 20% of the variance in the effect size correlations was accounted for by the time interval between the attachment assessment and the externalizing problem assessment.

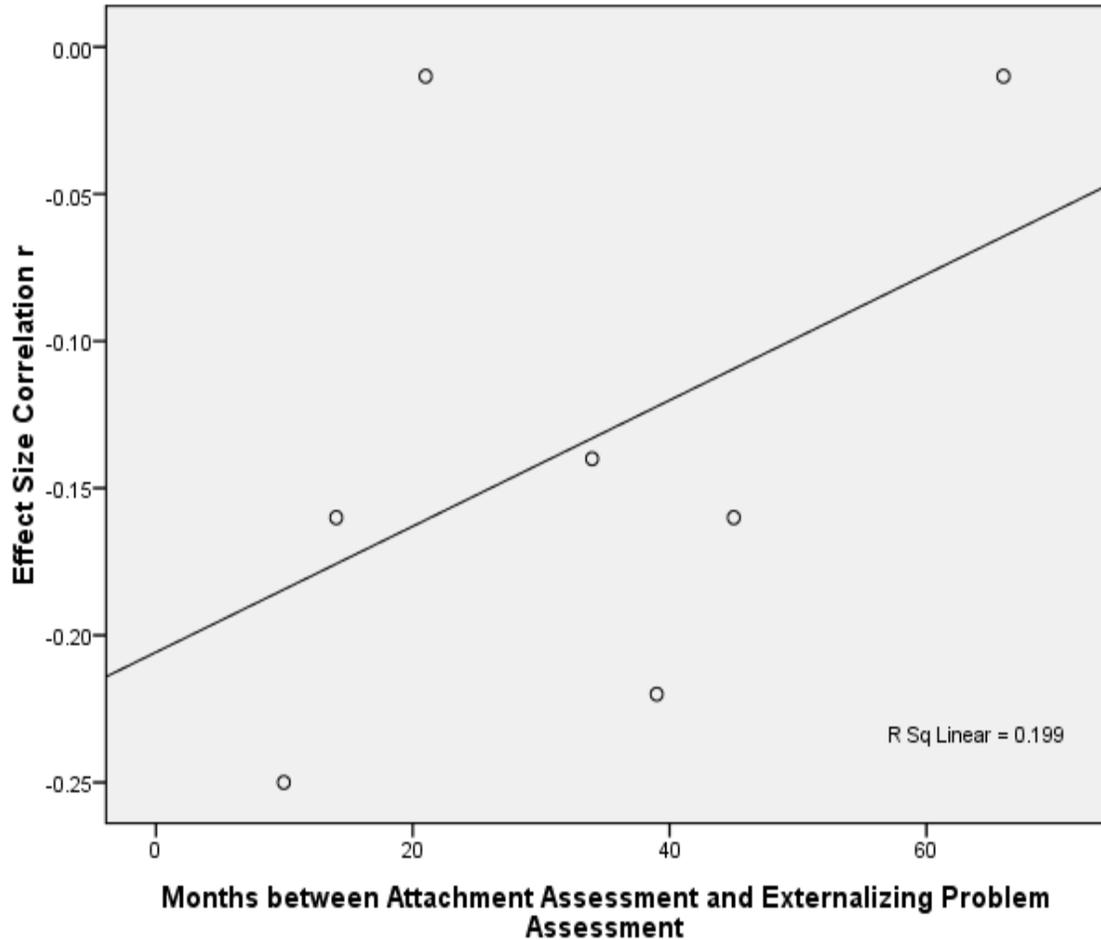


Figure 16: Scatterplot showing the relationship between the number of months between the two assessments and 7 effect size correlations (prospective studies; externalizing problems)

3.4.4.4 Year of Publication

The mean year of publication across the 7 effect size correlations ($n = 1492$) was 2000 ($SD = 4$). The median year of publication was also 2000 (earliest year = 1996; latest year = 2006).

The Spearman's r rank correlation between the year of publication and the effect size correlations was moderate ($r_s = 0.40$), yet statistically unreliable ($p = 0.38$). A scatterplot

(Figure 17) was generated to explore this positive correlation further. It can be seen that the scatter of the data points was considerable, thus ruling out a strong relationship. The linear relationship between the two variables appeared weak and the shape of the scatterplot was somewhat irregular. The value of R Square Linear suggested that only 5% of the variance in the effect size correlations was accounted for by the year in which the research was published. Given the unreliable rank correlation and the large spread of the data points it seemed unlikely that year of publication was a potential moderator and therefore no further analyses were carried out on this variable.

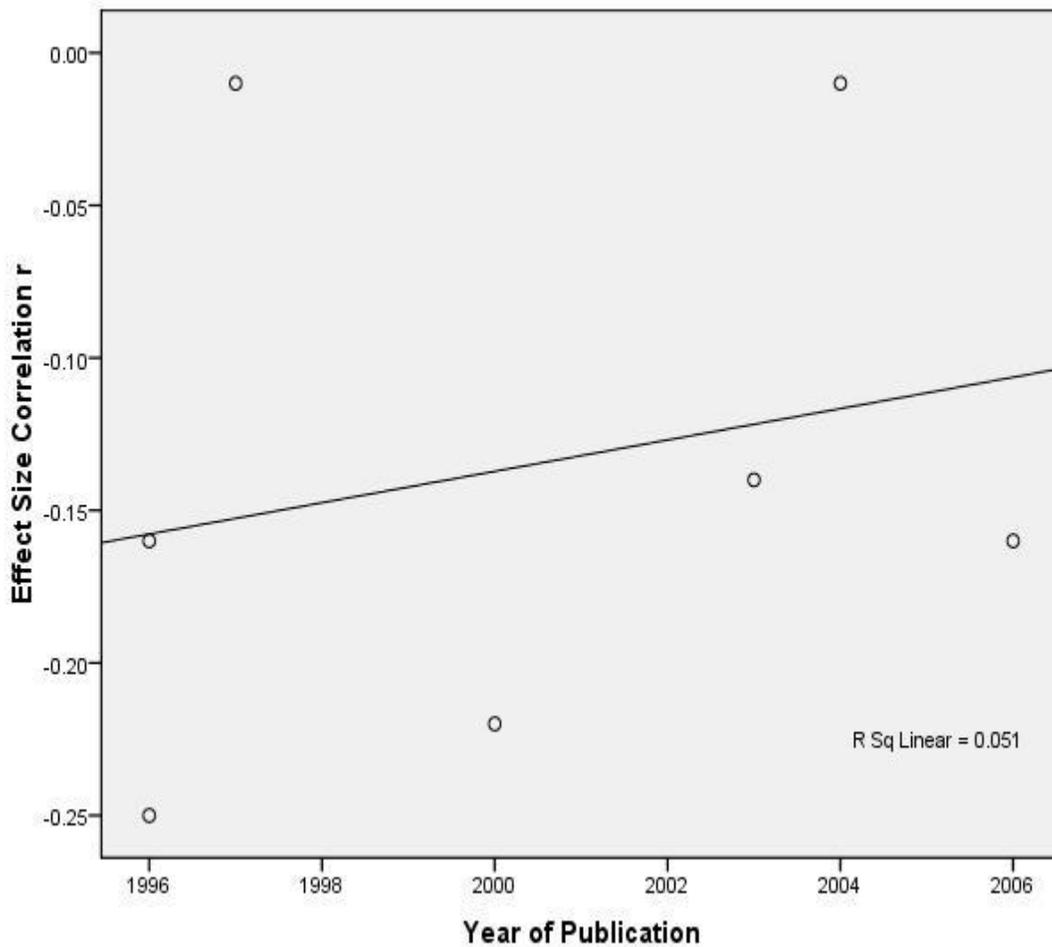


Figure 17: Scatterplot showing the relationship between year of publication and 7 effect size correlations (prospective studies; externalizing problems)

3.5 Comparison of the Four Mean Effect Size Correlations

3.5.1 Comparison of Mean Effect Size Correlations for Internalizing and Externalizing Problems in Studies Employing a Cross-Sectional Design

As shown in Table 38 the weighted mean effect sizes for attachment security and internalizing problems and attachment security and externalizing problems in studies employing a cross-sectional design were similar. In addition the confidence intervals overlapped, indicating that there was not a reliable difference between the mean effect sizes for internalizing and externalizing problems when measured concurrently.

Table 38: Comparison of mean effect sizes for attachment security and internalizing problems; and attachment security and externalizing problems; for studies employing a cross-sectional design

	Cross-Sectional Design		
	Weighted Mean Effect Size	-95% Confidence Interval	+ 95% Confidence Interval
Internalizing Problems	-0.24	-0.31	-0.17
Externalizing Problems	-0.28	-0.34	-0.21

3.5.2 Comparison of Mean Effect Size Correlations for Internalizing and Externalizing Problems in Studies Employing a Prospective Design

Table 39 shows that when measured prospectively, the confidence intervals for attachment security and internalizing problems and attachment security and externalizing problems overlapped. This indicates that there was not a reliable difference between these mean effect size correlations.

