A cognitive perspective on attachment: The functioning of the internal working model and connections with the cognitive schema theory

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Proefschrift ingediend tot het behalen van de academische graad
van Doctor in de Psychologie

2009

Adesso vieni qui

E chiudi dolcemente gli occhi tuoi

Vedrai che la tristezza passerà

Il resto poi chissà

Verrà domani

(E non abbiam bisogno di parole – Ron)

Acknowledgements

Ook al is dit de eerste tekst uit dit doctoraat die u tegenkomt, toch is dit voor mij het laatste schrijfsel dat een punt zet achter een vier jaar durende periode die als een sneltrein is verlopen en op meer dan één vlak een beproeving is geworden. Dit eindproduct is enkel maar tot stand kunnen komen dankzij de hulp, de steun, de vriendschap, en de samenwerking met onnoembaar veel vrienden, collega's en ex-collega's. Terugkijkend op die periode, heeft het schrijven van dit doctoraat een onbeschrijfelijk gevoel van existentiële integratie en coherentie gegeven: alsof alle ervaringen, contacten, gesprekken, en gebeurtenissen van de voorbije jaren rechtstreeks of onrechtstreeks noodzakelijk waren om op dit punt aan te komen. Het is onbegonnen werk om alle mensen op te sommen zonder wie dit werk niet tot stand was gekomen en om goed uit te drukken hoe dankbaar ik hen wel ben. Maar voor alle duidelijkheid, ik voel me een gelukzak dat ik al die mensen heb mogen leren kennen en ik kijk nu al uit naar de volgende keer dat we elkaar zien. Hoewel dit dankwoord eigenlijk voor iedereen is, wil ik graag een aantal mensen heel expliciet vermelden omdat ze op een of andere manier een bijzondere bijdrage hebben geleverd.

In eerste instantie wil ik graag mijn promotor bedanken. Caroline heeft om verschillende redenen een essentiële bijdrage geleverd. Een paar jaar voor ik aan dit onderzoek begon, had ik eigenlijk uitgemaakt dat ik niet wilde doctoreren, dus zonder haar enthousiasme en aanmoediging was ik hier nooit aan begonnen. Bovendien heeft ze me op verschillende momenten de voorbije vier jaar ongelofelijk veel vertrouwen geschonken. Eerst en vooral heb ik zelf helemaal vrij mijn onderzoeksonderwerp mogen kiezen, ik heb dit onderzoek mogen uitbouwen zoals ik zelf wou en ik heb dit mogen doen op mijn manier. Maar daarenboven weet ik dat ze een somtijds koppige en somtijds te enthousiaste of te betrokken doctoraatsstudent heeft gehad met meer oog voor

het geheel dan voor de details. Ik vind dan ook dat het getuigt van erg veel vertrouwen dat ze er altijd opnieuw in geslaagd is vooral het stuk enthousiasme en betrokkenheid te zien. Daarnaast heb ik de voorbije jaren op onderzoeksvlak heel veel geleerd van Caroline. Ik bewonder bovenal haar talent om onderzoeksresultaten in verband te brengen met theorieën en om daarover klinisch relevante conclusies te trekken op een gestructureerde en logische wijze, zonder denkstappen over te slaan. Ik heb veel geleerd en heel erg genoten van het samen denken en discussiëren. Tenslotte heb ik Caroline leren kennen als een promotor met een warm hart voor al haar medewerkers, die ontzettend veel begrip en empathie kan tonen op de momenten dat je er net het meeste nood aan hebt. Caroline, het was echt fijn en je bent super bedankt!

Ik wil Prof. Dr. Rudi De Raedt, Prof. Dr. Wim Beyers, en Prof. Dr. Herbert Roeyers, de leden van mijn begeleidingscommissie, bedanken voor alle hulp de voorbije jaren bij het uitwerken van het doctoraatsproject. Wim bedank ik voor alle LISREL hulp, en voor zijn inzet bij het nalezen van de manuscripten en zijn steeds rake suggesties. Rudi zal in mijn herinneringen ook steeds onlosmakelijk verbonden zijn met dit doctoraat. Ik heb genoten van het samen uitzoeken van onderzoeksparadigma's, van de statistische en theoretische discussies over onderzoeksresultaten, van zijn onbegrensd enthousiasme, en van zijn warme betrokkenheid. Daarnaast wil ik ook graag alle leden van mijn informele begeleidingscommissie bedanken. Ernst voor alle hulp met het experimenteel onderzoek en voor alle steun. Marieke voor onze urenlange discussies over hechting, visies over hechting en hechtingsonderzoek, voor het nalezen, haar eerlijke meningen, en alle plezier.

Na 8 jaar in het werkveld is het onmogelijk om alle vrienden en fijne collega's en ex-collega's bij naam op te noemen en te bedanken. Ik denk dan in het bijzonder aan professor Paul De Boeck, mijn eerste bureaugenoot ooit, die me heeft warm gemaakt voor onderzoek en van wie ik zoveel heb mogen leren over statistiek. Aan de ex-collega's van KPC, aan Jan en aan de lieve mensen

van Leefgroep 2 waar ik met zoveel spijt afscheid van genomen heb, aan Harriet met wie ik zo intens en fijn heb samengewerkt, en aan Sven voor de eindeloze stroom aan klinische onderzoeksplannen en de emo-carousel. Aan de collega's en ex-collega's van Gent zoals onder meer Thierry, Jan, Veerle, Els, Benedikte, Ellen, Leen, Let, Lien, Sandra, Katrijn, Liesbet, en al de collega's van de vakgroep. Aan Let, Johan, en Helga voor het nalezen en aan Bart voor de hulp bij de lay-out en omdat hij al van mijn kindertijd de beste vriend is die je u maar kan voorstellen. Ik denk ook aan alle vrienden van wie ik dit laatste, moeilijke, jaar zoveel steun heb gehad: Kristin, Steven, Romain, Ronny voor de mental en physical coaching, Pascal dankzij wie er ook zoveel plezier was dit jaar, en tenslotte de vrienden van de Lo.

Omdat dit doctoraat handelt over hechting, lijkt het me dan ook niet meer dan gepast om te eindigen met het in de bloemetjes te zetten van mijn belangrijkste hechtingsfiguren. Tinne, ondanks het feit dat ze ook mijn onveilige hechtingsschema's heeft geactiveerd, voor alle geloof en liefde gedurende de vorige jaren. En dan de engel die uit het niets kwam. De liefde en steun van Rozemarijn zijn een nieuwe secure base geworden zonder dewelke ik dit doctoraat nu niet had kunnen voltooien. Ik zie haar graag om alles wat ze is. Mijn ouders, Els, en Ann dank ik voor alle onvoorwaardelijke liefde, geloof, en steun die ze me al 32 jaar onbaatzuchtig hebben geschonken. Mijn vader voor zijn stand houden in moeilijke tijden, omdat hij mij aan de telefoon, terwijl ik stond te wachten bij de apotheker, heeft overtuigd om aan dit doctoraat te beginnen, voor het plezier en de interesses die ik met hem heb kunnen delen, voor het geluid van de éénklappende hand in de Colli. Mijn moeder voor alle inspanningen, troost, liefde, plezier, en volharding. Maar bovenal voor het voorbeeld dat ze mij geeft, omdat ze zo moedig niet opgeeft en omdat ze, ondanks dat het voor haar moeilijk is, toch meteen weer helemaal mijn mama is op het moment dat ik ze nodig heb. Ik kan deze twee lieve mensen onmogelijk genoeg bedanken voor alles wat ze de voorbije jaren gedaan hebben.

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Chapter 1

General introduction

And of the objects which are being carried in like manner they would only see the shadows?

(Plato, Politeia, 427-348 BC)

The internal working model is a fundamental concept within attachment theory, necessary to explain why early parent-child interactions influence later functioning (Bowlby, 1969; Cassidy, 1999). According to attachment theory, children are intrinsically motivated to be close to their attachment figures to help them regulate aversive emotional experiences. The internal working model was described as a mental representation that develops as a result of the continuing experience with the care provided by these attachment figures (Bowlby, 1969). In spite of its vital role in the ontogenetic development of the attachment system, the concept was not thoroughly defined, which has made it hard to deduce testable hypotheses (Hinde, 1988; Rutter, 1995). Therefore, the internal working model has remained an understudied and poorly understood construct (Waters & Waters, 2006), unable to explain how individuals cognitively represent different attachment relationships, why evidence for the expected cross-temporal stability is not always strong, which is the content of the internal working model, and whether and how internal working models guide the cognitive processing of attachment-related information.

This dissertation aims to increase our understanding of internal working models. The studies were designed to investigate three important questions. Firstly, we investigated the assumption that the relation between parent-child interactions and psychopathology can be explained by the associated attachment quality. For this purpose, we investigated the mediating role of attachment on the link between negative parenting styles and externalizing behaviour problems (Chapter 2) and between excessive punishment and internalizing behaviour problems (Chapter 3) in adolescence. Attachment theory suggests that a mediation effect of attachment should be due to the influence of the internal working model (Bowlby, 1969/1982).

Secondly, to increase our understanding on the nature of the internal working model, we followed recent developments within the attachment literature suggesting that this construct might better be conceptualized as a

cognitive schema (Bretherton, 1990; Waters & Waters, 2006). Cognitive schema theory has assumed that early maladaptive schemas influence the development of psychopathology (Young, 1990). Such schemas are formed early in life based on frequent less favourable relational experiences that influence later relationships. This cognitive schema conceptualization is interesting as it leads to very clear predictions regarding information processing (Beck, 1964, 1983). In order to link the internal working model to the cognitive schema concept, we first investigated whether the association between individual differences in attachment quality and psychopathology can be explained by the early maladaptive schemas (Chapter 4). In a next step, we have investigated the important prediction that a cognitive schema will influence the attentional processing of schema-congruent information. Two studies were designed to measure the attentional processing of attachment figures, testing the hypothesis that less securely attached children would show an increased attentional engagement towards their mother (Chapter 5) and a narrowed attentional focus on their mother (Chapter 6).

This general introduction explains the different constructs under investigation. In part I we will briefly review the basic concepts of attachment theory. In part II, we will further explore the concept of the internal working model. In part III, we will discuss the latest conceptualization of the internal working model, which will lead us to the assumption that the internal working model concept can be linked to the cognitive schema concept.

I. Attachment and the Attachment Behavioural System

Basic Concepts

In reaction to the leading psychoanalytic and social learning theories, Bowlby developed attachment theory, based on his observations of disrupted relationships between maladjusted boys and their mothers. Bowlby disagreed with the ruling secondary-drive explanation that the infant's relationship with the mother emerges because she feeds the infant and because of the pleasure the infant experiences upon having hunger drives satisfied (Bowlby, 1980).

> This [secondary drive] theory did not seem to me to fit the facts. For example, were it true, an infant of a year or two should take readily to whomever feeds him, and this clearly is not the case. But, if secondary drive dependency theory was inadequate, what was the alternative? (Bowlby, 1980, p. 630).

Instead, Bowlby proposed an alternative point of view on the organization of children's behaviour in relationship with their caregivers. Drawing upon the knowledge gathered in evolutionary biology, ethology, developmental psychology, cognitive science, and control systems theory, Bowlby (1969/1982) proposed a biologically based desire for proximity that arose through the process of natural selection (Cassidy, 1999). This new theoretical approach was constructed around the concept of attachment security. Security is a word derived from Latin "sine cura" which means "without care" or "without worry" or even "free from insecurity" (Ainsworth, 1987). This

definition implies that Bowlby considered security to be an “all is well” feeling, which he expressed as follows:

> "Many of the most intense emotions arise during the formation, the maintenance, the disruption, and the renewal of attachment relationships. The formation of a bond is described as falling in love, maintaining a bond as loving someone, and losing a partner as grieving over someone. Similarly, threat of loss arouses anxiety, and actual loss gives rise to sorrow; whilst each of these situations is likely to arouse anger. The unchallenged maintenance of a bond is experienced as a source of security, and the renewal of a bond as a source of joy." (Bowlby, 1977, p.203).

Attachment behaviours are thought to be mentally organized into an “attachment behavioural system” which contains a variety of behaviours having similar meanings and serving similar functions in a goal-corrected manner (Bowlby, 1988). His assumption implied that there is no longer the theoretical need to view attachment as the by-product of more fundamental processes or “drives”. Children are thought to become attached whether their parents are meeting their physiological needs or not (Cassidy, 1999). The attachment system is seen as a “safety regulating system” with as main function promoting safety (Crittinden, 2000). Two major classes of events are expected to influence its activation: (a) the presence of potential danger or stress (internal or external) and (b) threat to the accessibility and/or availability of the attachment figure (Mayseless, 2003). When having achieved sufficient proximity, the activation stops (Bowlby, 1969/1982).

The attachment system has increasingly been identified as playing also an important role in the development of adequate affect regulation-strategies

(Shaver, Mikulincer, & Pereg, 2003). In infancy, available attachment figures help the child in times of distress to overcome aversive affective states by means of caring, comforting and applying age-appropriate affect-regulation strategies such as helping to direct the infant's attention away from the stressor. If this co-regulation occurs successfully, the ageing child increasingly learns to cope with aversive affects through self-regulation (see Figure 1). This transition is hypothesized to be mediated by three different mechanisms. Through the first mechanism of "self-expansion" the child includes the attachment figures' resources and strengths in its self-concept (Aron & Aron, 1997). This facilitates the development of a sense of mastery and the belief that the self has the capacities to handle distress alone. A second process is called "transmuting internalizations" (Kohut, 1971). By gradually internalizing the "mirroring affects and celebratory approval" (Shaver et al., 2003, p. 94), the child learns to actively and independently deploy positive affect in the service of self-regulation (Diamond & Aspinval, 2003). Finally, an important third process involves the activation of other behaviour systems following attainment of a sense of attachment security. Especially the link between the activation of what Bowlby called the exploratory system and the attachment system is thought to be particularly intricate (Cassidy, 1999). Bowlby explained the exploratory system, again, from an evolutionary perspective. He stated that children who more freely explore their environment are given an important survival advantage as they can store information about the way things go: how to use tools, build structures, obtain food, and overcome physical obstacles.

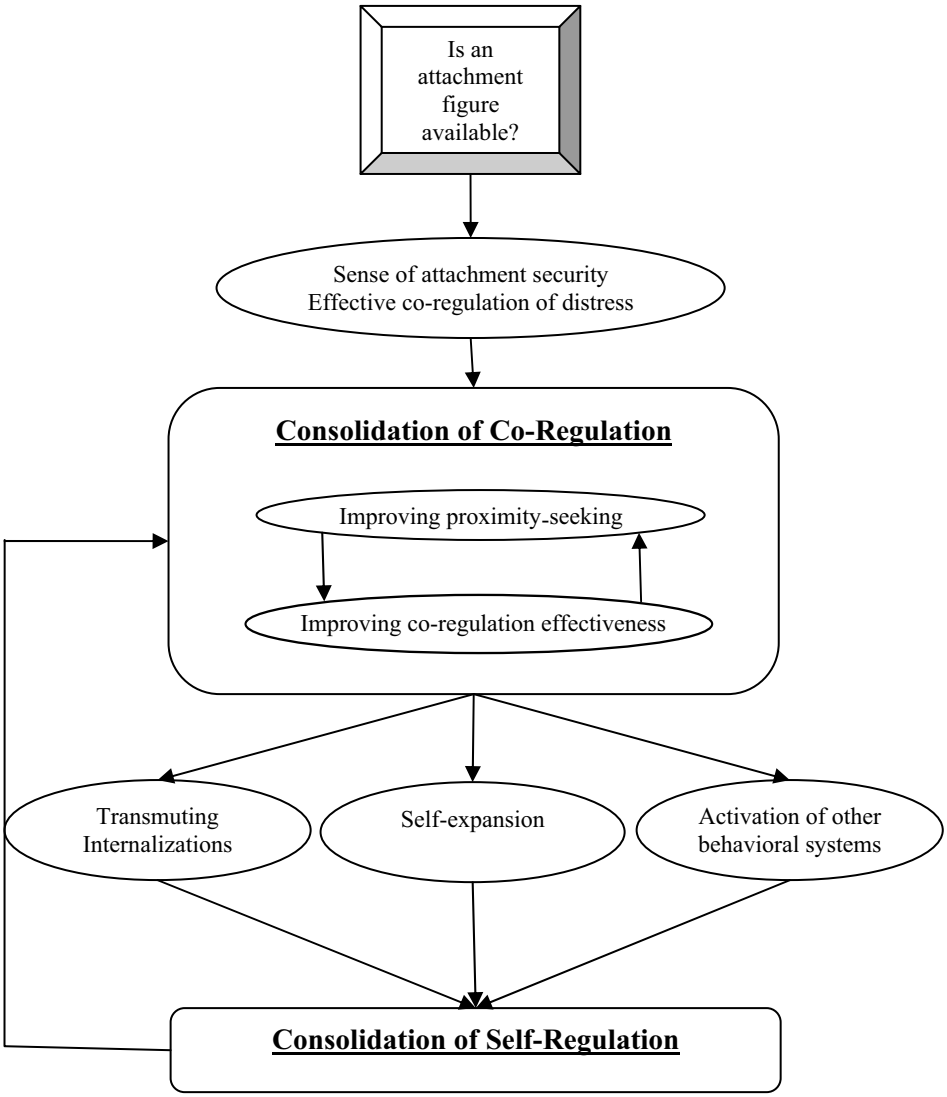

Figure 1: Flowchart Illustrating the Development of Security-based Strategies (Shaver, Mikulincer, & Pereg, 2003, p. 92)

Central in attachment theory is the evaluation of the attachment figure as a "secure base from which to explore" (Ainsworth, 1991). The attachment and exploration behavioural systems are expected to be continuously in balance (Ainsworth, Bell, & Stayton, 1971) depending on the child's assessment of the environment's characteristics and the caregiver's availability and likely behaviour. For instance, children are unlikely to explore an environment that is experienced as potentially harmful. Additionally, observations learn that infant's exploration and play decline after activation of the attachment system due to separation. Contrary, when the attachment figure is available and the attachment system is not activated, exploration is enhanced (Cassidy, 1999). Thus, when the attachment system becomes activated in times of perceived threat or danger, gaining access to the attachment figure may be conceived as the set goal of attachment.

Attachment figures that are called upon to provide comfort during times of distress, have been described as functioning as a *safe haven* for the child. In addition, attachment processes may be manifested when children are faced with challenges that only moderately activate the attachment system as in exploration contexts. In these situations children use other people who provide them with a sense of availability of support and protection as a secure base from which to explore the environment (Mayseless, 2003). Thanks to the ability to explore the environment, children acquire important knowledge about the environment, and gradually learn to develop necessary skills to cope with unfavourable emotional states through the confrontation with threatening and/or distressing experiences.

Bowbly (1969/1982) assumed that a child has more than one relationship in which the other functions as a secure base or a safe haven. According to Bowlby (1969/1982) responsiveness to crying and readiness to interact socially might be the main variables determining who will serve as an attachment figure to infants. In most cultures, this means that the biological parents, older siblings, grandparents, aunts, and uncles are most likely to serve as attachment figures,

whereby the bond with the mother is regarded as the most obvious (Cassidy, 1999). These attachment relationships are organized in an "attachment hierarchy" in which attachment figures are not all equivalent or interchangeable (Bowlby, 1969/1982). The structure of this hierarchy is assumed to be influenced by (1) how much time the infant spends in each figure's care, (2) the quality of care each provides, (3) each adult's emotional investment in the child, (4) social cues (Colin, 1996), and the repeated presence of the figure in the infant's life (Cassidy, 1999).

Attachment and Individual Differences

Differences in attachment security were assumed by Bowlby (1969/1982) and later demonstrated by the work of Ainsworth (Ainsworth, Blehar, Waters, & Wall, 1978). Ainsworth designed the Strange Situation procedure in order to observe inter-individual differences in the reaction of infants on the separation of their mother. This structured experimental situation consists of the following 8 phases: (1) Parent and infant are introduced to the experimental room. (2) Parent and infant are alone. Parent does not participate while infant explores. (3) Stranger enters, converses with parent, then approaches infant. Parent leaves inconspicuously. (4) First separation episode: Stranger's behavior is geared to that of infant. (5) First reunion episode: Parent greets and comforts infant, then leaves again. (6) Second separation episode: Infant is alone. (7) Continuation of second separation episode: Stranger enters and gears behavior to that of infant. (8) Second reunion episode: Parent enters, greets infant, and picks up infant; stranger leaves inconspicuously.

The reactions of the child on the reunion with the mother were used to distinguish three major attachment categories. These categories were originally only labelled with three different letters (A, B, C), but later these categories were

given names that reflect an interpersonal style: Securely attached (indicated by Ainsworth as Group B), Avoidantly attached (Group A), and Resistant children (Group C). Securely attached children were confident in their exploration of the laboratory and sought comfort from their mothers during the reunion after the distressing separation. In general, mothers of these children had been rated more sensitive and responsive during home observations before the laboratory visit. Avoidantly attached children tended to pull away from their mother after the reunion. They tended to avert their gaze from their mothers, distract themselves with nearby toys, and ignore their mothers' attempts to re-establish communication. Their mothers were rated as more rejecting and less accepting of infant attachment behaviour during the home visit. Finally, resistant children were less comfortable in exploring the laboratory and tended to maintain close contact with their mothers throughout the procedure. These infants also displayed a mixture of anger and contact seeking when their mothers attempted to comfort them. Home observations indicated that these mothers were often unresponsive or inconsistently available.

Although consecutive research with the Strange Situation Procedure has confirmed that these three categories indeed represent individual differences between children (Bretherton, 1992; van Ijzendoorn, 1994), the classification system failed to clearly identify a minority of the children that participated. Main and Solomon (1986; 1990) identified a fourth category: disorganised attachment (Group D). Disorganised attached children do not show coherence in their attachment behaviours. The child does not react adequately to the separation nor to the threat of separation, with attachment behaviours that contradict each other or seem to be purposeless and demonstrate disorientation, disorganisation or immediate fear for the attachment figure.

Further, in spite of the heuristic value of this classification system, revelatory statistical analyses on Strange Situation Procedure of Fraley and Spieker (2003) have not found convincing statistical evidence for Ainsworth's

classification system. The analyses of Fraley and Spieker (2003) revealed that the traditional attachment patterns do not follow a categorical organization. Instead, their analyses revealed that these traditional attachment patterns can best be viewed as lineair combinations of at least two fundamental latent dimensions: (a) proximity-seeking versus avoidant strategies and (b) the amount of angry and resistant strategies. Furthermore, even when these dimensions were combined to deduct attachment categories, little evidence was found for an organization of individual differences in attachment in terms of different categories. Although these results have been critized for the indicators Fraley and Spieker used in their analyses (see Appendix A), at the same time they were acknowledged as an important contribution to the understanding of individual differences in attachment (Waters & Beauchaine, 2003). This was especially so since Bowlby himself did not predict individual attachment differences in terms of different attachment categories in his original formulation of his attachment theory (Waters & Beauchaine, 2003).

Next to this statistical evaluation of the Strange Situation Procedure – an observational attachment measure – the same analysis with the Adult Attachment Interview – a narrative measure and one of the most widely used and well validated instruments to measure attachment states of mind in adults – have lead to the same conclusions (Roisman, Fraley, & Belsky, 2007). Furthermore, psychometric evaluation of adult attachment questionnaires confirmed the need for a dimensional approach to the attachment concept. Brennan, Clark, and Shaver (1998) created a pool of 482 questionnaire items designed to measure attachment. After reducing this pool to 323 by eliminating item-overlap, they conducted a factor-analysis on 60 subscale scores. Factor-analysis revealed an oblique two-factor structure (attachment avoidance and attachment anxiety). As the two oblique factors only correlated .12, they argued that these two dimensions are in fact independent dimensions and that they can be used to assess three attachment types: (1) low scores on both attachment avoidance and

attachment anxiety represent securely attached individuals; (2) low scores on attachment avoidance and high scores on attachment anxiety represent anxiously attached individuals; (3) high scores on attachment avoidance represent avoidantly attached individuals. The Brennan et al. (1998) model is also in line with the model developed by Bartholomew and Horowitz (1991) who designed an attachment measurement model with two dimensions ranging from positive to negative (1) the model of the self as worthy for care and (2) the model of the other as available to provide care in times of distress. Both models appear to be quite interchangeable (Brennan et al., 1998) as the attachment anxiety dimension is strongly linked with the model of the self, whereas the attachment avoidance dimension is conceptually linked with the model of the other.

Based on these results, Brennan et al. (1998) developed the widely used Experiences in Close Relationships Questionniaire (ECR). However, in spite of their first results, more recent research with the ECR and especially with the revised version of the ECR (Fraley, Waller, & Brennan, 2000) has continuously found highly significant correlations between the two attachment dimensions (Conradi, Gerlsma, van Duijn, & de Jonge, 2006).

Attachment and Parenting

In line with Bowlby's (1969/1982) predictions, Ainsworth et al. (1978) observed how differences in parental responsiveness and sensitivity influence inter-individual differences in attachment security. Later research has tried to further investigate the relative influence of parenting styles in the development of attachment security. Longitudinal research by Kochanska (1998) has revealed that differences in responsiveness and sensitivity can explain differences in whether children are securely or insecurely attached. Whether insecurely attached children are more anxiously or more avoidantly attached is only

accounted for by temperamental factors. In line with these findings Behaviour-genetic twin studies have demonstrated that a large majority of the association between maternal sensitivity and infant attachment security could be accounted for by shared environmental variation, such that when sensitivity was shared within families, it was positively associated with infant security (Fearon et al., 2006; Roisman & Fraley, 2008).

Next to the influence of sensitive parenting during infancy, in middle childhood and adolescence, links have been suggested between attachment security and (1) parental warm and responsive involvement, (2) parental encouragement towards psychological autonomy and individuation through noncoercive discipline, and (3) parental demands for age-appropriate behaviour, limit-setting, and monitoring (e.g. Baumrind, 1971; Steinberg, Darling, Fletcher, Brown, & Dornbusch, 1995). Indeed, Doyle and Markiewicz (2005) found a link between parental psychological control – a parenting style directed at manipulating the child's thoughts and feelings through the use of techniques such as inducing guilt, withdrawing love, provoking shame, and arousing anxiety – and decreases of attachment security and between parental warmth and increases of attachment security.