Table 39: Comparison of mean effect sizes for attachment security and internalizing problems; and attachment security and externalizing problems; for studies employing a prospective design

	Prospective Design		
	Weighted Mean Effect Size	-95% Confidence Interval	+ 95% Confidence Interval
Internalizing Problems	-0.17	-0.28	-0.04
Externalizing Problems	-0.09	-0.16	-0.01

3.5.3 Comparison of Effect Sizes for Cross-Sectional and Prospective Studies Investigating Attachment Security and Internalizing Problems

As shown in Table 40, using a mixed effects model the confidence intervals relating to the weighted mean effect sizes for cross-sectional and prospective studies overlapped. This suggested that there was not a reliable difference between these mean effect size correlations. In order to test this further, an inverse variance weighted one-way ANOVA was conducted (Table 41). As implied by the confidence intervals, the *Q-between* value was not statistically significant. This indicated that the association between attachment security and internalizing problems did not differ depending on whether they were measured concurrently or prospectively.

The *Q-within* statistic (Table 41) indicated that the effect size distributions within the two groups were homogeneous. Therefore any variability in the distribution of effect size correlations was likely to be caused by sampling error alone.

Table 40: Weighted mean effect sizes by design of study for attachment security and internalizing problems

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% CI	+95% CI	Z	p	K
Cross-Sectional	-0.24	-10.00	-0.32	-0.15	-5.98	<0.01	14
Prospective	-0.16	-10.00	-0.26	-0.06	-3.01	<0.01	8
Total	-0.21	-10.00	-0.27	-0.15	-6.58	<0.01	22

Note. CI = confidence interval

Table 41: Results of the homogeneity analysis investigating study design as a potential moderator variable for attachment security and internalizing problems

Mixed Effects Model			
	Q	df	p
Between Groups	1.52	1.00	0.22
Within Groups	16.32	20.00	0.70
Total	17.84	21.00	0.66
Cross-Sectional Group	10.83	13.00	0.63
Prospective Group	5.50	7.00	0.60

3.5.4 Comparison of Effect Sizes for Cross-Sectional and Prospective Studies Investigating Attachment Security and Externalizing Problems

As shown in Table 42 using a mixed effects model, the confidence intervals relating to the weighted mean effect sizes for cross-sectional and prospective studies did not overlap. This suggested that there was a reliable difference between these mean effect size correlations. This was further confirmed by the results of an inverse variance weighted one-way ANOVA (Table 43). The *Q-between* value was statistically significant

indicating that the association between attachment security and externalizing problems differed depending on whether they were measured concurrently or prospectively. More specifically, there tended to be a larger effect size for attachment security and externalizing problems when measured concurrently rather than at a later time point.

The *Q-within* statistic was not statistically significant, which suggested that the residual variability after considering design of study as a potential moderator variable was no more than would be expected from sampling error alone.

Table 42: Weighted mean effect sizes by design of study for attachment security and externalizing problems

Mixed Effects Model							
Group	Weighted Mean Effect Size	Weighted Standard Error	-95% CI	+95% CI	Z	p	K
Cross-Sectional	-0.27	-10.00	-0.33	-0.21	-8.34	<0.01	16
Prospective	-0.11	-10.00	-0.20	-0.01	-2.14	0.03	7
Total	-0.22	-10.00	-0.28	-0.17	-8.12	<0.01	23

Note. CI = confidence interval

Table 43: Results of the homogeneity analysis investigating study design as a potential moderator variable for attachment security and externalizing problems

Mixed Effects Model			
	Q	df	p
Between Groups	8.17	1.00	<0.01
Within Groups	24.32	21.00	0.28
Total	32.49	22.00	0.07
Cross-Sectional Group	21.57	15.00	0.12
Prospective Group	2.76	6.00	0.84

3.5.5 Degree of Concordance between Mean Effect Size Correlations for Internalizing Problems versus Externalizing Problems

An analysis was carried out to determine the extent to which the effect size correlations regarding attachment security and internalizing problems and the effect size correlations regarding attachment security and externalizing problems would be identical. Thus, only studies reporting both effect size correlations ($n = 18$) were included in this analysis.

The scatterplot shown in Fig 18 suggests that the magnitude of the two effect size correlations were by and large very similar as the individual correlations are situated close to the *line of identity*; only two studies were somewhat discordant in their figures.

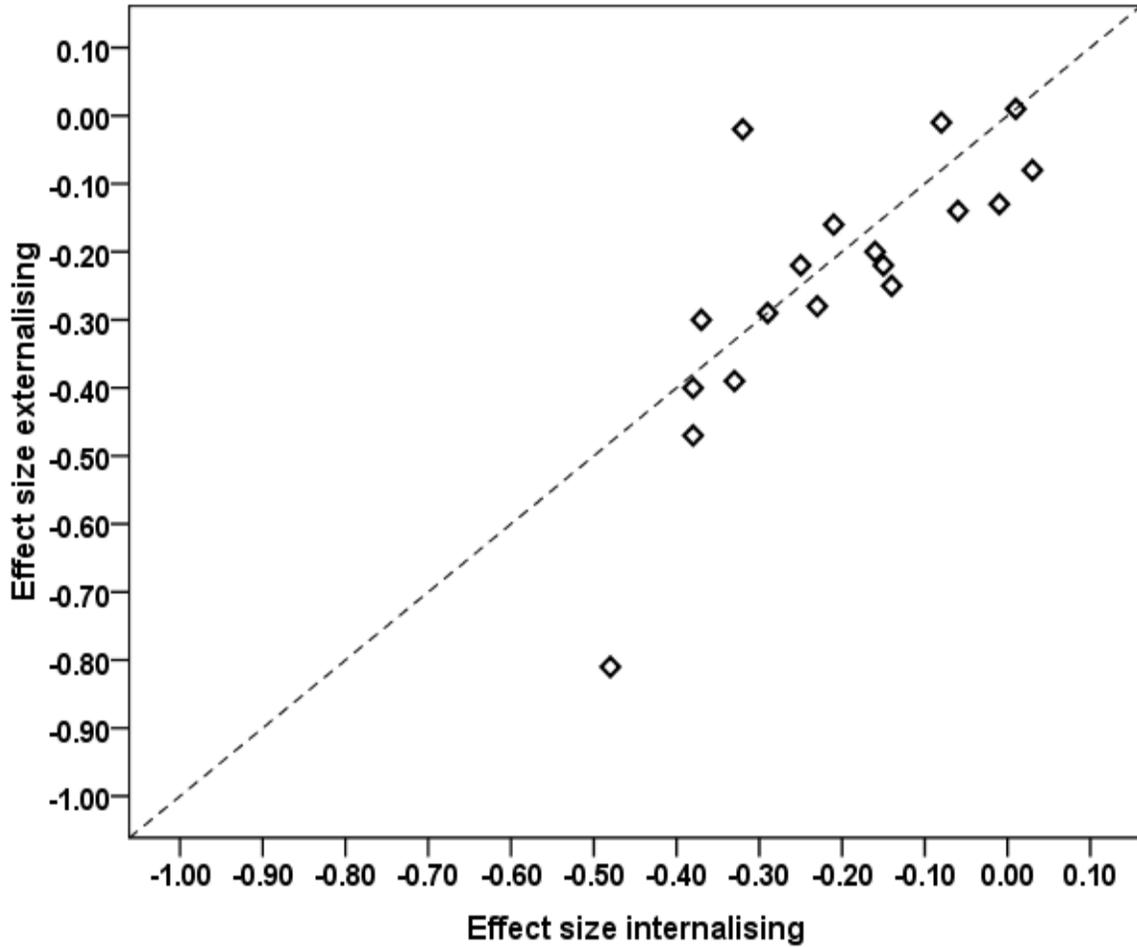


Figure 18: Scatterplot with the line of identity showing the effect size correlations for internalizing and externalizing problems in relation to attachment security.

Both the Pearson and Spearman correlations were large ($r = 0.78$; $r_s = 0.82$) and statistically reliable ($p < 0.01$) suggesting a strong relationship between these two variables. To assess the amount of *perfect agreement* of the figures for the two effect size correlations, Lin's Concordance Correlation Coefficient was calculated. This revealed a value of $R_c = 0.74$ suggesting a substantial agreement in terms of the magnitude of the two effect size correlations within the 18 studies.

3.6 Publication Bias Analysis

An important question a meta-analysis must address after the average effect sizes have been estimated concerns the generalization of its essential findings. Basically this is the question to what extent the sample of studies forming the database for a meta-analysis represents all available evidence or may have been tainted by ‘publication bias’. Severe publication bias would result in an overestimation of the ‘true’ average effect size. This is because studies with small and unreliable effect sizes are underrepresented in the literature databases of published papers; either because they are more likely to be rejected at the end of the peer review process of academic journals, or because the authors feel discouraged to publish their ‘null-findings’ in the first place. The extent of publication bias in this meta-analysis was explored graphically with funnel charts and Orwin’s fail-safe N method.

3.6.1 Cross-Sectional Studies

Figure 19 shows a funnel plot for 16 cross-sectional studies (externalizing problems) where the effect sizes are plotted against sample sizes. The vertical line represents the weighted mean effect size correlation. As one would expect, there was more scatter around this reference line amongst studies with a smaller sample size as sampling error becomes larger when the sample size becomes smaller resulting in an inverted funnel shape of the plot. However and importantly, the shape of the inverted funnel-plot was fairly symmetrical meaning that there were studies included in this meta-analysis reporting only a small effect size correlation close to zero; therefore a considerable publication bias due to a failure of including studies with small and non-significant effect sizes seems unlikely. There was also one unusually large effect size found in a very small study reporting a Spearman’s r correlation.