The Development of Attachment

Bowlby (1969/1982) described in his attachment theory four developmental stages, which were supposed to end around two/three years of age. Bowlby assumed they followed the cognitive and emotional development of the child. Although the attachment system is supposed to play its part during the entire life-span, less attention was paid to the development of attachment beyond the early years. In the last decades, research on the development of attachment in adolescence and adulthood has been increasing. Yet, research on the

development of attachment in middle childhood has been rather absent until the last years. This lacuna has been partly due to the fact that Bowlby's developmental theory focused mainly on the first four stages (Mayseless, 2003) and partly due to the lack of valid and reliable research instruments in middle childhood (Dwyer, 2005). As recent research has started to fill in the gaps, we will use this overview to briefly discuss the development of attachment during infancy, adolescence and adulthood, and to discuss attachment in middle childhood more elaborately.

Bretherton (1992) has described how "Bowlby reviewed data from existing empirical studies of infants' cognitive and social development, including those of Piaget (1951, 1954), with whose ideas he had become acquainted during a series of meetings by the "Psychobiology of the Child" study group, organized by the same Ronald I Hargreaves at the World Health Organization who had commissioned Bowlby's 1951 report. These informative meetings, also attended by Erik Erikson, Julian Huxley, Baerbel Inhelder, Konrad Lorenz, Margaret Mead, and Ludwig von Bertalanffy, took place between 1953 and 1956. (Proceedings were published by Tavistock Publications.) For additional evidence, Bowlby drew on many years of experience as weekly facilitator of a support group for young mothers in London" (p. 769)

During the first six weeks after birth, in the *pre-attachment stage*, babies display different social communicative signals (crying, smiling, eye contact) which provoke proximity with caregivers (Marvin & Britner, 2000). Although babies do recognize the primary caregivers, anybody can comfort the child when in distress. From six weeks to six/eight months, in the *attachment-in-the-making stage*, the preference for familiar adults increases: babies will smile more towards these adults, and these persons can better reinstall comfort when the infant is in distress. The *clear-cut attachment stage* lasts until approximately 18/24 months and is characterized by an increase of proximity seeking

behaviours, the development of an internal working model of the caregiver, separation fear, and fear for strangers. In the following year the child further develops towards the fourth stage of *goal corrected partnership* (3 years old) in which own goals and the perspective of the relationship partner are both taken into account when trying to accomplish a certain goal (e.g. proximity). This requires a more sophisticated interpersonal functioning which is only possible when the cognitive development allows the child to monitor his/her own needs and motives and to infer and acknowledge his/her relationship partners' motives and intentions. For example, a child playing with mother may understand that mother needs to pick up a ringing phone, but that she'll return to continue their game.

In middle childhood, further cognitive maturation is characterized by the development of abilities such as the ability (1) to reason in terms of abstract representations of objects and events, (2) to employ planned behaviour that includes coordinating knowledge of previous experiences to obtain a goal and monitoring one's activities and mental processes, and (3) to acquire new information and to use it in reasoning and mental processes (Collins, Madsen, & Susman-Stillman, 2001). This cognitive progression influences the further development of the attachment system (Mayseless, 2003) in several ways. The attachment system becomes (1) more sophisticated and governed by cognitive-affective internalizations, (2) more integrated and generalized, and (3) more differentiated and diversified. Furthermore, these cognitive developments lead (4) to a shift in responsibility between child and parent for monitoring and maintaining the availability and accessibility of the caregiver and (5) to a decrease in intensity of attachment behaviour. The following paragraphs will discuss these five points in detail.

First, cognitive development leads to a shift in the organization of behaviour: This organization becomes increasingly governed in terms of set goals and plans and includes subordinate plans and alternative ways to achieve a

desired set goal including the capacity to change the goal. This capacity of top-down processing is manifested in a more proactive attitude in social interactions. The child negotiates more with the caregiver and is better capable to mesh his or her plans with those of the caregiver. It becomes easier to implement different behaviours with different persons in different circumstances. Finally, semantic memory becomes more multifaceted and more differentiated from episodic and procedural knowledge. Due to the sophistication process at this age, individual differences in attachment security can best be defined as differences in strategies with the goal to attain the protection from another person (Waters, & Cummings, 2000). This goal encompasses more than just affect regulation (Cassidy, 1994), as for example the relationship with that person is important as well. Furthermore, it is not the specific behaviours that matter, but which strategy they serve, as the same behaviours may serve different strategies (Mayseless, 2003).

Second, attachment behaviours become more integrated. At first, integration leads to a strategy that encompasses various moments and experiences with one caregiver. Later attachment behaviours are integrated into a general strategy that reflects contributions from relationships with various figures. As children mature, attachment security or insecurity becomes increasingly an attribute of the person rather than a specific relationship (Thompson & Raikes, 2003).

Third, during middle childhood, the number of persons that have an attachment function increases (Collins et al., 2001). These relationships do not entirely have the same characteristics as attachment relationships, but should rather be considered as attachment bonds (Weiss, 1991): there is often no long-enduring tie and these relationship partners are interchangeable. Still, attachment-related dynamics might be apparent (Mayseless, 2003). For example, a child may derive a sense of security from being in the proximity of a teacher (secure-base function) or may turn to this teacher for comfort in distress (safe-haven function). Children will increasingly turn to different attachment figures

when confronted with different types of distress (Mayseless, 2003). Moreover, the range of possible attachment strategies increases. Whereas in younger children secure, ambivalent and resistant attachment styles were distinguished, as children grow older, a larger pool of individual variation could be observed (Crittenden, 2000).

Fourth, parents become less obliged to constantly monitor their children's whereabouts. Children can now go to friends' houses or stay alone at home without adult supervision (Collins et al., 2001). Children become capable to call upon their caregivers in times of need or to tackle by themselves many of the challenges encountered during their activities. Therefore, the responsibility to maintain proximity shifts progressively from the mother to the child (Bowlby, 1969/1982) as children can now rely on a better knowledge of the world and alarming situations (Mayseless, 2003).

Finally, in middle childhood, it is assumed that the conditions under which the attachment system gets activated and deactivated change as children grow older. The attachment system is less activated by strange situations or persons, or in situations of mild hunger, pain, or longer separations, because children have already developed sufficient skills to master these conditions without the immediate need for help of attachment figures. Instead, the attachment system is rather influenced by self-related threats such as hurt pride, shame, guilt, and feeling rejected by peers (Mayseless, 2003). The deactivation is less dependent on actual proximity and can occur after less intense interventions of caregivers (e.g. a reassuring glance or a phone call), or can even be symbolic with a letter. In spite of these changes in intensity, there is not necessarily a decrease in the frequency of attachment, behaviours as the amount of for example telephone calls before the attachment system is deactivated can remain high (Marvin, & Brittner, 2000).

Overall, the changes in the attachment system during middle childhood can best be described as a shift in goal. Instead of seeking proximity, the attachment system's goal becomes the feeling of availability of the attachment figure. Availability has been described as open communication between parent and child, parent responsiveness to the child's needs, and the parent's physical accessibility to the child.

Although growing children make less use of their parents and increasingly turn to their peers when seeking support (Lieberman, Doyle, & Markiewicz, 1999), the importance of the perception of availability of parents remains and parents remain the main safe haven during middle childhood (Kerns, Tomich, & Kim, 2006). The gradual distancing from the parents, who simultaneously continue to be the most important safe haven in times of distress, continues throughout adolescence and (young) adulthood (Marvin & Britner, 1999). In adolescence, the movements away from parental proximity and control are alternated with adaptive temporary returns to that safe haven (Marvin & Britner, 1999). Furthermore, hormonal changes influence the start of a search for a permanent, goal-corrected partnership with a peer that starts functioning as an attachment figure. The biological function of this relationship is to produce offspring and raise them to reproductive age. However, this adult pair bond does not imply the cessation of attachment to parents. On the contrary, attachment-caregiving relationships between adult offspring and parents often continue actively (Mayseless, 2003).

Attachment and Psychopathology

Bowlby (1969/1982) predicted that individual differences in the quality of parent-child attachment relationships can be related to later functioning in general and to the development of psychopathology in specific. Although it is

not the purpose of this introduction to give an exhaustive overview of the existing evidence for this link, it is worthwhile to mention that many researchers have found evidence for such a relationship across all ages. For both externalizing (e.g., Greenberg, Speltz, & Deklyen, 1993; Waters, Posada, Crowell, & Lay, 1993) and internalizing behaviour probems (e.g., Armsden, McCauly, Greenberg, Burke, & Mitchell, 1990; Kobak, Sudler, & Gamble, 1991; Muris, Meesters, van Melick, & Zwambag, 2001) links have been found with insecure attachment.

In the following paragraphs, two different perspectives on the link between attachment and psychopathology will be discussed. (a) In a first part, we will discuss contemporary attachment research on the affect-regulating quality of the attachment system. Because insecure attachment is typically characterized by less adequate or ineffective affect-regulating strategies, insecure attachment can be considered to be an important risk factor for developing psychopathology within ecological models (Bronfenbrenner, 1986; Hill, 2002; Sameroff, 2000). As a product of research on developmental psychopathology, these ecological models demonstrate how the development of psychopathology is not just caused by one risk-factor. Instead, if a child develops psychopathology, this is the result of the interaction of multiple risk-factors. (b) Because many clinicians link the association between attachment and psychopathology almost automatically with attachment disorders, in a second part, we will very briefly discuss some theory on attachment disorders (Zilberstein, 2006).

(a) Attachment as an affect-regulating system

As mentioned above, Shaver et al. (2003) have argued that the link between attachment and psychopathology is evident because the attachment system primarily functions as an affect regulation system. The following

paragraphs were written closely following the manuscript of Shaver et al. (2003). Their model (see figure 2) consists of three components. Once signs of threat are being detected, the attachment system is activated, leading to proximity seeking behaviours towards the attachment figure. In a second component, individuals will assess whether this attachment figure is available and responsive. If individuals answer this question positively, they are likely to adopt the primary attachment strategy of seeking proximity to the attachment figure (or, most commonly in adults, to the internalized attachment figure). This strategy will then help to solve the distress, making it possible for the individual to reengage in non-attachment activities. According to this model, these individuals are assumed to be securely attached.

Contrarily (third component), insecurely attached individuals have developed internal working models containing the expectation that the attachment figure will fail to provide sufficient support and are therefore expected to adopt secondary attachment strategies. Which strategy they will adopt, will largely depend on whether they evaluate proximity seeking still as a viable affect-regulation option. Compared to secure attachment, proximity seeking will not necessarily result in alleviating the level of distress in insecurely attached individuals. Therefore it can lead to very energetic, insistent attempts to attain proximity, support and love. Two different secondary attachment strategies exist: hyperactivation or deactivation of emotions.

This strategy is called *hyperactivating strategies* (Cassidy & Kobak, 1988). They require constant vigilance, concern, and effort until an attachment figure is perceived to be available and a sense of security is attained. These individuals are assumed to score high on the attachment anxiety dimension. Research shows that the attachment anxiety dimension is associated with exaggeration of the appraisal of threats, negative views of the self, and pessimistic, catastrophic beliefs about transactions with other people and the nonsocial world (e.g., Bartholomew & Horowitz, 1991; Mikulincer, 1995;

Mikulincer & Florian, 1998). People who score high on attachment anxiety tend to react to stressful events with intense distress and to ruminate on threat-related worries (see Mikulincer & Florian, 1998, for a review). They also have easy access to painful memories and exhibit an automatic spread of negative emotion from one remembered incident to another (e.g., Mikulincer & Orbach, 1995). Moreover, their representations of attachment figures and attachment-related worries are activated even when there is no external threat (Mikulincer et al., 2000; Mikulincer, Gillath, & Shaver, 2002).

On the other hand, when proximity seeking is not considered a viable option, individuals will deactivate proximity seeking, inhibit their quest for support, and actively attempt to handle distress alone. These secondary attachment strategies are called *deactivating strategies* (Cassidy & Kobak, 1988). Their primary goal is to keep the attachment system deactivated to avoid frustration and distress caused by attachment-figure unavailability. This goal leads to the denial of attachment needs, avoidance of closeness, intimacy, and dependence in close relationships. The purpose is to maximize cognitive, emotional, and physical distance from others. These strategies are often characterized by inhibition and suppression of thoughts and memories that are associated with distress. These individuals are assumed to score high on the attachment avoidance dimension. Research has shown that attachment avoidance is associated with low levels of intimacy and emotional involvement in close relationships, suppression of painful thoughts, repression of negative memories, lack of cognitive accessibility to negative self-representations, projection of negative self-traits onto others, failure to acknowledge negative emotions, and denial of basic fears (e.g., Dozier & Kobak, 1992; Fraley & Shaver, 1997; Mikulincer, 1995; Mikulincer, Florian, & Tolmacz, 1990; Mikulincer & Horesh, 1999; Mikulincer & Orbach, 1995). Recent research indicates that high scores on attachment avoidance are associated with lack of mental access to attachment-related worries (Mikulincer et al., 2000) and with deactivation of representations

of attachment figures following reminders of separation (Mikulincer, Gillath, & Shaver, 2002).