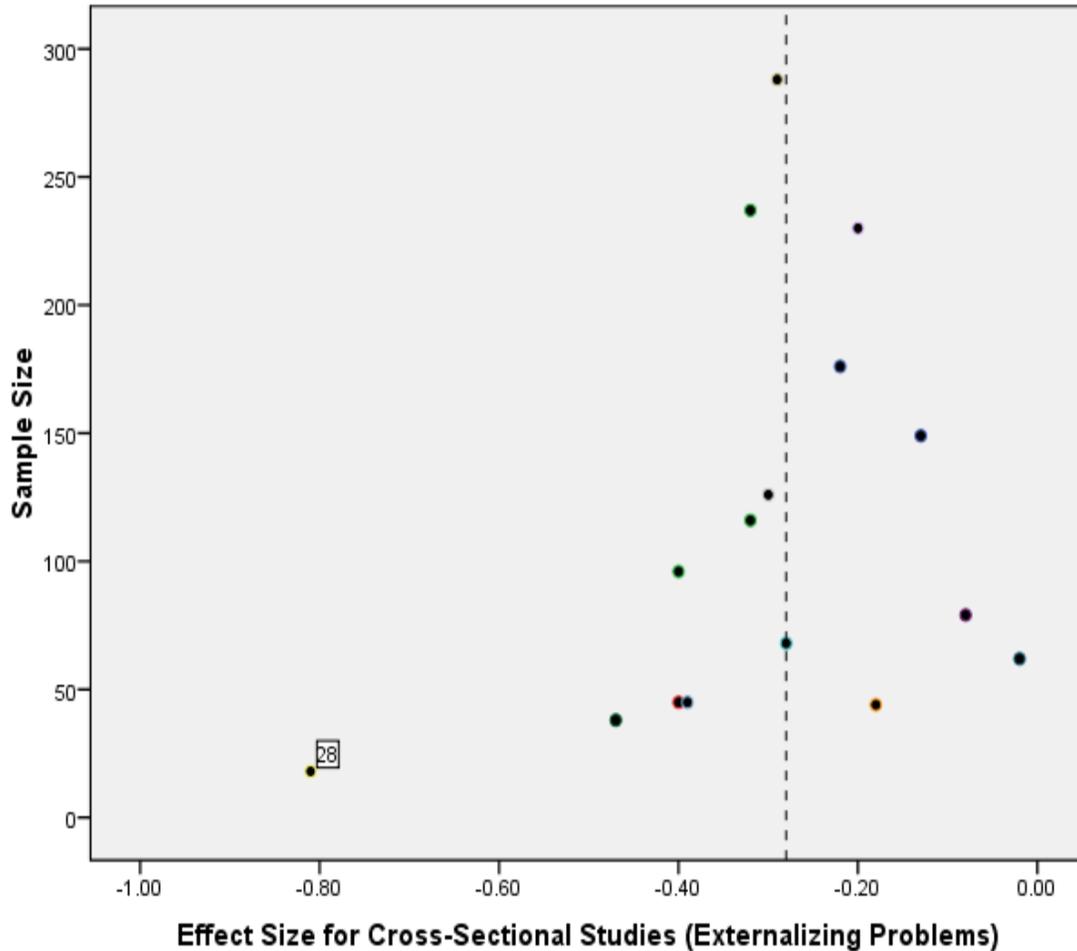


Figure 19: Funnel plot showing effect sizes for cross-sectional studies (externalizing problems) against study sample size

As a further method of quantifying the amount of publication bias the fail safe N was calculated using Orwin's (1983) method. This found that 74 unidentified studies reporting a zero effect would be required to reduce the observed effect size of -0.28 to a negligible effect size of -0.05. It is doubtful that such a large number of unidentified studies exist; therefore it is unlikely that the present findings are considerably biased upwards as a result of a 'file-drawer' problem of unpublished studies with null-findings.

3.6.2 Prospective Studies

Figure 20 shows a funnel plot for 8 prospective studies (internalizing problems). It can be seen that there was one outlier representing a study with an unusually large sample size that reported a zero effect size correlation. The scatter of the remaining effect sizes around the reference line appeared normal with respect to sampling error. However, due to the small number of studies only limited information in terms of publication bias can be derived from this funnel-plot. The fail safe N was calculated, which showed that 19 unidentified studies reporting a zero effect size are required in order to reduce the observed effect size of -0.17 down to an effect size of -0.05. It is doubtful that this many unpublished studies with a zero effect size exist and therefore publication bias is unlikely to have seriously biased the present results.

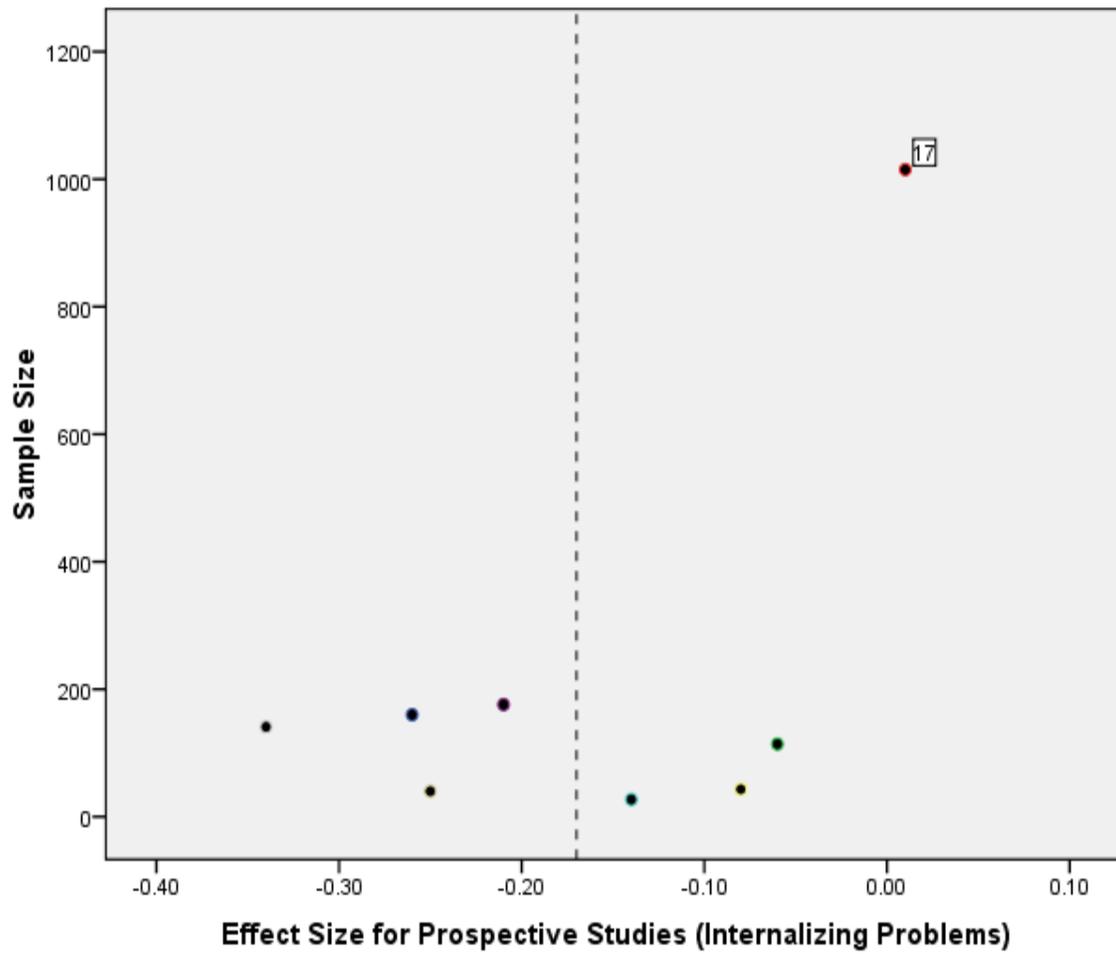


Figure 20: Funnel plot showing effect sizes for prospective studies (internalizing problems) against study sample size

3.7 Summary of Main Findings

3.7.1 Cross-Sectional Studies

- For cross-sectional studies a greater level of attachment security was reliably associated with fewer internalizing problems and fewer externalizing problems. The magnitude of these effects can be described as medium.
- For both internalizing and externalizing problems, assessments that measured attachment specifically to the mother produced a stronger effect size than assessments that measured a general attachment state of mind.
- For externalizing problems, the percentage of males in the sample may have caused some variation in the distribution of the effect size correlations.
- For externalizing problems residual variability was identified in a number of variables.

3.7.2 Prospective Studies

- For prospective studies a greater level of attachment security was reliably associated with fewer internalizing problems and fewer externalizing problems. The magnitude of these effect sizes was small.

3.7.3 Comparisons

- There tended to be a larger effect size for attachment security and externalizing problems when measured concurrently rather than prospectively.

- There was substantial agreement in terms of the magnitude of effect sizes for attachment security and internalizing problems and attachment security and externalizing problems in studies that reported results for both associations.

3.7.4 Publication Bias

- For cross-sectional studies the analyses suggested that publication bias was unlikely to have affected the findings.
- For prospective studies the relatively small number of studies made it difficult to determine the influence of publication bias based on the funnel chart. However the fail safe N suggested that publication bias was unlikely to have affected the findings.

CHAPTER FOUR: DISCUSSION

4.1 Review of Aims

The major aim of these meta-analyses was to investigate the magnitude of the relationship between attachment security and psychopathology in children and adolescents. A more specific aim was to examine the association between attachment security and two widely used broadband classifications of psychopathology - internalizing and externalizing problems. In addition, the present meta-analyses aimed not only to examine the evidence for a concurrent correlation between the variables of interest, but also to investigate the predictive validity of attachment security in terms of the development of psychopathology. This was achieved by conducting separate meta-analyses for studies that employed a cross-sectional design and for studies that employed a prospective design. A final aim was to investigate which variables may moderate the relationship between attachment security and psychopathology.

4.2 Concurrent Relationship between Attachment Security and Psychopathology

4.2.1 Main Findings

This study is the first meta-analysis to investigate the relationship between attachment security and internalizing problems in children and adolescents. When assessed concurrently, greater attachment security was associated with fewer internalizing problems ($r = -0.24$) and fewer externalizing problems ($r = -0.28$) as assessed by mothers and self-report. According to Cohen's (1988) benchmarks for describing the magnitude of effect sizes, these effects can be described as medium. However, it should be kept in mind that a previous meta-analysis by van Ijzendoorn et al (1999), which investigated the association between disorganized attachment and externalizing problems, found an effect size of $r = 0.29$ and described this effect as 'substantial'.

4.2.2 Explanations for Findings

The results of this part of the analysis are consistent with several theories in the attachment literature. For example, it has been suggested that children with secure attachments may be protected from experiencing symptoms of psychopathology due to the type of internal working models that they form. Their internal working models are likely to foster a sense of competence in their ability to manage difficulties and in their capacity to elicit helpful responses from others in times of need (Pauli-Pott et al, 2007). In addition, the internal working models of more secure children and adolescents may allow them to freely explore the world and fully engage in enjoyable activities; thus encountering more positive life experiences and developing a greater sense of psychological well-being (Allen & Land, 1999).

Closely linked to theories about the development of internal working models is the idea that children develop different strategies for affect regulation depending on their experiences with the primary care-giver. The finding of the present study that children and adolescents with more secure attachments tend to have fewer concurrent internalizing problems and fewer concurrent externalizing problems is consistent with theories of affect regulation and attachment. The type of affect regulation strategies used by children with secure attachments may be better at protecting them from experiencing symptoms of psychopathology than the strategies used by children with less secure attachments. For example, children with secure attachments are likely to seek comfort and support in times of distress and to feel reassured by the comfort and support that they receive (Ainsworth et al, 1978). On the other hand, hyperactivating strategies which are thought to be used by children with insecure-ambivalent attachments, may increase their experience of internalizing and externalizing problems as they involve hyper-vigilance to threat and intensification of distress (Allen and Land, 1999). In addition, preoccupation with gaining the attention of the primary care-giver may impede exploration and the chance to develop affect regulation skills by other means (Rosenstein and Horowitz, 1996). Deactivating strategies, which are thought to be used by children with insecure-avoidant attachments may increase the experience of externalizing problems in particular, as they

involve distraction from the experience of internal emotional distress (Allen and Land, 1999). Therefore the finding that greater attachment security is associated with less concurrent psychopathology may be explained by the fact that affect regulation strategies optimal for the development of healthy psychological functioning are more likely to be used by children with secure attachments.

The results may also be interpreted in terms of secure children having a better understanding of their own and other people's emotional states – therefore a greater capacity for reflective function (Fonagy and Target, 1997). It was beyond the scope of the present study to explore whether there is an association between better mentalizing abilities and more secure attachments and also whether mentalizing ability in children and adolescents is related to the level of parental attunement. However, Fonagy and Target (1997) have suggested that a child's ability to mentalize develops as a result of attuned parenting (i.e. where a child grows in an environment knowing their needs will be met through consistent, reliable parental responsiveness) and that attachment security is likely to be associated with a greater capacity for reflective function. As the securely attached child's cognitive abilities develop, they are more able to reason and make use of alternative hypotheses for understanding behaviour in themselves and others. This reduces the need for reacting at a purely emotional level. Therefore, a greater mentalizing ability may contribute to an understanding of the evidence provided in the current study that a greater level of attachment security is associated with a fewer symptoms of psychopathology in children and adolescents.

Recent and novel developments in the area of neurobiology may offer further information with regard to the association between attachment security and psychopathology. This is a very complex topic and it is beyond the scope of the present study to provide a detailed account of this area. However, in basic terms it has been proposed that emotional intelligence depends heavily on the functioning of the right brain and that the development of the right brain relies on the formation of a secure attachment. Thus it is suggested that there is a direct link between attachment security, efficient right brain development and adaptive mental health. In contrast, insecure attachment may lead to

inefficient right brain development, compromised emotional development and therefore less optimal mental health (Shore, 2001). As a consequence of ineffective right brain development, children with insecure attachments may either fail to activate neuro-chemical stress responses when they are needed or may fail to terminate them and return to homeostasis when they are no longer required (Shore, 2001). In addition children with insecure attachments may have a compromised ability for neural integration of the left and right hemispheres of the brain, which is thought to be essential for psychological resilience and emotional health (Siegel, 2001).

4.2.3 Results Arising from the Moderator Analysis

4.2.3.1 Type of Problem Assessment

While the results for both problem dimensions were very similar, there was a slightly larger association between attachment security and externalizing problems than there was for attachment security and internalizing problems for cross-sectional studies. It seems likely that this may be due to the greater difficulty involved in identifying internalizing problems in contrast to externalizing problems, as they tend not to be expressed so overtly. In light of this, it might be expected that there would have been a smaller association between attachment security and internalizing problems for assessments that involved mother-report as opposed to assessments that involved self-report of problems. Inconsistent with this explanation, ‘type of problem assessment’ was not found to be a moderator variable and therefore there was not a reliable difference between the mean effect sizes for self-report and for mother-report of problems. Nevertheless, children and adolescents reporting on their own internalizing problems may also find it difficult to recognize or consciously acknowledge their symptoms and distress, particularly in the case of children and adolescents with an insecure-avoidant attachment style (Berger et al, 2005). Therefore, irrespective of whether internalizing problems are assessed by self-report or mother-report, they may be less likely to be identified than externalizing problems.

4.2.3.2 Attachment Figure

For cross-sectional studies the magnitude of the effect size for attachment security and both types of psychopathology was greater for assessments that measured attachment specifically to the mother rather than assessments that measured a general attachment state of mind. One explanation for this may be that in younger children it is less valid and relevant to measure an attachment state of mind as their attachment experiences may not yet have fully progressed to the level of representation. However, it should be noted that there was greater heterogeneity in the ‘attachment state of mind’ group (especially for externalizing problems), which suggests that there may be a third unidentified variable that contributed to the smaller effect size for this group. One possibility is that a ‘general attachment state of mind’ is a rather abstract concept and therefore the various measures designed to assess this may not tap into the same construct.

4.2.4 Residual Variability

The moderator analyses for externalizing problems showed that there was residual variability within a number of variables. For example, the moderator analysis investigating ‘type of externalizing psychopathology assessment’ (e.g. self-report versus mother report) found remaining variability within the mother-report group, which was not accounted for by sampling-error alone. This suggests that there were other sources of variance within the mother-report group that were not possible to identify. One theory is that the type of assessments that comprised this group may have varied in the way that they measured externalizing problems. Another possibility is that there were differences between the mothers who completed the measures, which affected their responses to the questions.

Residual variability was low for each of the moderator analyses carried out for attachment security and concurrent internalizing problems. However, one must bear in mind that because of the relatively small sample sizes one cannot fully rely on the conclusion that other unidentified moderators are not relevant.

4.2.5 Direction of Causality

The results of this part of the analysis provided evidence for a link between attachment security and psychopathology. However, it should be kept in mind that it is impossible to determine the direction of causality in cross-sectional studies. Although it may seem to make more theoretical sense that greater attachment security allows children and adolescents to manage their emotions in a manner that does not cause them as much psychological distress, it is also possible that greater levels of psychopathology may interfere with the attachment relationship thereby causing less secure attachments.

4.3 Prospective Relationship between Attachment Security and Psychopathology

4.3.1 Main Findings

Further clarity regarding the issue of causality was obtained by synthesising the available prospective studies investigating attachment security and psychopathology. In line with theoretical expectations, the results of the prospective meta-analysis found that attachment security was negatively associated with later internalizing problems. Surprisingly though, the magnitude of the correlation was only small ($r = -0.17$). The association between greater attachment security and a lower level of later externalizing problems was even smaller ($r = -0.09$) and the lower limit of the 95% Confidence Interval was close to zero. In addition, for externalizing problems there was a reliable difference between the mean effect size for cross-sectional studies and the mean effect size for prospective studies.

4.3.2 Explanations for Findings

The rather small effect sizes may be somewhat surprising given that it has often been reported that the level of attachment security in children and adolescents is likely to have a negative association with later psychopathology (Kobak et al, 2006). There are several

possible explanations for this and for the finding that the effect sizes were larger for cross-sectional studies.