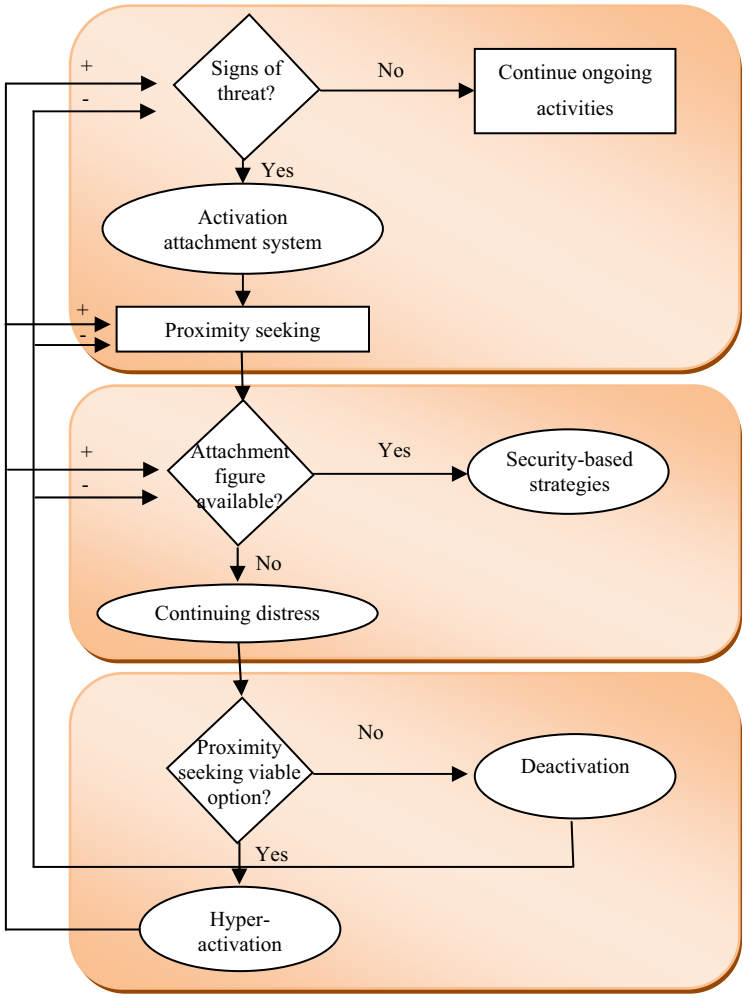

Figure 2: Shaver and Mikulincer's integrative model of the activation and dynamics of the attachment system (Shaver, Mikulincer, &Pereg, 2003, p. 81)

In summary, attachment theory suggests at least three mechanisms. Each attachment-related strategy has a specific regulatory goal, and cognitive and affective processes are shaped to facilitate goal attainment. Whereas the goals of security-based strategies are to alleviate distress, build a person's resources, and broaden his or her perspectives, the goals of secondary attachment strategies are to manage attachment-system activation and reduce or eliminate the pain caused by frustrated proximity-seeking attempts. For secondary strategies, distress-regulation stops being the main regulatory goal and instead hyperactivation or deactivation of the attachment system becomes the goal. Hyperactivating strategies keep the attachment system chronically activated, constantly on the alert for threats, separations, and betrayals; deactivating strategies keep the attachment system in check, with serious consequences for cognitive and emotional openness. Approaching the attachment system from a affect-regulation perspective demonstrates how insecure attachment leads to the dysfunctional regulation of negative emotions, which represents a vulnerability for developing emotional disorders, such as depression and anxiety.

Furthermore, when reviewing the literature linking attachment to psychopathology, it is important to note that strong associations have been found between disorganized attachment and psychopathology (Cassidy & Mohr, 2001). However, the current dissertation approaches attachment from a dimensional, rather than a categorical, perspective, which makes it difficult to formulate specific disorganized-related predictions. More importantly, this line of research did for example find interesting links between disorganized attachment and post traumatic stress disorders, but not always with general symptoms of psychopathology (e.g. Macdonald, Beeghly, Grant-Knight, et al., 2008).

(b) Attachment and attachment disorders

Attachment theory has also been considered as an important base to understand attachment disorders (Zilberstein, 2006). In DSM-IV-TR (APA, 2000) these disorders have been defined as Reactive Attachment Disorders (RAD) and are characterized by seriously disordered social behaviours across situations. DSM-IV-TR mentions two RAD subtypes: the inhibited and disnhibited subtype. When children show a lack of social approach behaviours, are emotionally withdrawn and are terrified by others, DSM-IV speaks of inhibited RAD. Disinhibited RAD is diagnosed when children show shallow, superficial, yet overly assertive social behaviours, in the form of clinging and/or indiscriminate friendliness. These behaviours must not be due to developmental deficits and must have been manifest before the age of 5 and should stem from persistent pathogenic care.

However, this definition of attachment disorders is difficult to link with attachment theory for different reasons. Attachment theory is a theory on development and not on pathology and therefore does not clearly distinguish between normal attachment variations and a psychiatric disorder (Zilberstein, 2006). Although attachment theory makes clear that early relationships are important in development and more specifically in the development of psychopathology, this knowledge does not extrapolate directly to understanding attachment disorders. For several reasons it is important to clearly distinguish attachment theory and attachment disorders.

Firstly, with regard to the widely studied attachment styles, research has repeatedly found that approximately 40% of the children, adolescents and adults assessed with the strange situation procedure or the interviews can be considered as insecurely attached (Mikulincer & Shaver, 2007), whereas probably only 1% of the population is diagnosed with RAD (e.g. Skovgaard, Houmann, &

Christiansen, 2007). In line with this discrepancy in prevalence, research could not associate attachment styles and RAD subtypes. Furthermore, within DSM-IV-TR (APA, 2000) there are several problems concerning the diagnosis of RAD and the link with attachment. First of all, RAD diagnoses are primarily based on current social functioning and the quality of the parent-child relationship is not taken into account to derive a diagnosis (Zilberstein, 2006). For example, the DSM-IV-TR diagnosis does not take into account the important difference between children who through adoption or other circumstances possess an appropriate attachment figure but cannot make use of it and children who do not have an appropriate attachment figure (James, 1994). As such, DSM-IV-TR cannot recognise problems that are relation specific, nor does it acknowledge the quality of a child's primary attachment. Secondly, although the disinhibited subtype has been extensively identified and researched, less data support the conceptualization of the inhibited subtype (Minde, 2003; O'Conner & Zeanah, 2003). Thirdly, although widely researched and supported, it has been argued that the conception of attachment disorders might be too specific and unable to capture the variety and richness of problems that poor attachment produces (Zilberstein, 2006). This way DSM-IV-TR excludes children who did develop an attachment relationship with a caretaker but for whom this relationship is pathological (Minde, 1999). Although these children form an important group of the children referred for mental health care, they are not necessarily recognized as attachment disordered (Bryne, 2003; Howe, 2003). Finally, DSM-IV-TR does not take into account the various representations of attachment disorder across the life-span (Volkmar, 2002). Therefore, the RAD diagnosis seems primarily applicable to young children, while in older children the diagnosis is not well recognized, not covering all attachment problems, little understood and easily mistaken for other disorders. Instead, DSM-IV-TR takes the quality of the parent-child relationship into account for the evaluation of Axis V, implying that

the psychiatric approach regards attachment specifically as an aspect of global functioning, rather than as a psychiatric disorder.

More recently, an alternative definition for attachment disorders has been proposed (Zeanah & Boris, 2000; Zilberstein, 2006) This proposal aims at providing criteria to diagnose children with secure base distortions - with a selective, but disturbed relationship with a caregiver. Nevertheless, more research and further refinement of this diagnostic system is necessary (Boris et al., 2004). Furthermore, its applicability for older children is still unclear (Zilberstein, 2006). Therefore, we decided for this dissertation not to focus on attachment in the context of attachment disorders, but rather on individual differences in attachment as defined within attachment theory as originally developed by Bowlby and further elaborated through the dimensional approach of Brennan et al. (1998). When in later chapters the link with psychopathology is discussed, we will do so from the perspective of insecure attachment as one of the risk-factors in the development of psychopathology.

The repeatedly demonstrated association between attachment and psychopathology seems to suggest that all insecurely attached children develop psychopathology. However, for example Hinde (1982) opposed to this assumption, considering that our current human population is the result of millennia of natural selection (Darwin, 1859). Given the process of natural selection – those individuals best adapted have more opportunities to survive and to reproduce – it does not sound reasonable to suggest that approximately 40% of our population is not well adapted. Instead, it has been argued that developing less secure internal working models might be an adaptive reaction to a maladaptive environment (Treboux, Crowell, & Waters, 2004). Also, insecure attachment can only be considered to be a factor increasing the risk to develop psychopathology. Individuals who are less securely attached will probably not develop psychopathology when they do not have to face additional stressors and on the contrary can benefit from protective influences (Hill, 2002).

II. The Internal Working Model of Attachment

> *Each individual builds working models of the world and of himself in it, with the aid of which he perceives events, forecasts the future, and constructs his plans. In the working models of the world that anyone builds a key feature is his notion of who his attachment figures are, where they may be found, and how they may be expected to respond. Similarly, in the working model of the self that anyone builds a key feature is his notion of how acceptable or unacceptable he himself is in the eyes of his attachment figures. (Bowlby, 1973, p, 203 ; taken from Pietromonaco & Barett, 2000)*

This part of the general introduction will expound the main concept of this dissertation. Firstly, we will discuss the definition of internal working models, why and how Bowlby developed this concept. This will lead us to explain the importance of Chapters 2 and 3 of the dissertation. Secondly, we will discuss the conceptual and practical problems linked with the original definition of the internal working model. Following the analysis of the problematic features of this concept, we will describe how, during the last decades, attachment research has tried to increase our understanding of internal working models. Thirdly, we will argue that the internal working model can be conceptually linked with the cognitive schema concept, which leads to the specific hypotheses that will be investigated in Chapter 4. Finally, we will describe how approaching the internal working model as a cognitive schema leads to the expectation that schema-congruent attentional biases should be found. This expectation will be investigated in Chapters 5 and 6.

The Definition of the Internal Working Model

The internal working model forms the cornerstone of attachment theory, as it was postulated by Bowlby (1969/1982) to explain why experiences in the context of the caregiver- child relationship influence later functioning and why adverse interactions with important caregivers increase the risk of developing psychopathology. When describing the internal working model, Bowlby was inspired by two different theoretical perspectives (Grossmann, 1999). The first perspective was psycho-analysis. Bowlby regarded the internal working model as an updated version of Freud's dynamic unconscious and of the introjections of good or bad experiences with caregivers (Freud, 1938). Bowlby's theoretical interest for psycho-analysis became particularly evident when Bowlby discussed working models in relation to psychopathology and psychotherapy (Thompson, 2008).

The second perspective was cognitive psychology. The internal working model concept was on the one hand based on the notion of "mental models" (Craik, 1943). Craik was an important precursor of current cognitive psychology. He described the mental model as a kind of internal reality that, once formed, would replace carefully considered analysis as a means to gain time and energy. A clear example is the mental model of a wild bear as dangerous: upon encountering a bear, one who holds this model will likely flee from the animal. Flight is the result of the application of the mental model, and would probably not be the immediate reaction of someone whose mental model of bears was formed solely from experience with a teddy bear, or who had not yet formed any mental models about wild bears. On the other hand, Bowlby followed Piaget's concept of objects and object permanence, stating that "internal working models are not merely pictures or passive introjections of the objects of past experience. They are active constructions and can be restructured." However, according to

Bowlby, ”reconstructions of early internal working models is difficult, since internal working models, once organized, tend to operate outside conscious awareness and resist dramatic change” (Bowlby, 1980, in Main, Kaplan, & Cassidy, 1985, p. 69).

Bowlby (1979) claimed that repeated experiences with attachment figures would be internalized or stored in internal working models that help children (and later adolescents and adults) predict and understand their environment, engage in survival-promoting behaviours such as proximity maintenance, and establish a psychological sense of “felt” security (Ainsworth, 1987; Sroufe & Waters, 1977). He expected that relational experiences are stored like memories of stimulus-response chains or associations. Bowlby (1969/1982, p. 354) originally introduced the internal working model and attachment research on this topic as follows: “Starting, we may suppose, towards the end of his first year, and probably especially actively during his second and third year when he acquires the powerful and extraordinary gift of language, a child is busy constructing working models of how the physical world may be expected to behave, how his mother and other significant persons may be expected to behave, how he himself may be expected to behave, and how each interacts with all the others. Within the framework of these working models he evaluates his situation and makes his plans. And within the framework of the working models of his mother and himself he evaluates special aspects of his situation and makes his attachment plans. How these models are built up and subsequently bias perception and evaluation, how adequate and effective for planning they become, how valid or distorted as representations they are, and what conditions help to hinder their development, all these are matters of great consequence for understanding the different ways in which attachment behaviour becomes organised as children grow older.” Bowlby (1969/1982, p. 354). This definition of the internal working model led later attachment researchers to assume that especially the first years of life are important for the development of the internal

working model. Given Bowlby's idea that the internal working model is hard to change after it has been established, little hope was left for the future functioning of persons with less secure working models. Nevertheless, Bowlby acknowledged the need for further research on the matter and in the following paragraphs we will return to the issue of stability.

The publication of Ainsworth's work with the Strange Situation procedure (Ainsworth et al., 1978) was an essential step forwards in the worldwide acceptance of Bowlby's theoretical approach. These findings demonstrated that differences in the quality of caregiver-child interactions led to different attachment behaviour, evidencing the existence of secure and insecure internal working models. Although the content of the internal working model was not measured directly, but rather inferred from the infants' reactions to the separation with their primary caregiver, the finding that stable individual differences could be linked with specific parenting behaviours underscored the importance of attachment theory.

However, until the mid eighties, attachment researchers tended to overlook the internal working concept. It was only when the first language-based approaches to measure the internal working models of older children and adults were developed, that researchers' interest increased (Thompson, 2008). One important contribution to this increase was the work of Main, Kaplan, and Cassidy (1985) who investigated the individual differences in attachment relationships that were related to individual differences in mental representation. They carefully reviewed the conceptualization of the internal working model idea and developed new measurement instruments to measure mental representations based on interview techniques (amongst which the Adult Attachment Interview).