One explanation may be related to help-seeking behaviour. When parents encounter difficulties with their children they are likely to seek help and advice from friends, relatives, teachers, professionals, books and the internet. In addition, other significant people in the child's life (such as teachers) may also take steps to address the child's identified difficulties. A likely outcome of help-seeking behaviour and intervention (especially in non-clinical samples – which were the majority in the present study) is an improvement in the child's difficulties. Therefore, the correlation between attachment security and psychopathology may be expected to weaken over time. Given that externalizing problems are more readily identified and have greater social implications than internalizing problems it may be the case that this type of problem is more likely to be addressed. This is consistent with the finding that the difference between the mean effect sizes for cross-sectional studies and prospective studies was greater for externalizing problems than for internalizing problems.

A related explanation concerns the notion of spontaneous recovery. As noted by Wessely (2007) many psychological difficulties improve of their own accord without any treatment or intervention. If there was spontaneous improvement in the symptoms of internalizing and externalizing problems then the correlation between attachment security and psychopathology would weaken over time.

Selective attrition is another factor that may have weakened the strength of the relationship between attachment security and psychopathology over time. Children with more severe symptoms of psychopathology may have been more likely to drop out of the studies over time. This would have affected the validity of the results and lead to a false conclusion of a weakened relationship between attachment security and psychopathology over time.

The findings of the current meta-analysis may have been affected by the type of assessments that were used to measure internalizing and externalizing problems. The majority of studies used the Child Behaviour Checklist (Achenbach and Rescorla, 2006) and while this is a widely used and validated instrument, it has been suggested that it may lack sensitivity to identify less serious problems. For example, Merrell (2003) stated that while the behavioural descriptions on the scales seem to be highly relevant for a clinical population, they may be less applicable to the type of behavioural and emotional problems seen on a day-to-day basis in non-clinical samples. Therefore, given that the majority of participants included in the current meta-analysis were from non-clinical populations, a stronger relationship between attachment security and both internalizing and externalizing problems may have been detected if more sensitive and appropriate assessment measures were used.

It has been suggested that one particular type of insecure attachment, namely disorganized attachment, is most likely to be associated with later psychopathology. While children with insecure-avoidant and insecure-ambivalent attachments may not develop the most optimal affect regulation strategies, they are at least thought to be able to employ some strategies that are effective in managing their emotions in some contexts. In contrast, children with disorganized attachments are not thought to have developed any successful and coherent affect regulation strategies (Child Psychotherapy Trust, 2002) and it is thought that this is likely to leave them vulnerable to experiencing greater symptoms of psychopathology as they mature. The finding that there was only a very small association between greater attachment security and a lower level of later externalizing problems may be explained by the fact that the present study did not consider the particular category of disorganized attachment. Van Ijzendoorn et al (1999) did find a link between disorganized attachment and externalizing problems, which may provide some evidence for the theory that disorganized attachment is predictive of externalizing problems; however a distinction was not made between cross-sectional studies and prospective studies. Therefore the question of whether it is disorganized attachment in particular that is predictive of later externalizing problems rather than less secure attachment per se, remains unanswered.

4.4 Relationship between the Mean Effect Size Correlations for Internalizing and Externalizing Problems

Across all studies that measured both types of psychopathology, there was a strong relationship between the effect size correlations for internalizing and externalizing problems. These results suggest that less secure attachments in children and adolescents are not associated with particular types of problems, but rather that there is a link between less secure attachments and psychopathology in general. It would be interesting for future studies to investigate this further by comparing the association between particular classifications of insecure attachments and internalizing problems with the association between particular classifications of insecure attachment and externalizing problems. This would be important in relation to theories that suggest, for example that children with insecure-avoidant attachments are more likely to exhibit externalizing symptoms due to their tendency to avoid internal distress.

4.5 Limitations of the Study

While the present study provides an important contribution to the literature on attachment and psychopathology, a number of limitations should be noted.

4.5.1 Potential Sources of Bias

As with any research, there were several sources of potential bias in the present meta-analysis. The first relates to the search strategy that was employed. For example, electronic data-base searches were conducted only within the title of the reference and while this strategy was likely to produce the *most relevant* studies, it may have failed to identify *all relevant* studies. However, the aim of any meta-analysis cannot be to identify all pertinent research; the most important factor is to ensure as far as possible that the set of included studies are a representative sample (Durlak et al, 2003). A large number of references were excluded despite using a comprehensive set of search terms, which indicates that conducting wider searches was unlikely to produce many more relevant

studies. Furthermore, there is no reason to believe that the methodology and results of any additional studies, identified from a wider search strategy, would differ significantly from the set of studies included in the present meta-analysis.

Another potential source of selection bias related to the fact that it was beyond the scope of the present study to include dissertations. Nevertheless, again it is unlikely that this introduced a bias to the results as it seems doubtful that the design and outcome of dissertation studies would be significantly different from the set of included studies.

A common source of potential bias in meta-analytic studies is known as publication bias. This refers to the fact that studies which find statistically significant results have more chance of being published as they are often considered more interesting. The publication bias analyses carried out in the present study showed that the results of unpublished studies were unlikely to have affected the findings of the current meta-analysis.

4.5.2 Selection Criteria

Stringent inclusion and exclusion criteria were employed, which may be considered both a strength and limitation of the present study. By using strict criteria, such as only including studies that assessed attachment to the mother or a general attachment state of mind, the likelihood of comparing apples and oranges was reduced. This is a common criticism of meta-analyses and therefore it was important to attempt to address this issue as far as possible. However, in doing so, the number of studies that could be included was reduced, which may have affected the power of the analyses.

4.5.3 Coding

Due to the relatively small number of included studies, it was necessary to give the same code to a number of items which may have been of questionable similarity. For example, mother-report questionnaires; interviews of the target person; and verbal responses to a task by the target person were all coded as 'other' for the variable 'type of attachment

assessment'. This limitation was an unavoidable consequence of the diverse range of methods employed to assess attachment, in combination with the relatively small number of studies. Nevertheless, it is important to bear this limitation in mind when interpreting the results.

4.5.4 Restriction of Range and Operationalization

The constructs of attachment security and insecurity have typically been operationalized in terms of the categories used in Ainsworth's Strange Situation Procedure. With this in mind, studies that used a continuous measure of attachment security may have suffered from restriction of range, in that the attachment scale may not have been wide enough to encompass the construct of insecure attachment. Therefore it is not necessarily the case that the negative correlation between attachment security and psychopathology found in the present meta-analysis indicates that there is also a positive correlation between attachment insecurity and psychopathology. In other words, a child with a low score on an attachment measure that is restricted in range may only be said to have a *less secure* attachment rather than an *insecure attachment*. The problem of range restriction means that the results presented in this study may only provide information about attachment *security* and psychopathology and may have little or nothing to say about *insecure* attachment and psychopathology. While this is a possibility, a third of the included studies employed the Strange Situation Procedure as the attachment measure. Therefore these studies at the very least would have captured the construct of insecure attachment in addition to attachment security.

A related issue is that some studies employing a categorical measure of attachment included the disorganized classification and others did not. It has been proposed that disorganized attachment (which is a particular type of insecure attachment) is most likely to be linked with psychopathology rather than the other types of insecure attachment. It would have been interesting to perform a moderator analysis to determine whether or not there was a larger correlation between attachment security and psychopathology for studies that included disorganized attachment than for studies that did not. Unfortunately

this was not possible due to the relatively small number of studies employing a categorical attachment assessment.

4.6 Contribution to the Existing Research Base

The present study contributes in important ways to the existing evidence base concerning attachment and psychopathology. To the author's knowledge the present study is the most comprehensive and thorough consolidation of the available evidence on the link between attachment security and psychopathology to date. Perhaps most importantly, the current study is the first to use meta-analytic techniques to investigate the link between attachment security and internalizing problems. Externalizing problems have typically received more research attention than internalizing problems (Mesman et al, 2001) and it is only in recent years that more research has become available investigating the link between attachment security and internalizing problems. Therefore the finding that attachment security was related both to concurrent and later internalizing problems, as well as externalizing problems, is of particular interest. In addition, the current study suggests that however strong the association is between attachment security and externalizing problems, a similar strength of association is likely to be found between attachment security and internalizing problems in individual studies. Again, this is a novel finding and warrants further investigation in future studies. The present study was also the first to carry out separate meta-analyses for cross-sectional and prospective studies relating to attachment and psychopathology. These analyses produced interesting and surprising findings in relation to attachment security and the later development of externalizing problems, in particular. This indicates the need for further more detailed prospective studies investigating the predictive validity of attachment security for later externalizing problems in children and adolescents.

4.7 Clinical Relevance and Implications

The present meta-analysis found evidence for a link between greater attachment security and fewer internalizing and externalizing problems, both concurrently and prospectively in children and adolescents. These findings have important clinical implications in relation to the following areas:

- Developing effective prevention programs for infants identified as being at risk of developing symptoms of psychopathology.
- Informing treatment and intervention approaches for young people who are currently experiencing symptoms of psychopathology.
- Developing strategies for promoting and enhancing the psychological well-being of all children and adolescents whether or not they are identified as having clinically recognised mental health problems.

4.7.1 Infant Mental Health Services

In recent years, increased attention has been paid to the importance of evidence-based preventative services for infants at risk of developing symptoms of psychopathology. This may be connected to the fact that psychopathology (in particular externalizing problems) has been linked with significant social and economic costs (Kazdin, 1985, cited in Greenberg et al, 1997). Balbernie (1998) argued that without preventative services children from high risk families (including difficulties in the attachment relationship) are likely to grow up needing the input of additional services at the cost of the tax-payer. For example, there will be greater long-term demands in terms of financing social services, special education resources, unemployment benefit and prison services for these children as they progress through life. Therefore it is clear that developing successful early preventative services may not only benefit the individual but may also have wider reaching advantages for society and the economy. In addition,

attachment security is thought to be an intergenerational process whereby the attachment experiences of parents influence the attachment security of their own children (Slade et al, 2005, cited in Allen et al, 2008). Therefore intervening at an early age may also help future generations and prevent ongoing patterns of interactions from having negative long-term consequences.

In response to the growing awareness of the importance of preventative interventions an increasing number of Infant Mental Health Services are beginning to emerge. Balbernie (1998) suggested that Infant Mental Health Services should focus on infant development and attachment theory and aim to ‘...preserve, enhance or repair the attachment relationship between the infant (or toddler) and the parent.’ (Balbernie, 1998, p.39). He proposed that a standard Infant Mental Health Service would consist of the following components: assessment of the required assistance; emotional support; developmental guidance; infant-parent psychotherapy; and advocacy.

In terms of the preferred model of intervention, the majority of work in this area tends to be based on a systemic perspective that involves working with both the parent and infant together. For example, in the Haringey Parent Infant Psychology Service parents are observed interacting with their infants. They are then encouraged to develop an understanding of what the child is communicating and to pay attention to their own thoughts and reactions in relation to the infant. The origins of the parents’ thoughts and reactions are also explored in order to address the intergenerational aspect of attachment relationships. In this way, the parents are supported to develop their capacity for mentalization, which has been impaired as a result of their own attachment experiences (Kondel, personal communication). A systemic model is generally preferred over an individually focussed one as it is recognised that attachment difficulties arise from dyadic relationships and interpersonal processes affected by intergenerational patterns of relating.

4.7.2 Preventative Techniques and Interventions

A range of different therapeutic techniques and interventions have been developed with the aim of improving the parent-child relationship, thus increasing the child's resilience and promoting more positive psychological outcomes. One such intervention carried out in Holland was a skill-based training program aimed at enhancing maternal sensitivity in relation to infants aged between 6 and 9 months of age. Van den Boom (1995) carried out a study investigating the effectiveness of this intervention and found that at aged 3 years, children whose parents participated in the intervention had more secure attachments and showed fewer behaviour problems than children in the control group.

Another type of preventative intervention is psychodynamic infant-parent psychotherapy, in which the mother is supported to explore emotional difficulties from past relationships that may have an effect on her relationship with her infant. The aim of this is to interrupt the intergenerational re-enactment of detrimental (unconscious) parent-child interactions. The *relationship* is the focus of the work rather than the parent or child themselves. This is generally a long-term intervention as it requires exploration of the parent's childhood – often as far back as the pre-verbal stage (Balbernie, 1998). Lieberman and Pawl (2003) carried out an evaluation of this intervention and found evidence for improved infant attachment security and less anger and avoidance behaviour in the intervention group.

A third intervention is called the Watch, Wait and Wonder method. Parents are encouraged to interact with their child but are instructed to follow the child's lead completely. The aim of this is to allow the child to be able to explore their relationship with the parent. The parent is then supported to understand their own thoughts and feelings in relation to this experience; and to explore the origin of these in terms of their internal working model of relationships (Balbernie, 1998). In a comparison of this intervention with infant-parent psychotherapy, Cohen et al (1999) found that infants in the Watch, Wait and Wonder group were more likely to move towards a secure attachment than infants in the infant-parent psychotherapy group and were also better at regulating their emotions.

In recent years several interventions have been designed that make use of video feedback in order to facilitate the parent's exploration of their interactions with the infant. The first program to use in vivo video feedback was developed in a study of families with adopted children (Juffer, 1993, cited in Juffer et al 2008a). This intervention seemed to be effective in encouraging maternal sensitivity and promoting infant attachment security (Juffer et al, 2005b, cited in Juffer et al, 2008a). The Video-feedback Intervention to promote Positive Parenting (VIPP) is an elaboration of this program and was developed at the Centre for Child and Family Studies (Leiden University, the Netherlands). This program involves videoing the mother and infant at home during everyday interactions. The intervener and mother then review the video together with the purpose of focusing on positive interactions and encouraging more sensitive behaviours where insensitive behaviours are displayed (Juffer et al, 2008a). Several additional video feedback interventions have evolved from the VIPP, such as the Video-feedback Intervention to promote Positive Parenting with an additional focus on sensitive discipline (VIPP-SD) and the Video-feedback Intervention to promote Positive Parenting with additional representational discussions (VIPP-R) (Juffer et al, 2008a). All of these interventions are short-term in nature and involve approximately four to eight sessions. A study by Juffer et al (2008b) that involved adoptive families provided some evidence in support of the video-feedback intervention. In this study short-term improvements in maternal sensitivity and disorganized infant attachment were found. However, the results failed to show a long-term intervention effect. The authors concluded that booster sessions may be required in order to see long-term effects of the intervention.

Bakermans-Kranenburg et al (2003) carried out a systematic review of preventative interventions aimed at enhancing parental sensitivity and infant attachment security. They included a wide range of approaches from brief cognitive-behavioural programmes to long-term intensive psychosocial treatments. Based on 70 published studies of 88 interventions they found that randomized interventions were effective in changing insensitive parenting and infant attachment insecurity. The most effective interventions were shorter term; began after the infant was 6 months of age; and had a behavioural

focus. They also found evidence for a causal link between increased maternal sensitivity and increased infant attachment security.

While a range of preventative interventions have been developed and the number of infant mental health services is increasing, the area of infant mental health intervention is still in the early stages. The results of the present meta-analysis provided further support for the continued development of preventative interventions for infants considered at risk of developing less secure attachments and later psychopathology. Experimental evaluation of such preventative interventions may shed more light on their effectiveness as well as the direction of causality in relation to the association between attachment security and psychopathology.

4.7.3 Treatment Interventions

The present study suggests that attachment is a significant factor to consider in the development of effective treatment interventions for young people who are experiencing symptoms of internalizing and externalizing problems. The finding that attachment security is negatively associated with concurrent psychopathology suggested that it is important for mental health professionals, such as Clinical Psychologists, to recognise the significance of attachment theory in the formulation of clients' difficulties. In addition, it may be beneficial to develop intervention strategies that specifically aim to promote the development of more secure attachments in children and adolescents who are experiencing symptoms of psychopathology. Although there seems to be less progress in this area than in the area of preventative interventions, a small number of treatment interventions have been developed.

One example of a treatment intervention is the Circle of Security Project which involves small group sessions and video feedback to provide parent education and psychotherapy based on attachment theory (Marvin et al, 2002). The groups meet for 20 weeks with a psychotherapist and review videotapes of themselves interacting with their children. The content of the videos is discussed with the specific attachment patterns of each dyad in

mind. Hoffman et al (2006) carried out a study to investigate changes in toddler and pre-school children's attachment classifications from before the intervention to immediately afterwards. The results of this study showed that 44% of the children who were classified as having an insecure attachment pre-intervention shifted to a secure attachment immediately after the intervention.

A controversial treatment for children with attachment difficulties is known as holding therapy. This intervention is not based on a systemic model but rather views the child as the primary target of the intervention (Cline, 1979; Levy & Orlans, 1998, cited in Barth et al, 2005). Among other components it involves prolonged restraint of the child by the parents with the aim of assisting the child to progress through various stages, such as rage, acceptance and bonding (Crawford et al, 1986, cited in Barth et al, 2005). Proponents of this approach assert that this type of intense physical contact with the parent can promote a positive attachment relationship. However, holding therapy has come under strong criticism. It has been suggested that it is not based on attachment theory and is not an evidence based approach (Patterson & Fisher, 2002). More importantly, there are important ethical and legal considerations involved in purposefully restraining a child and it has been proposed that it is more likely to do harm than good (Saunders et al, 2003, cited in Barth et al, 2005). In addition the British Association for Adoption and Fostering concluded that '...there is nothing to justify or recommend the use of holding therapy as an intervention for attachment disorders...' (Simmonds, 2007, p.6).

It is clear that while the Circle of Security Project seems promising, further evidence-based treatment interventions with a focus on attachment are required. In addition, greater attention to attachment theory in the formulation and intervention of psychopathology in young people is warranted.

4.8 Recommendations for Future Research

A few recommendations for future research have already been suggested above. These shall be summarized below together and further recommendations shall be made.

It would be useful for future studies to investigate the relationship between particular classifications of insecure attachment and psychopathology. This would provide more clarity regarding the issue of whether insecure-avoidant attachment, insecure-ambivalent attachment; and disorganized attachment are differentially associated with internalizing and externalizing problems. This would be useful information for mental health professionals in terms of the formulation and intervention of clients' difficulties.

Further research is warranted to investigate the finding that the strength of association between attachment security and *internalizing* problems is strongly related to the strength of association between attachment security and *externalizing* problems in individual studies. It would be interesting for future studies to examine whether this link is caused by particular aspects of the study design or whether it is because children who experience more externalizing problems also tend to experience more internalizing problems. As internalizing difficulties tend to be more complex to identify than externalizing problems, it would have important clinical implications if it was found that the presence of externalizing problems may also indicate the existence of internalizing problems.