In their review, they drew on Bowlby's idea that internal working models evolve out of interpersonal relationship experiences. However, Main et

al. (1985) argued against the original assumption that internal working models develop like memories: organized out of stimulus-response chains, or by means of association. Following Bretherton (1985) they suggested that the basic modules of mental representations might be event schemata (Mandler, 1979), scripts (Schank & Abelson, 1977), or generalized event representations (Nelson & Gruedel, 1981). This theoretical shift implied that "what is encoded by and guides the individual is not a concept abstracted out of static environmental features but a generalized representation of the events experienced. In this view, the child's memory is seen as being guided by general event schemata that organize experience in terms of reactions, goal paths, attempts, and outcomes" (Mandler, 1983, in Main et al., 1985, p. 75). This assumption suggests that a child's knowledge of relationships will be organized schematically rather than categorically. In other words the organization will be by actions and action outcomes rather than by the abstraction from the environment of similarities and differences. If the child's knowledge of relationships is organized by actions and action outcomes, then the internal working model of the child-parent relationship will be formed out of the history of the child's actions, the infant-parent interactions, and the outcome of the child's efforts and intentions to regain the parent. The internal working model of the relationship with the attachment figure will reflect not an objective picture of "the parent" but rather the history of the caregiver's responses to the infant's actions or intended actions with/toward the attachment figure. In an impressive attempt to provide a conceptual basis for further research on internal working models, Main et al. (1985, p. 76) listed all existing definitions of internal working models (see Appendix B).

The first two studies of the present dissertation were designed to test attachment theory's central assumption that a child's experiences with the parent are linked with psychopathology because of the associated internal working models. As Bowlby defined the internal working model concept as a mediator of attachment-related experience and later functioning, we investigated in a group

of adolescents the mediating role of attachment-related cognitions in the association between negative parenting and externalizing problems (Chapter 2), and between punitive parenting behaviours and internalizing problems (Chapter 3).

Critique on the original definition

The growing research interest for internal working models went hand in hand with criticism on the breadth of the concept. Hinde (1988) was the first to express the concern that the power of this theoretical construct also implies its pitfall as it can too easily explain anything. This concern was repeated by Belsky and Cassidy (1994) who stated that research needs to provide evidence that secure or insecure children, differently anticipate interpersonal events, selectively attend to different events, or differentially encode or transform (to be consistent with their internal working models) events and experiences. They argued that as long as this evidence cannot be provided, the internal working model concept cannot be more than a catch-all, *post-hoc* explanation. In line with this contention, Rutter (1995) opposed to the internal working model's definition as he considered the concept as a general notion that is difficult to translate in something more specific that can lead to testable hypotheses.

This overly general formulation of the internal working model was actually pursued by Bowlby, who wanted to formulate a conceptual metaphor rather than a clear cut well defined mechanism (Thompson & Raikes, 2003). As a consequence, the construct could be criticized for three important reasons (Thompson & Raikes, 2003). First, as the internal working model concept lacks the specificity required to guide its empirical applications, the concept has been enlisted over the years to explain a widening variety of attachment-related processes. Secondly, basic conceptual questions remain unclarified. Are internal

working models consciously accessible? How do they develop? What accounts for consistency or change over time? How do they relate to other aspects of cognitive processing. Thirdly, the relation of the internal working model to other developmental and conceptual processes remains unclear.

Hereafter, we will elaborate on some major points of discussion that follow from the lack of concrete definition of these internal working models. (a) Although it has been recognized that individuals develop different internal working models, it remains unclear how these different models are related to each other. (b) Next, the question remains whether the internal working model develops continuously from early childhood onwards, or whether and how later experiences can change the content of the internal working model. (c) The specific content of internal working models remains an enigma. (d) Finally, many questions remain regarding the actual processes underlying the attachment construct.

In line with the approach of Pietromonaco and Feldman Barrett (2000) we will describe attachment theory's predictions for each point of discussion and then describe the related empirical findings. Given the amount of research reports, it will not be possible to exhaustively describe all existing findings, but we will rely on reviews of widely recognized attachment scholars (Baldwin & Fehr, 1995; Fraley, 2007; Mikulincer & Shaver, 2007; Pietromonaco & Feldman Barrett, 2000; Thompson, 2008; Thompson & Raikes, 2003). In the last part of this general introduction we will discuss how the contemporary concecptualization of internal working models and the research proposed in this dissertation can provide an onset for an answer to these points of discussion.

(a) The organization of internal working models

Theory: As described earlier, Bowlby (1969/1982) hypothesized that children develop attachment relationships with different attachment figures. Consequently, children will develop different internal working models for these different figures with independent effects on attachment behavior (Bowlby, 1973). However, the question remains how the different working models about different attachment figures are related to each other and how existing internal working models influence the development of new internal working models (Brumbaugh & Fraley, 2007). The original definition of internal working models did not allow predicting how discrepant relationships are dealt with in the development of a person's attachment security or insecurity. Possible processes were suggested: a predominant influence of the most important relationship; a balance between differing relationships; or a stronger influence of secure attachment (Rutter, 1995).

Evidence. Research has demonstrated that multiple internal working models coexist in one person (Collins & Read, 1994). A review on the associations between attachment toward mother and father, demonstrated that their intercorrelation averagely equals not more than .30 (Fox, Kimmerly, & Shafer, 1991). Later research demonstrated that people develop both general and relationship-specific internal working models (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996). Global working models hold general information about experiences across past relationships and are conceptualized as elaborated models that are chronically accessible. As relationships with others become more significant, individuals construct working models that are specific to this attachment figure. Specific models allow more flexibility in the accessibility of different attachment representations depending on the interpersonal situation (Baldwin et al., 1996). Specific internal working models turned out to be better

predictors for different outcome variables such as psychological well-being (Cozzarelli, Hoekstra, & Bylsma, 2000; Klohnen, Weller, Luo, & Choe, 2005).

These findings have led to an enhanced discussion about how these multiple internal working models might be interrelated. Different possibilities have been suggested. It could be that a global model of attachment does not really exist. This would imply that ratings obtained with self-report measures mirror the average security across different specific relationships (Fraley, 2007; see Figure 3).

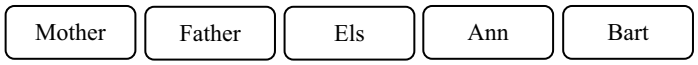

Figure 3: Organization without general internal working model

However, research demonstrates consistency in infant attachment organization across parents (Fox et al., 1991), a partial match between specific representations and a global representation within a person (Baldwin et al., 1996), and high correlations between representations of different attachment figures of one individual (Gerlsma & Lueijn, 2000). Overall, Fletcher, and Fliesen (2003) tested three alternative models to explain links between global and specific attachment representations using structural equations modelling. A first model consisted of a single global working model (see Figure 4). This model assumes that global attachment representations are constructed from relationship-specific models. The most salient and consistent features across the specific relationships are the building stones of the general working model.

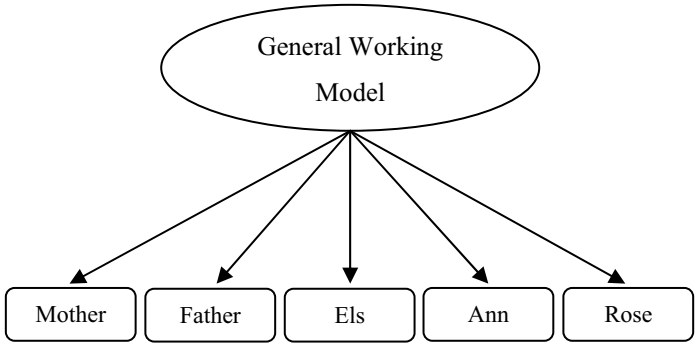

Figure 4: Organization with a single general working model

Next, a model was tested in which individuals hold general attachment working models that operate independently for each relationship domain (see Figure 5). As a consequence, experiences in one relationship domain (e.g. betrayal in the family context) does not affect relational functioning in another domain (e.g. in a romantic context).

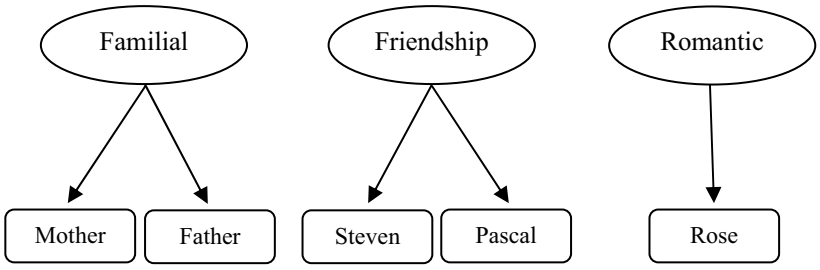

Figure 5: Organization with independent relationship-domain representations

Finally, Collins and Read (1994) argued that both relationship-specific and general working models exist, but that they are organized in a hierarchical

structure (see Figure 6). This multilevel network of attachment representations has at its highest order level one global attachment representation which should help encode general information that applies across relationship contexts and incorporates the most consistent, central, and influential attachment information. Under this global level, general attachment representations are nested within particular network domains. At the lowest level, working models of attachment exist with specific relationships.

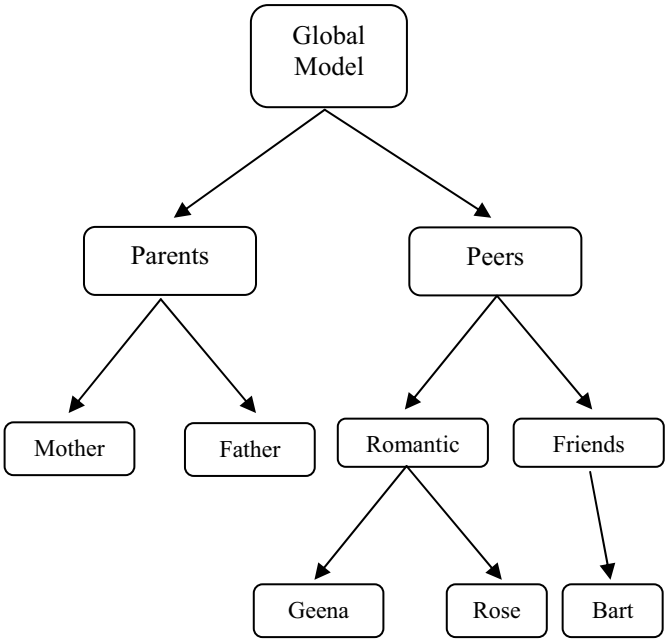

Figure 6: The hierarchical model of the organization of working models of attachment (based on Fraley, 2007, p. 1165)

Overall et al. (2003) found that the last model fitted best with data collected in young adults. Furthermore, a study by Sibley and Overall (2008) using also structural equations modelling demonstrated how domain-specific representations were strongly associated with attachment-ratings of specific

relationships within that domain but were generally not correlated with ratings of relationship-specific attachment in other domains.

Discussion. Although Fraley (2007) acknowledges the practical relevance of this model and the difficulty to investigate the organization of the internal working models, he argues that this test is not satisfactory and still leaves room for alternative structures. The cross-sectional character of Overall et al.'s (2003) study does not allow investigating the organization of internal working models from a developmental perspective. From this perspective, one could suggest that a new internal working model is forged in part on the basis of those that already exist (see Figure 7). Fraley (2007) used the following example. If one relationship-specific representation (i.e. pertaining to the mother) was constructed before another one (i.e. concerning one's partner),the working models would be at least partly similar (and correlated as well) without a global representation. Longitudinal data would be needed to study this alternative "prototype" model.

Furthermore, this alternative model has the advantage that it functions without having to explain how general working models might be abstracted from relation-specific internal working models, which remains a problematic conceptual flaw of the hierarchical perspective. Classic models of memory do not explain how both global and relationship-specific representations develop, but simply assume that both kinds of representations exist.

Although the studies presented in this dissertation were not designed to increase our understanding regarding the organization of the different internal working models a person holds, the issue remains very important as we did intend to study the internal working model's features. The next section of the general introduction and the general discussion (Chapter 7), will try to provide a theoretical framework that on the one hand helps to interpret the present studies' findings and on the other hand integrates these findings within a broader theory

that might provide a modern perspective on internal working models and simultaneously might provide an onset to understand or study the organization of these multiple working models.

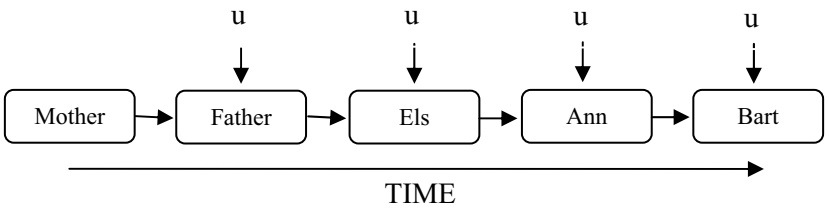

Figure 7: Relations among relationship-specific working models according to a simple developmental model. The influences of unique experiences that are uncorrelated with existing representations are denoted as "u." (Fraley, 2007, p. 1166)

(b) The stability of internal working models

> [The system] starts as a single main route which leaves a central metropolis in a certain direction but soon forks into a range of distinct routes. Although each of these routes diverges in some degree, initially most of them continue in a direction not very different from the original one. The further each route goes from the metropolis, however, the more branches it throws off and the greater the degree of divergence of direction that can occur. Nevertheless, although many of these sub-branches do diverge further, and yet further, from the original direction, others may take a course convergent with the original; so that ultimately they may even come to run in a direction close to, or even parallel with, routes that have maintained the original direction from the start. In terms of this model, the critical points are the junctions at which the lines fork, for once a train is on a particular line, pressures are present that keep in

> on that line, although, provided divergence does not become too great, there remains a chance of a train taking a convergent track when the next junction is reached (Bowlby, 1973, pp. 413-414).