It should be noted that the majority of the participants in the present meta-analysis were from non-clinical populations. Despite this, an association was found between greater attachment security and fewer symptoms of psychopathology. For clinical populations there may be an even stronger negative association between these two variables. In the case of children identified as having psychological difficulties a more secure attachment may act as a protective factor and provide the child with greater resilience against developing even more serious difficulties. Further studies involving clinical samples are necessary in order to test this theory empirically.

There seems to be a lack of prospective studies investigating the relationship between attachment security and psychopathology; possibly due to the time and cost involved in this type of research. However, studies of this kind are important and could provide more information about the predictive validity of attachment in the development of later psychological problems. More prospective studies that are conducted over a longer period of time are warranted. In addition, both attachment and psychopathology should be measured at each time point in order to gain a clearer understanding of how these variables and the relationship between them may change throughout childhood and beyond.

Future research investigating the relationship between attachment and psychopathology should include detailed assessments of potential risk factors that may in combination with less secure attachments result in more psychological problems. For example, it would be interesting to include assessments that provide information about maternal mental health; life stressors; experience of domestic violence; and child temperament. This would provide more clarity around the issue of whether attachment security by itself is negatively associated with psychopathology, or whether a link is more likely to be found where other risk factors are also present. This would also help to identify protective factors against developing symptoms of psychopathology.

Further research is necessary in order to investigate the mechanisms that underlie the relationship between attachment security and psychopathology. For example, future studies may investigate whether a child's capacity for reflective function moderates or even mediates the relationship between the two variables. This is important as it only by gaining a clear understanding of the means by which attachment security is associated with fewer problems that effective intervention and prevention programmes can be developed.

Finally, the present study may be complemented by further meta-analyses that investigate the relationship between attachment security and other aspects of psychological functioning. For example, given that there are theories linking attachment security and

development of the brain, it would be useful to consolidate the available empirical evidence investigating the association between attachment security and cognitive development.

4.9 Conclusion

“As anyone who has ever planted a garden knows, you must first prepare the soil – make the soil fertile in order to foster health and growth. The same is true for children.... Attachment between child and caregiver(s) is a major aspect of....healthy functioning and development. It is as basic as food and water, necessary for healthy development of the body, mind, relationships, values, and spirit.” (Levy, 2000, pxiii).

Bowlby’s original concept of attachment has had a significant impact on the understanding of human development and functioning. A considerable amount of research has been conducted in order to empirically investigate and further understand the theory of attachment. However, it is only in more recent years that the theory has been used in the way that Bowlby initially intended – to inform the diagnosis and treatment of individuals and families with emotional problems. The present study focused the research in the direction that Bowlby originally intended by using meta-analytic techniques to consolidate the available empirical evidence on attachment security and psychopathology.

Cross-sectional and prospective studies were analyzed separately, as were internalizing and externalizing problems. The analyses found evidence for a link between attachment and both internalizing and externalizing problems and a stronger association was found for cross-sectional studies compared with prospective studies. Despite the study limitations the results provide an important contribution to the attachment literature and are of important significance for future research and clinical practice.

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APPENDICES

Appendix 1

Search Terms - PsycINFO

Database: PsycINFO <1967 to January Week 2 2009>

Search Strategy:

- 1 (attachment and psychopathology).m_titl. (87)
- 2 limit 1 to (english language and yr="1978 - 2008") (74)
- 3 (attachment and internal*ing).m_titl. (13)
- 4 limit 3 to (english language and yr="1978 - 2008") (11)
- 5 (attachment and external*ing).m_titl. (29)
- 6 limit 5 to (english language and yr="1978 - 2008") (27)
- 7 (attachment and 'behavi* disorder*').m_titl. (4)
- 8 limit 7 to (english language and yr="1978 - 2008") (3)
- 9 (attachment and 'disordered behavi*').m_titl. (3)
- 10 limit 9 to (english language and yr="1978 - 2008") (3)
- 11 (attachment and 'behavi* problem*').m_titl. (50)
- 12 limit 11 to (english language and yr="1978 - 2008") (47)
- 13 (attachment and 'problem behavi*').m_titl. (14)
- 14 limit 13 to (english language and yr="1978 - 2008") (13)
- 15 (attachment and 'behavi* adjust*').m_titl. (4)
- 16 limit 15 to (english language and yr="1978 - 2008") (4)
- 17 (attachment and 'behavi* function*').m_titl. (0)
- 18 limit 17 to (english language and yr="1978 - 2008") (0)
- 19 (attachment and 'emotion* disorder*').m_titl. (3)
- 20 limit 19 to (english language and yr="1978 - 2008") (3)
- 21 (attachment and 'emotion* problem*').m_titl. (1)
- 22 limit 21 to (english language and yr="1978 - 2008") (1)
- 23 (attachment and 'emotion* adjust*').m_titl. (7)
- 24 limit 23 to (english language and yr="1978 - 2008") (7)
- 25 (attachment and 'emotion* function*').m_titl. (5)
- 26 limit 25 to (english language and yr="1978 - 2008") (5)
- 27 (attachment and 'social* disorder*').m_titl. (0)
- 28 limit 27 to (english language and yr="1978 - 2008") (0)
- 29 (attachment and 'social* problem*').m_titl. (3)
- 30 limit 29 to (english language and yr="1978 - 2008") (3)
- 31 (attachment and 'social* adjust*').m_titl. (5)
- 32 limit 31 to (english language and yr="1978 - 2008") (4)
- 33 (attachment and 'social* function*').m_titl. (7)
- 34 limit 33 to (english language and yr="1978 - 2008") (7)
- 35 (attachment and 'psycholog* disorder*').m_titl. (1)
- 36 limit 35 to (english language and yr="1978 - 2008") (1)
- 37 (attachment and 'psycholog* problem*').m_titl. (0)

38 limit 37 to (english language and yr="1978 - 2008") (0)
39 (attachment and 'psycholog* adjust*').m_titl. (22)
40 limit 39 to (english language and yr="1978 - 2008") (21)
41 (attachment and 'psycholog* function*').m_titl. (8)
42 limit 41 to (english language and yr="1978 - 2008") (8)
43 (attachment and 'mental health').m_titl. (45)
44 limit 43 to (english language and yr="1978 - 2008") (43)
45 (attachment and 'behavi* well being').m_titl. (0)
46 limit 45 to (english language and yr="1978 - 2008") (0)
47 (attachment and 'emotion* well being').m_titl. (5)
48 limit 47 to (english language and yr="1978 - 2008") (5)
49 (attachment and 'social* well being').m_titl. (1)
50 limit 49 to (english language and yr="1978 - 2008") (1)
51 (attachment and 'psycholog* well being').m_titl. (14)
52 limit 51 to (english language and yr="1978 - 2008") (14)
53 32 or 26 or 2 or 48 or 42 or 22 or 18 or 46 or 30 or 16 or 44 or 6 or 50 or 28 or 40 or
36 or 12 or 14 or 20 or 52 or 38 or 8 or 4 or 34 or 24 or 10 (286)
54 from 53 keep 1-286 (286)

Appendix 2
Sample of Excel Spreadsheet

FIRST AUTHOR	YEAR	SOURCE	ABSTRACT YES NO POSS	ABSTRACT REASON	NOTES	OBTAINED?	PRINTED?	EXTRCTED INFO?	ARTICLE YES, NO, PENDING, NEEDS ES CALCULATED	ARTICLE REASON	ID.NO.
DeKlyen	1996	Peer reviewed journal	P	Research study but looks at mother's attachment towards their parents in relation to their own child's behaviour problems. May also look at relationship between child's problems and attachment but unclear		Obtained	Y	N/A	N	Does not provide data for attachment and psychopathology.	N/A
Easterbrooks	1993	Peer reviewed journal	Y	N/A		Obtained - Interlibrary loan	Y	Y	Y	N/A	30
Pierrehumbert	1996	Peer reviewed journal	Y	N/A	Possibly same sample as Pierrehumbert 2000 and Pierrehumbert 1998	Obtained - Interlibrary loan	Y	N/A	N	Same sample as Pierrehumbert (2000)	N/A

Sample of Excel Spreadsheet Continued

FIRST AUTHOR	YEAR	SOURCE	ABSTRACT YES NO POSS	ABSTRACT REASON	NOTES	OBTAINED?	PRINTED?	EXTRCTED INFO?	ARTICLE YES, NO, PENDING, NEEDS ES CALCULATED	ARTICLE REASON	ID.NO.
Racanelli	2005	Peer reviewed journal	N	Research study but does not look at the relationship between attachment and psychopathology	Same sample as Racanelli 2005						
Ramos-Marcuse	2001	Peer reviewed journal	Y	N/A		Obtained	Y	N/A	N	Only includes teacher report of behaviour problems	N/A

Appendix 3

Table for Extracting Information – Study Characteristics

STUDY NO.	FIRST AUTHOR	YEAR	AIM OF STUDY	SOURCE	DESIGN
43	Roelofs	2006	To investigate the relationships between negative family factors such as insecure attachment and adverse parental rearing, and internalizing and externalizing symptoms.	Peer reviewed journal: Journal of Child and Family Studies	Cross sectional
44	Rekart	2007	To evaluate models investigating reported family environment during childhood, current attachments, control-related cognitions, and current symptoms of emotional disorders in adolescence.	Peer reviewed journal: Cognitive Therapy and Research	Cross sectional
45	Ronnlund	2006	To examine the relation between dimensions of attachment and internalizing and externalizing problems in 15 to 16 year old adolescents.	Peer reviewed journal: Journal of Genetic Psychology	Cross sectional

Table for Extracting Information – Participant Characteristics

STUDY NUMBER	TOTAL N (N); MALE N (M); FEMALE N (F)	CHILDREN / ADOLESCENT SAMPLE	SAMPLE CHARACTERISTICS	PARTICIPANT CHARACTERISTICS	PARENT / CARER CHARACTERISTICS
43	N = 237 (before attrition) N = 230 (after attrition) M = 114 (before attrition) F = 123 (before attrition)	Child	Recruited from four primary schools in the southern part of The Netherlands Non-clinical	Age: Range = 9-12 years Mean = 10.5 years SD = 1.0 Ethnicity: Caucasian = more than 90%	None reported
44	N = 214 (after attrition) M = 89 (after attrition) F = 125 (after attrition)	Adolescent	Recruited from the class lists of two introductory psychology courses at Northwestern University. Non-clinical	None reported	None reported
45	N = 62 (after attrition) M = 26 (after attrition) F = 36 (after attrition)	Adolescent	Recruited from three classes in a secondary school in Umea, a city in northern Sweden. Non-clinical	Age: Range = 15-16 years Ethnicity: Caucasian = >90%	Social status: Upper middle-class = 13% Lower middle class = 67% Working class = 20%

Table for Extracting Information – Assessment Characteristics

STUDY NO.	ATTACHMENT ASSESSMENT					PSYCHOPATHOLOGY ASSESSMENT			
	Name of Assessment	Attachment to Whom?	Categorical (and categories) / Continuous	Age at Time of Assessment	Completed by	Name of Assessment	Type of Psychopathology Assessed	Age at Time of Assessment	Completed by
43	The Relationship Questionnaire for Children (RQC)	Mother	Categorical (secure, fearful, preoccupied, dismissing). For analysis only secure versus insecure was used.	10.5	Self-report	The Revised Child Anxiety and Depression Scale (RCADS)	Anxiety and depression (internalizing problems)	10.5	Self-report
						Self-report version of the Teacher Rating Scale of Aggression (TRA)	Aggression (externalizing problem)	10.5	Self-report
44	Adult Attachment Scale	General Attachment State of Mind	Continuous	Not reported	Self-report	Mood and Anxiety Symptom Questionnaire (MASQ)	General distress / Negative Affect (internalizing problems)	Not reported	Self-report
45	Attachment Style Questionnaire (ASQ)	General Attachment State of Mind	Continuous	15.5 years	Self-report	Youth Self-Report	Internalizing and externalizing behaviour	15.5 years	Self report

Table for Extracting Information – Results

STUDY NO.	ES ID	CONSTRUCT ANALYSED	TYPE OF ANALYSIS (e.g. correlation, mean difference etc.)	EFFECT SIZE MEASURE (e.g. r, d, odds ratio, etc.)	EFFECT SIZE	P-VALUE
43	69 70	Secure versus insecure attachment with: Internalizing problems Externalizing problems	ANOVA ANOVA	Eta squared Eta squared	.03 .04	p = ? p = .002
44	71	Attachment security with general distress / negative affect (internalizing problems)	Correlation	r	-.50	p<.05
45	72 73	Attachment security (Confident dimension) with: Internalizing Externalizing	Correlation Correlation	r r	-.32 -.02	p<.05 ns

Appendix 4

Information Extracted from Studies

Information extracted for study characteristics included:

- Author.
- Year of publication.
- Source of publication
- Aim of study.
- Design of study (e.g. cross-sectional, prospective or retrospective).

Information extracted for participant characteristics included:

- Total number of participants.
- Gender (number of males and females).
- Sample characteristics (clinical or non-clinical).
- Ethnic origin.
- Birth order.
- Family background (e.g. living with both parents, parents divorced / separated, death of parent).
- Parent / carer characteristics (socioeconomic status, age of mother, age of father).

Information extracted for assessment characteristics included:

- Name of attachment assessment.
- Assessment to a specific person (e.g. attachment to mother, father, peers) or general attachment state of mind.
- Continuous or categorical measure of attachment.
- Age of child / adolescent at the time of the attachment assessment.
- Type of attachment assessment (e.g. self-report questionnaire, mother-report questionnaire, observation of children / adolescents and coded by researchers, task carried out by children / adolescents and coded by researchers).

- Name of psychopathology measure.
- Type of psychopathology assessed (e.g. internalizing, externalizing, social functioning difficulties).
- Age of the child at the time of the psychopathology assessment.
- Type of psychopathology measure (e.g. self-report questionnaire, mother-report questionnaire, observation of child / adolescent and coded by researchers, interview of child / adolescent and coded by researchers).

Information extracted for the results table included:

- Construct analysed (e.g. secure versus insecure attachment with internalizing problems; organized versus disorganized attachment with internalizing problems; secure versus insecure attachment with externalizing problems etc.).
- Type of analysis (e.g. correlation analysis, analysis of mean difference between groups)
- Effect size measure (e.g. Pearson's r , Spearman's ρ , Cohen's d etc.).
- Effect size (if no effect size was given a note was made to indicate what information was provided that could be used to calculate an effect size).
- P-value.

Appendix 5

Coding Scheme

STUDY

Study Id

Give each study a unique ID number.

Authors

Name of the authors. If two authors record them both. If more than two record first authors name with et al.

Year

Publication year

Time frame

Cross sectional (attachment measure and psychopathology measure taken at the same time point) = code 1

Prospective (attachment measure taken at one time point and psychopathology measure taken at a later time point) = code 2

Retrospective (attachment measure taken at one time point and psychopathology measure taken at an earlier time point) = code 3

Other = code 4

Time interval between attachment assessment and psychopathology assessment

Number of months between the two assessments

PARTICIPANTS

Gender

% of males

Birth order

% first born

Siblings

Number of siblings

Clinical or non clinical

Clinical (any sample where the children are recruited from a service for mental health problems) = code 1

Non-clinical (any sample that is not recruited from a service for people with mental health problems) = code 2

Not reported = 3

Offenders (e.g. prison sample) = 4

Clinical status of mother

Clinical sample = code 1

Non-clinical sample = code 2

Mixed (some participants clinical, some not) = code 3

Age of mother

Report mean age in years to two decimal places.

Age of father

Report mean age in years to two decimal places

Socioeconomic status of parent

Predominantly lower class = code 1

Predominantly middle class = code 2

Predominantly upper class = code 3

Family Background

% of parents married

ATTACHMENT ASSESSMENT

Name of assessment

Strange Situation (including variations of) = code 1

Adult Attachment Interview (including variations of) = code 2

Inventory of Parent and Peer Attachment (including variations of) = code 3

Separation Anxiety Test (including variations of) = code 4

Reunion Rating Scale (including variations of) = code 5

Revised Adult Attachment Scale (including variations of) = code 6

Parent / Child Reunion Inventory (including variations of) = code 7

Adolescent Attachment Questionnaire (including variations of) = code 8

No name = code 9

Manchester Child attachment story Task (including variations of) = code 10

The Relationship Questionnaire for Children (including variations of) = code 11

Attachment Style Questionnaire (including variations of) = code 12

Attachment Q Set = code 13

Type of assessment

Observation of behaviour = code 1
Verbal responses to a task = code 2
Interview of target person = code 3
Self-report questionnaire = code 8
Mother report questionnaire = code 9

Attachment to whom

Mother = code 1
General attachment state of mind = code 6

Categorical or continuous assessment

Continuous = code 1
Categorical = code 2

Direction of continuous attachment measure (if continuous measure of attachment)

Higher score means more secure = code 1
Lower score means more secure = code 2

Direction of categorical attachment measure

Higher score is secure = code 1
Lower score is secure = code 2

Age at time of attachment assessment

Mean age in years to two decimal places.

PSYCHOPATHOLOGY ASSESSMENT

Name of assessment

- Child Depression Inventory (including variations of) = code 1
- Child Behaviour Checklist (including variations of) = code 2
- Preschool Behaviour Questionnaire (including variations of) = code 3
- Youth Self-Report (including variations of) = code 4
- Adolescent Self-Perception Profile (including variations of) = code 5
- Nijmegen Problem Behaviour List (including variations of) = code 6
- Strengths and Difficulties Questionnaire (including variations of) = code 7
- Dimensions of Depression Profile (including variations of) = code 8
- Depressive Mood List (including variations of) = code 10
- Eyberg Child Behaviour Inventory (including variations of) = code 11
- Child Anxiety and Depression Scale (including variations of) = code 12
- Teacher Rating Scale of Aggression (including variations of) = code 13

Type of assessment

- Interview of target person = code 1
- Interview of mother about target person = code 2
- Self-report questionnaire = code 7
- Mother report questionnaire = code 8

Type of psychopathology

- Internalizing = code 1
- Externalizing = code 2

Direction of psychopathology measure

- Higher score means greater psychopathology = code 1
- Lower score means greater psychopathology = code 2

Age at time of psychopathology assessment

Mean age in years to two decimal places.

RESULTS

Effect size ID

Give each effect size a unique ID number.

Sample size

Total sample size (use sample size after attrition if this is reported).

Effect size measure

Pearsons r = code 1

Spearman's rho = code 2

Eta = code 3

Point biserial = code 4

Eta squared = code 5

Cohen's d = code 6

Effect size

Size of the effect - reported to two decimal places.

Appendix 6

Project Team:

Caroline Goldstein

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Eusebyu Constantin