Theory. Generally, attachment theory would predict that attachment-related behavior patterns should remain stable over time (Hamilton, 2000). Indeed, Bowlby (1973) predicted that early relational experiences, stored in internal working models, will influence further personal and relational functioning of the developing child/adolescent/adult. Several reasons have been proposed to explain this stability. Early attachment experiences are (a) stored in preverbal working models that (b) have an influence on the experience of the interactions with attachment figures and the shaping of the environment.

Working models that are developed early in life, are expected to continue to influence later (adult) relational behavior, as they are formed during the preverbal period of a person's life. Therefore the content of these early internal working models is rather sensorimotor, procedural, and nonlinguistic in nature. Thus, early internal working models are expected to form a prototype that will influence all later interactions (Mikulincer & Shaver, 2007). In line with this theory, Schore (2000) has argued that the development of early internal working models should be linked with the development of the right hemisphere's orbitofrontal cortex and the frontolimbic system.

Internal working models also have an influence on a person's experience of the environment. First of all, they will increase the likelihood that new information will be interpreted in line with previous experiences (this idea was based on Piaget's (1953) theory on cognitive development). Furthermore, internal working models will cause individuals to behave in a way that elicits working model congruent behaviors of attachment figures. Moreover, due to these internal working models, people will often attract similar relationship

partners. Thus, internal working models will cause people to shape an environment that continues to confirm their internal working models. In spite of his prediction that attachment security or insecurity would become a stable feature of a person (which can be considered more or less as a trait), Bowlby (1973) acknowledged that later relational experiences might influence this otherwise stable development. It has been argued that stressful life events and negative relational experiences might cause initially securely attached children to develop insecure internal working models. These negative influences on stability have been described as lawful discontinuities (Mikulincer & Shaver, 2007; Thompson & Raikes, 2003).

Next to influences of negative life events and in line with the previously stated expectation that internal working models might be reorganized due to neurobiological and cognitive maturation, Crittinden (2000) suggested that this might especially happen during the preschool years and adolescence. For example, the adolescent's cognitive abilities during the stage of formal operations (Piaget, 1953) allow to look at a relational situation from a cognitive distance.

Evidence. Initial research seemed to favour long-term stability of internal working models. However, much of this research relied on retrospective self-report (e.g. Hazan & Shaver, 1987) which makes it difficult to interpret these findings as evidence for long-term stability of internal working models (Pietromonaco & Feldman Barrett, 2000). Longitudinal research (mostly carried out using the Strange Situation procedure and Adult Attachment Interviews) is a better approach to demonstrate cross-temporal stability of internal working models but this approach has led to mixed results, ranging from very high concordance across measurement moments to non-significance. This has lead to very mixed opinions about the matter. Mikulincer and Shaver (2007) have discussed these studies from the perspective that most studies indicate moderate to high stability from infancy through adulthood, citing Fraley's (2002) meta-

analysis that found a moderate cross-temporal stability across 27 longitudinal studies (a correlation of approximately .39). Interestingly, Fraley himself, on the other hand, argued that this correlation makes cross-temporal stability of internal working models rather questionable (Fraley, 2007).

Compared to longitudinal research from infancy through adulthood, Research on stability of attachment security throughout adulthood showed higher levels of concordance, ranging from 44% to 90% over a period of 1, 2, 4, 6 and even 25 years (Mikulincer & Shaver, 2007). Again, Fraley meta-analyzed 24 studies and found a correlation of .54, which was significantly higher than the correlation found in younger samples (Fraley & Brumbaugh, 2004).

Research on lawful discontinuities evidenced the impact of several life stressors on the cross-temporal variability of internal working models. However, the most supporting evidence comes from cross-sectional studies or from retrospective studies. There is cross-sectional evidence for the effect of, amongst others, loss of a parent to death (e.g. Brennan & Shaver, 1998), or parental divorce (Henry & Holmes, 1998; Lopez, Melendez & Rice, 2000; Shaver & Mikulincer, 2004), and parental alcoholism (Brown, 1988). Retrospective studies have shown that more insecurely attached adults more frequently report maltreatment and physical or sexual abuse (e.g. Shapiro & Levendosky, 1999; Twaite & Rodriguez-Stednicki, 2004). One longitudinal study found evidence for maternal depression, child maltreatment, and poor family functioning (Weinfield, Sroufe, &Egeland, 2000). In accordance, Sagi-Schwartz & Aviezer (2005), found an influence of attachment-relevant stressful life events and the point in development when sleeping arrangements changed (). Alternatively, Hamilton (2000) did not find evidence for an influence of attachment-relevant stressful life events and changes in attachment security.

Discussion. As Fraley (2007) points out, the current research seems to suggest that it is unlikely that working models in early childhood are very stable

constructs of reality that continue to persist into adulthood. Although studies on the influence of developing cognitive abilities and lawful discontinuities cross-temporal attachment instability, Thompson and Raikes (2003) warn that the explanation of lawful discontinuities is incomplete for several reasons. First, the associations found are moderate, but not strong, suggesting the existence of other influences. Secondly, although the impact of negative life events is expected to be caused by changes in the sensitivity and responsiveness of the parents, adult's coping capacities can mediate whether these events negatively affect the attachment relationship (Teti, Sakin, Kucera, Corns, & Das Eiden, 1996). Third, the impact of negative life events might also be mediated by temperament and other influences on children's coping capacities (Thompson, 2000). Finally, even less research has been carried out to explain how insecurely attached children can become secure. Understanding this direction of change is fundamental to clarify cross-temporal instability and would be very important in the development of adequate therapeutic approaches. Although the current dissertation did not aim to investigate cross-temporal stability of internal working models, we will argue in the next section of the general introduction and in the general discussion (Chapter 7) that the conceptualization on which the present studies are based, does have in important implication that can contribute to our understanding of this cross-temporal instability.

(c) The content of internal working models

When Bowlby described the internal working model, he argued that it would consist of beliefs about the significant other and about the self (Bartholomew & Horrowitz, 1991). More specifically, Bowlby described the internal working model of the self as beliefs about how worthy the self is in the eyes of early attachment figures. Children with attachment figures who are

readily available, responsive, and reliable are expected to develop a representation of the self as acceptable and worthwhile. Children with inconsistent and unresponsive attachment figures are assumed to develop a view of the self as unacceptable and unworthy (Cassidy, 1999). Working models of others are hypothesized to include expectations about who will serve as attachment figures, how accessible those figures are, and principally how they would respond when needed (Main et al., 1985).

It was further assumed that children's different interpersonal behavior patterns were stored in internal working models with different contents. As described earlier Mikulincer and Shaver (2007) have developed a model distinguishing attachment anxiety and attachment avoidance dimensions, which they closely related to the self-other dimensions. The attachment anxiety dimension was linked with the model of self (positive versus negative ideas about the self linked with less or more attachment anxiety), whereas attachment avoidance was linked with the model of others (positive versus negative ideas of the other linked with less or more attachment avoidance).

Next to linking attachment anxiety and avoidance to models of the self and others, it has been proposed that attachment dimensions can be linked to maladaptive personality dimensions that increase a person's vulnerability to develop for example depression (Mongrain, Vetesse, Shuster, & Kendall, 1998). Blatt and Maroudas (1992) have theoretically linked the attachment avoidance and attachment anxiety dimensions to Beck's (1983) dimensions of autonomy – feelings of incompetence – and sociotropy – feelings of losing the love of significant others – and to Blatt's (1990) distinction between anaclitic and introjective personality configurations. According to their argumentation, anxious attachment should reflect ideas of being unloved, unwanted, neglected, and abandoned. These beliefs are supposed to lead to feelings of being dependent and the desire to be comforted and soothed in an immediate fashion. Avoidant attachment should reflect ideas of self-doubt, self-criticism, self-

loathing, excessive ideas, a harsh superego, a constant drive to perform and achieve, and associated cognitions about guilt and shame over not having lived up to expectations. Both Beck's (1983) and Blatt's (1990) styles have been described in the depression literature as reflecting two different types of depression – dependent and self-critical depression – with different developmental pathways which require different therapeutic strategies. Although these dimensions are rather regarded as personality dimensions developed during interactions with primary caregivers, they do seem closely linked with the attachment dimensions (Mongrain et al.,1998) and have been argued to share common elements with these dimensions (Sibley, 2007). Furthermore, this approach to the attachment dimensions seems to help to better understand the content of the cognitive processes explaining the link between attachment and depression (Blatt & Maroudas, 1992).

Evidence. Research demonstrates that attachment insecurity is strongly associated with more negative ideas about *the self* (for a very thorough review, see Mikulincer & Shaver, 2007). Less secure adolescents are more likely to attribute academic and relational problems to own lack of ablity (Armsden et al., 1990; Greenberger & McLauglin, 1998). Schmitt and Allik (2005) found strong evidence for the link between attachment and self-esteem in a cross-cultural study comprising 53 nations. The same effect was found in 49 of these 53 countries. A negative correlation between self-esteem and avoidant attachment was found as well, but in fewer studies (Mikulincer & Shaver, 2007). A strong link was found between attachment anxiety and the ideas that luck and the power of others have a stronger influence on life events than own actions (Mikulincer, 1994). Less evidence was found for an association between external locus of control and attachment avoidance (Mikulincer & Shaver, 2007). Both avoidantly and anxiously attached individuals prefer negative feedback from significant others (Brennan & Bosson, 1998; Cassidy, Ziv, Meehta, & Feeney, 2003).

Hazan and Shaver (1987) were the first to provide preliminary evidence that differences in attachment security are linked with differences in the representation of *others*, more specifically of parents. Securely attached adults described their parents as more respectful, responsive, caring, accepting, and less demanding than did anxiously attached adults. As for the link with attachment avoidance, stronger links were found in older participants, which was interpreted as due to a diminished need to defensively idealize the parent. The finding that more negative expectations regarding attachment figures can be found in anxiously and avoidantly attached individuals has ever since been confirmed in more than 50 studies (Mikulincer and Shaver, 2007). More than 40 independent studies have provided strong empirical support that attachment security is associated with the perception of support availability, with greater confidence in the supportiveness of specific relationship partners, and with greater satisfaction concerning received support (Mikulincer and Shaver, 2007).

As for the link between the attachment dimensions and maladaptive personality dimensions, Onishi, Gjerde, & Block (2001) have found significantly higher levels of sociotropy in anxiously attached individuals, and significantly lower levels of autonomy in avoidantly attached individuals that tended to dismiss their need for others. Higher levels of autonomy were found in avoidantly attached individuals. A study of Reis and Greyner (2002) has demonstrated that anxious attachment is correlated with both introjective and anaclitical depression. Avoidant attachment in individuals that recognize the importance of others is only related to introjective depression, whereas avoidant attachment in dismissing individuals is only negatively related to anaclytical depression. Finally, Sibley (2007) followed this line of research and demonstrated links with dimensions of autonomy and sociotropy. For autonomy, strong associations were found between defensive separation and need for control and attachment avoidance. Unexpectedly, no link was found between perfectionism and attachment avoidance. Also moderate correlations were found

between the three autonomy dimensions and attachment anxiety. The results for the dimensions of sociotropy were more in line with the predictions. Strong correlations were found between attachment anxiety and concern for what others think, dependency, and pleasing others, whereas only dependency was negatively linked with attachment avoidance.

Discussion. The research mentioned indeed confirms Bowlby's original idea that less secure attachment is associated with less positive beliefs about both the self and the significant other. However, studies investigating differences between attachment dimensions and specific outcomes regarding models of the self and models of the others have been less consistent in their results (Mikulincer & Shaver, 2007; Pietromonaco & Feldman Barrett, 2000). Conclusions about the relation between working models of the self and others and attachment anxiety and attachment avoidance are difficult to draw due to three important limitations in the studies mentioned (Pietromonaco & Feldman Barrett, 2000). Most studies on views of the self have measured global positive and negative feelings about the self. Firstly, these studies have provided limited information about the content of the model. Secondly, attachment working models have been linked with a widening variety of global variables and their association with attachment style is variable. This has lead to a growing number of associations that often also needed post-hoc explanations. Thirdly, the widening number of associated variables has made it increasingly difficult to derive a coherent view on the content of internal working models. Thompson (2008) argues that the idea that "all good things go together" does not reflect a sophisticated developmental theory. Attachment theory is in need of a more coherent explanation for this variety of outcomes.

In spite of the fact that attachment research needs to address these limitations, a careful review of existing research on the content of the internal working models has lead Mikulincer and Shaver (2007) to argue against the idea of linking attachment anxiety to the model of the self and attachment avoidance

to the model of the other. Furthermore, based on the generally high correlation between attachment anxiety and attachment avoidance (Conradi, Gerlsma, van Duijn, & De Jonge, 2006) and based on the finding in several studies that both dimensions tend to correlate with the same outcome variables, it might be argued as well that both dimensions have more content in common than originally has been assumed. Therefore, Mikulincer and Shaver (2007) argue that it might be more interesting to study affect-regulation process related differences instead of content-related differences.

Working models of the self and others have been approached as if they have independent effects on relationship-related thought, feeling, and action. However, Bowlby expected them to be interwoven, and research results suggest links between both variables (Pietromonaco & Feldman Barrett, 2000). Furthermore, the working models of the self are expected to develop through experiences with significant others (Markus & Cross, 1990). Thus, working models of the self are best seen as models of the self in relation to others (Baldwin, 1992; Markus & Cross, 1990; Pietromonaco & Feldman Barrett, 2000). This has at least two important implications. A first implication is that in line with the multiple working models of others, multiple working models of the self might exist as well. The content of the working model of the self would then vary with the situational or relational context (Pietromonaco & Feldman Barrett, 2000) even in relation to the same partner (Ogilvie & Ashmore, 1991).

A second implication, with regard to the content of internal working models of attachment, is that it might be more interesting to investigate relational schemas (Pietromonaco & Feldman Barrett, 2000). Such a relational schema is expected to consist of an interpersonal script for the interaction pattern, a self-schema about how the self is experienced in that specific interpersonal situation, and a schema for the other person in the interaction (Baldwin, 1992). Furthermore, the demonstrated link between attachment working models and the depression-related personality dimensions of autonomy and sociotropy is

interesting. Although these dimensions have been described as personality dimensions instead of cognitive schemas, the definition of these dimensions does seem to suggest that they also consist of more specific cognitive contents that might help understand the content of internal working models and their influence on the development of psychopathology. However, much work remains to be done, as Sibley's (2007) results did not follow the entire prediction. This implies that the conceptualization of anxious and avoidant internal working models needs further elaboration and further research. Amongst other goals, this dissertation aims at increasing our understanding of the content of internal working models.

(d) The processes underlying internal working models

Theory. Internal working models are assumed to guide attention, interpretation and memory during interactions with others. Thus, Bowlby (1980) conceptualized the internal working model as an information processing filter that allows individuals to generate expectations about future interpersonal situations and to develop plans for dealing with current and future situations. He argued that human beings selectively attend to sensory information to avoid information overload. It has been argued that investigating inter-individual attachment-related differences in information processing is essential for the acceptability of attachment theory in general and for our understanding of the functioning and the content of internal working models in specific (Belsky & Cassidy, 1994).

Evidence. Pietromonaco and Feldman Barrett (2000) enumerate an impressive list of research providing indirect evidence that working models guide the processes underlying attachment patterns. In this research working models are the hypothesized mediating mechanisms that for example direct

people's patterns of explanations for relationship events (Collins, 1996) or their emotional experience and coping styles (Fraley & Shaver, 1998).

A second line of research has been investigating the link between attachment working models and information processing of emotional stimuli such as information about positive or negative interactions, or emotion-expressing faces. Effects on information processing were measured with for example reaction time, recall, open-ended inferences, and physiological measures. This way an impressive line of research has demonstrated an influence of attachment security on attention for, interpretation of, or the memory of emotional information in both children (Belsky, Spritz, & Crnic, 1996; Kirsh & Cassidy, 1997; Main et al., 1985) and adults (Beinstein Miller & Noirot, 1999; Dewitte & De Houwer, 2008; Dewitte, Koster, De Houwer, & Buysse, 2007; Maier, Bernier, Pekrun, Zimmermann, Strasser, & Grossmann, 2005; Main et al., 1985; Mikulincer et al., 2003; Niedenthal, Brauer, Robin, & Innes-Ker, 2002; Zeijlmans van Emmichoven, van IJzendoorn, de Ruiter, & Brosschot, 2003; Pereg & Mikulincer, 2004).

Discussion. The demonstration of attachment-related differences in information processing of emotional information is important for understanding the processes underlying internal working models and for increasing their acceptability (Belsky & Cassidy, 1994). However, several questions regarding the effects remain unanswered. For example, not all studies confirm the main prediction derived from attachment theory: a stronger direction towards negative information linked with attachment anxiety and a stronger direction away from negative information linked with attachment avoidance. The lack of clear effects was especially evident in research on attentional processing (e.g. Dewitte et al. 2007; Zeilmans van Emmickhoven et al., 2003). Further research is needed to better understand this variation in the results. Furthermore, much research on the effect of attachment security on information processing has focused on the processing of general negative information. It should be possible to measure the

effects on the processing of information that is more directly related to the content of the internal working model (e.g. Dewitte, De Houwer, & Buysse, 2008). In the final section of this general introduction we will argue that studying the processes underlying the internal working model starting from a firm theoretical base is pivotal to increase our understanding of the internal working model concept. As the main studies of this dissertation are designed to investigate these processes, the next section will further discuss the existing knowledge and the hypotheses regarding these processes.

III. Towards a better understanding of internal working models

As situated in the previous overview, it has taken a while before attachment researchers started to investigate the internal working model (Thompson, 2008). Actually, even contemporary attachment researchers seem to prefer to direct their research focus on the effects of insecure attachment (e.g. especially on affect-regulation, Mikulincer & Shaver, 2007) instead of on the underlying cognitive processes. Although we do acknowledge the practical and therapeutical relevance of this shift in research focus, we nevertheless would like to argue that it remains important to investigate the internal working model. As it has been stated, this construct remains crucial for attachment theory. Even though examining cognitive processes has always proven to be a difficult enterprise, the review above has shown that internal working models keep on activating research interest, leading increasingly to a better understanding of the construct. Yet, the previous paragraphs also demonstrate that many questions regarding internal working models have been unanswered for decades.

This final part of the general introduction will try to elaborate our understanding of the internal working model by linking the construct on the one hand to Fraley's (2007) ideas about the internal working model as a neural

network, which can provide an onset to answer to critique (a) and (b), and on the other hand by linking the internal working model more explicitly to the current definitions of cognitive schema theory (Clark, Beck, & Alford, 1999) , which can provide an onset to answer to critique (c) and (d).

The internal working model as a neural network

In an attempt to provide an answer to the incoherent results regarding the organization and the stability of internal working models, Fraley (2007) has made an impressive attempt to approach the internal working models from the framework of connectionist theories of memory. These models are based on the assumption that familiar memory phenomena, such as schematic representations, are the emergent properties of the activity of networks with massively interconnected neurons (Rumelhart, McClelland, & the PDP Research Group, 1986). Connectionist models have become increasingly influential in cognitive science, linking diverse disciplines in psychology ranging from developmental psychology, social psychology, personality, to neuroscience.

A connectionist network is composed of a number of units (comparable to neurons) that are connected to one another through excitatory and inhibitory pathways. Like biological neurons, connectionist units can vary in their activity levels, sometimes being relatively inactive and, at other times, exhibiting increases in activity. Importantly, an active unit activates other units to which it is connected. Thus, activation originating from the external world or from a specific locus in the network can spread across a network in much the same way that activation may spread in a biological neural network (see Figure 8). Connectionist models of representations have clear advantages compared to classic, symbolic theories of cognition. Instead of looking at representations as discrete, non-overlapping nodes in an associative or hierarchical network,

connectionist networks consists of knowledge that is distributed across the connections among multiple units, and the same units can be involved in the representation of independent patterns (Anderson, 1993). Contrary to the classic approach of focussing on different kinds of processes (like encoding or retrieval) that operate upon memory units, connectionist networks view for example the process of retrieval as a reinstatement of a pattern of activation that corresponds to a concept. Finally, typical for connectionist models is the importance of the learning history. When the network performs incorrectly, the connections among units are modified relying on a variety of learning rules to reduce the probability that a similar error will be made in the future.

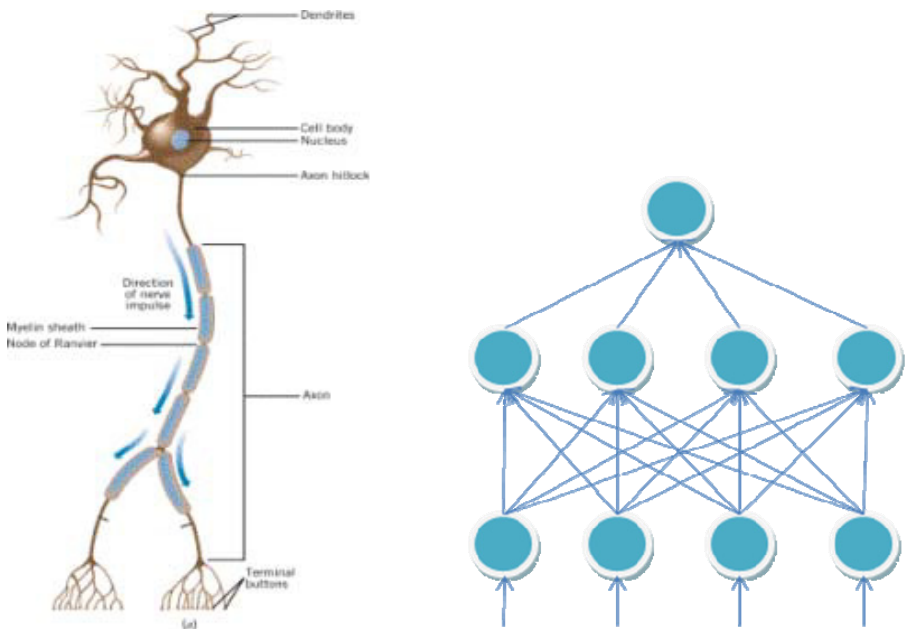

Figure 8: Illustrations of the way activation flows through a biological neuron (left) and artificial neural network (right) (taken from Fraley, 2007, p. 1160)

With regard to the problem of the organization of multiple working models, the conceptualization of connectionist models suggests that the same processes support the learning of specific representations and more global or abstract representations (Fraley, 2007). Connectionist research discovered that when a network is trained to recognize a variety of idiosyncratic stimuli, it develops a representation that captures the common features across all related stimuli. This leads to the development of a representation of a prototypical example even if the network was never exposed to the prototype itself. For attachment theory, this finding suggests that global representations of attachment can stem from relationship-specific experiences (Fraley, 2007). Applying the connectionist model to attachment representations using simulation techniques, Fraley (2007) could demonstrate that the same network is responsible for representing both the global and the specific features of relationships. The model tested indicated that based on a variety of experiences with one person, individuals can develop representations of the specific experiences and what the different experiences with that person have in common. Furthermore, the model demonstrated that if individuals interact with different persons, a representation that captures the core features of each relationship is extracted as well as one that captures what is common to each of those relationships.

With regard to the problem of the stability of internal working models, the simulations demonstrated that the key factor that influences the stability of a representation is the network's learning history (Fraley, 2007). If the initial environment changes gradually over time, the network's ability to represent the early relations gradually fades, favouring memories for more recent experiences. If the network experiences a variety of different caregiving environments in a non-ordered fashion (instead of a gradually sequential fashion), representations of early experiences continue to exist and are readily activated when the context is appropriate. Finally, the simulations show that representations of early

experiences have a privileged status in the memory system when those experiences are recurrent – even if rare – across development.

In summary, Fraley's (2007) preliminary research suggests that early attachment experiences can be retained in a mental system, even when they have been dormant for most of the time. This result is in line with Sroufe, Egeland, and Kreutzer's (1990) idea that "earlier patterns may again become manifest in certain contexts, in the face of further environmental change, or in the face of certain critical developmental issues. While perhaps latent, and perhaps never even to become manifest again in some cases, the earlier pattern is not gone" (p. 1364). Furthermore, in line with recent conceptualization of traits as a system of "if... then..." consistencies for behaviour (i.e. the CAPS model of Mischel & Shoda, 1995), the connectionist perspective suggests that the mind can construct unique representations (with associated unique "rules" for behaviour). This can explain why a person's attachment behaviour is not consistent across different contexts. However, for attachment at least one exception to the CAPS model should be taken into account. The connectionist perspective suggests that across all unique experiences a more global representation (with a more global set of rules) is abstracted and used as well. Therefore, behavior in any context is expected to be a product of both.

The internal working model as a cognitive schema

As described earlier, Bowlby based the concept of attachment-related internal working models on Craik's theory of mental models (1943) which later influenced the development of current cognitive psychology (Waters & Waters, 2006). Historically, research on attachment-related internal working models has increasingly incorporated ideas of cognitive psychology on so called relational schemas (e.g. Baldwin et al., 1996; Bretherton, 1990; Nelson, 1986; Schank,

1982, 1999). This has led Waters and Waters (2006) to argue that "Interpreting the working model's concept in terms of specific cognitive architectures would be an important step toward theoretical coherence, developmental analysis, and more refined assessment" (p. 187). This need for integration was suggested earlier, as it has been proposed that the internal working model of attachment is comparable to Beck's (1987) concept of cognitive schemas (Holmes, 1993). Interestingly, the ideas of Fraley (2007) and the cognitive schema concept do not exclude each other. Although the discussion regarding the relationship between connectionist models and cognitive schemas is still ongoing, it has been often suggested that both can be situated on a different level of analysis and can be integrated (Pennington,2002, Shea, 2007). A specific cognitive schema might then be considered as corresponding to a set of activated units in the neural network.

A schema is "a structure for screening, coding and evaluating impinging stimuli" (Beck, 1964, p.564). On the basis of their schemas an individual interprets new experiences in a meaningful way. Schema's direct attention to previously stored information to generate expectancies and interpretations for new experiences. They affect encoding, comprehension and retrieval of new information. Research has revealed that schemas are characterized by a biased processing of information that is congruent with the content of that schema. Three biases have been distinguished and demonstrated. (a) A bias in the attentional processing of schema-congruent information: if a cognitive schema is active, individuals will more easily direct their attention towards this information (e.g. Koster, Crombez, Van Damme, Verschuere, & De Houwer, 2005). This bias can be regarded as a mechanism that filters out of all incoming information, only that information which is relevant for the active schema (Baert, De Raedt, & Koster, 2009). (b) A bias in the interpretation of (ambiguous) schema-congruent information: if a cognitive schema is active it will cause individuals to interpret information in accordance with the stored information (e.g. Clark et al.,

1999). (c) A bias in the recall of schema-congruent information: if active, a cognitive schema will improve the recall of this information (Timbremont, Braet, Bosmans, & Van Vlierberghe, 2008). Like internal working models, cognitive schemas are thought to have developed during childhood as a result of interactions with significant others (Platts, Tyson, & Mason, 2002). This leads to the assumption that attachment-related processes guide early interpersonal experiences into cognitive schemas through assimilative influences (Chorpita & Barlow, 1998; Platts et al., 2002). Furthermore, when Young developed his currently influential cognitive behavioural therapeutic approach based on the concept of "early maladaptive schema" (Young, Klosko, & Weishaar, 2003) he assumed that the early maladaptive schemas develop out of the representations stored during early childhood interpersonal experiences.

In the following paragraphs we will describe how internal working models and cognitive schemas are theoretically interconnected and why it would be more interesting to approach internal working models from a cognitive schema perspective. If this approach would add significant value to the conceptualization of internal working models, we can argue that research is needed to confirm the interconnectedness between these two theoretical constructs. In a first step we should have to demonstrate that the content of internal working models is linked with content that has been demonstrated to be organized into a cognitive schema. In a second step we should have to demonstrate that the processes underlying the internal working model indeed behave according to predictions of cognitive schema theory.

Towards an integration of cognitive schema theory and internal working models

It has been argued that the cognitive schema's definition makes it a very interesting perspective from which to approach internal working models. Not

surprisingly, more recently, researchers started to link the cognitive schema concept and the internal working model. This line of research has been regarded as very promising because it might help to overcome some of the discussed difficulties contemporary attachment research is confronted with. Cognitive schemas have been described in structures with a very rich and elaborate content (Young et al., 2003). Demonstrating a link between internal working models and cognitive schemas, might help us to better understand the content of internal working models. Even more interestingly, the clear definition of a cognitive schema with its very straightforward predictions regarding information processing, might help to better understand the processes underlying the internal working model. Furthermore, links with cognitive schema theory might be important as it may well be that some of the cognitive behavioural therapy (CBT) techniques and strategies can be applied in the therapeutic approach of less securely attached individuals.

Linking internal working models and the cognitive schema idea seems to be in line with very recent evolutions in the conceptualization of internal working models. As described earlier, Fraley (2007) proposes a connectionist perspective to approach internal working models. According to this approach experiences are stored in units that get differently activated. This leads to representations with a different content and different related behavioural rules in different contexts. This idea is very much in line with cognitive psychology's diathesis-stress ideas. The diathesis-stress hypothesis was formulated by Beck (1983) to explain vulnerability for depression and later relapse. According to this theory, individuals with depressogenic schemata are not depressed as long as the schema is latent. However, as soon as these individuals are confronted with a schema-relevant stressor, the latent schema gets activated leading to more depression. Although research to demonstrate the diathesis-stress hypothesis is still ongoing, clear evidence for this model has been recurrently found (Abela & Hankin, 2008; Hankin, 2008).

Applied to attachment theory, this would suggest that people develop multiple internal working models representing the self in relation with the other. The content of these working models varies in relation to one attachment figure, due to different relationship experiences across time and situations, and varies in relation to different attachment figures. These working models can represent very specific or very general attachment experiences, but all the elements of all the working models that are stored in a person's brain are part of the same system. Internal working models can be latent, without exerting an influence on a person's behaviour, until an event occurs that reactivates the latent working model.

The clear definition with clear predictions, the implicit diathesis-stress characteristic and the potential therapeutical implications all indicate the potential relevance of studying the association between internal working models and cognitive schemas. In a first study, we will investigate the association between internal working models and early maladaptive schemas. This study is important for two reasons. Firstly, demonstrating this association will provide important substantiation of our central assumption that the internal working model can be operationalized as a cognitive schema. Secondly, this study can help increase our understanding of the content of internal working models. If this study confirms the association between the two concepts of interest, we will try to find further evidence for our central assumption by testing the implicit hypothesis that the internal working model should be accompanied by an information processing bias for internal working model congruent information. To test this hypothesis, the last two studies of this dissertation will investigate attentional biases for the central figure of the internal working model (in our samples this was the mother).

With regard to the content of internal working models. The cognitive schemas' content has been elaborated by Young, who defines a maladaptive schema as 'a broad pervasive theme or pattern comprised of memories,

emotions, cognitions and bodily sensations regarding oneself and one's relationships with others, developed during childhood or adolescence, elaborated throughout one's lifetime and dysfunctional to a significant degree' (Young et al., 2003). Based on clinical experience in adults with personality disorders, he distinguished 16 maladaptive schemas that are different as regards content and can be grouped within five schema domains: Disconnection and rejection; Impaired Autonomy and Performance; Impaired Limits, Other-Directedness; Overvigilance/Inhibition (for a full overview, see Appendix C). Research has found evidence for Young's conceptualization, both in adults (Rijkeboer & van den Bergh, 2006) as in adolescents (Van Vlierberghe, Braet, Bosmans, Bögels, & Rosseel, 2008; Van Vlierberghe, Timbremont, Braet, & Basile, 2007).It has been suggested that attachment insecurity might be linked to the development of psychopathology through the development of early maladaptive schemas (Mason, Platts, & Tyson, 2005). To test this hypothesis, the study described in Chapter 4 was designed to investigate the mediating role of early maladaptive schemas in the link between attachment and psychopathology. As these early maladaptive schemas have been considered to be less differentiated and remain in the process of elaboration throughout adolescence (Muris, 2006), we have decided to investigate this hypothesis in a sample of late adolescents.

With regard to the underlying processes, cognitive theory's schema conceptualization leads to the prediction that the internal working model should be accompanied by biases in the processing of information that is congruent with the content of the internal working model. Based on this assumption, the studies of Chapter 5 and Chapter 6 were designed to investigate attachment-related attentional biases. As the internal working model develops in relationship with an attachment figure, we decided to measure the attentional processing of attachment figures. Attention-related processes are typically investigated within experimental psychopathology using computerized experimental tasks that allow

fully standardized and precise presentations of stimuli. However, participants need to have accomplished sufficient cognitive maturation to successfully perform such tasks. Research has demonstrated that children as young as 5 years have a visual sensitivity that is only marginally lower than that of adults (Tschopp et al., 1999). However, during the school-age years attentional efficiency still increases with age (Schul, Townsend, & Stiles, 2003). In line with these findings, middle childhood seems to be a promising age-group to investigate attentional biases related to the attachment figure. Firstly, their cognitive maturation allows them to perform well on the computerized tasks (Schul et al., 2003). Secondly, as discussed earlier, the original main attachment figure still retains its predominate importance and its central role in the internal working model (Kerns, Abraham, Schlegelmilch, & Morgan, 2007). Finally, these children are increasingly capable to report on their relationships with their caregivers (Dwyer, 2005).

Based on the distinction in attentional processing made by Derryberry and Tucker (1994), we have designed two different methods to demonstrate the existence of an attachment figure related attentional bias.Derryberry and Tucker (1994) have demonstrated that emotions have two separate influences on attention reflecting different brain activation systems (Tucker & Williamson, 1984): they alter the ability to *orient attention* towards or away from emotionally relevant stimuli and they influence the *breadth of the focus* of attention. Therefore we designed two experimental tasks to measure the orientation of attention towards mother (Chapter 4) and to measure the attentional breadth around mother (Chapter 5).

In line with Ainsworth's work (Ainsworth et al.,1978) on the organization of inter-individual differences in attachment behaviour in distinct secure, avoidant and anxious attachment styles, attachment theory predicts vigilance to threat in anxious persons and avoidance to threat in avoidant persons. However, little evidence has been found for differences in attention

allocation across these abovementioned insecure styles. In studies with children, it has been found that insecurely attached children direct attention away from both disturbing information and information that is threatening for attachment after elongated presentation (Main et al., 1985; Kirsh & Cassidy, 1997). Adult research shows similar results, whereby a tendency to turn attention away from negative information and attachment threat was found in insecurely attached people, without evidence for differences across insecure attachment styles (Dewitte et al., 2007; Zeijlmans van Emmichoven, et al., 2003).

It is not clear whether specific distinctions in within the basic insecure and secure attachment styles is crucial for attachment theory in general and the secure base script in particular (Waters & Beauchaine, 2003; Frayley & Spieker, 2003). Based on the following arguments, a dimensional approach (insecure vs. secure) to studying attachment schemas seems most appropriate. First, research showing differences in information processing across the different attachment styles primarily used mood induction to prime the attachment system (e.g. Pereg & Mikulincer, 2004). In contrast, studies on attentional bias for attachment threat tended not to use mood-induction. They followed the rationale that the detection of attachment threat must specifically be measured in neutral mood contexts, since negative mood is considered to be the result of threat detection. These studies did not find evidence for differences across insecure styles. Second, research has generally focussed on coping with negative information, whereas the current studies will try to demonstrate how children direct their attention towards a main caregiver in an emotionally neutral situation. In line with our research question, the current studies will not use mood-induction to minimize a possible confound with coping effects. Consequently, we predict only an effect of high versus low secure attachment.

As for the *orientation of attention (Chapter 5)*, an interesting paradigm to explore attention allocation towards a stimulus is the Exogenous Cueing Task (ECT, Posner, 1980). In this task (see Figure 1) participants are asked to focus

attention on a cross in the middle of a computer screen. Then, at the left or right side of the screen, one cue (stimulus) appears and disappears followed by the appearance of a target-stimulus either on the same (valid trial) or opposite side of the cue (invalid trial). Participants are instructed to react as quickly as possible to the target, by pressing a key. If cues are presented with a Stimulus Onset Asynchronity (SOA: the time between the onset of the stimulus and the onset of the target) less than 300 ms, participants generally react faster on valid trials (called the cue validity effect). If cues are presented with a long SOA (e.g. 1000 ms), participants tend to react faster on invalid trials because they turn attention away from the already scanned cue to explore the other location. This robust Inhibition Of Return effect (IOR: Posner, 1980) has been demonstrated at 16-18 weeks after birth (Butcher, Kalverboer, & Geuze, 1999) and is expected to become fully acquired during childhood (MacPherson, Klein, & Moore, 2003).

In adult studies, modified versions of the ECT have shown differences in attention allocation depending on the content of specific cue stimuli. These differences in attentional processing have been described as specific attentional biases (e.g. Fox, Russo, Bowles, & Dutton, 2001; Yiend & Matthews, 2001). Three ECT scores can be calculated: (1) maintained attention or how long attention remains directed towards a stimulus, measured with the cue validity index (CVI: RTinvalid - RTvalid); (2) attentional engagement or attention towards a stimulus, measured with an engagement score (in our study: RTvalid/mother - RTvalid/unknown women); and (3) the time it takes to direct attention away from a stimulus, measured with a difficulty to disengage score (in our study: RTinvalid/mother - RTinvalid/unknown women).

Studies with ECT have revealed heightened engagement towards anxious stimuli in phobic patients (e.g. Koster, Crombez, Van Damme, Verschuere, & De Houwer, 2005), towards angry faces in depressed individuals (Leyman, De Raedt, Schacht, & Koster, 2007), maintained attention and a difficulty to disengage from negative words in dysphoric and depressed

individuals (Koster, et al., 2005; Leyman, et al., in press). In children, Pollak and Tolley-Shell (2003) used the modified ECT together with event-related potentials (ERPs) to measure the effect of physical abuse on selective attention to happy, angry and neutral facial expressions. Using the ECT, they demonstrated an engagement effect for angry faces in the abused population. No evidence was found for a disengagement effect using the ECT. However, ERPs were indicative of the existence of a disengagement effect.

In the study of Chapter 5, stimuli – pictures of either the participants' mother or an unfamiliar woman – were presented at two different SOAs. At an SOA of 200 ms, the ECT measures early attentional processes where no IOR is expected, and where an engagement effect reflects early vigilance – faster direction of attention towards the mother (Calvo & Eysenck, 2000). At an SOA of 1000 ms, the ECT measures later stages of processing where either IOR or maintained attention can be expected and where an engagement effect reflects enhanced attention for a stimulus – i.e. children remain focussed on the mother and do not explore the visual environment. On the other hand, the interpretation of the disengagement effect is independent of SOA.

At an SOA of 1000 ms, hypotheses derived from Bowlby's theory are straightforward: children who are less securely attached are expected to show difficulties distancing themselves from their parents. This effect should be reflected in higher maintained attention towards mother, enhanced attention, and more difficulty to disengage. At an SOA of 200 ms, attachment theory does not provide information to formulate specific hypotheses and no other studies using short presentation times were found (Niedenthal, Brauer, Robin, & Innes-Ker, 2002; Fraley, Davis, & Shaver, 1998). However, the assumption that the secure base script acts as a cognitive schema, leads to the prediction that attachment does not influence early engagement processes. If attentional bias should occur at an SOA of 200 ms, the attentional bias would be more stimulus-driven. If the bias occurs only at 1000 ms, then results would be indicative of a schema-driven

attentional bias (see the time course analyses in Koster, Verschuere, Crombez, & Van Damme, 2005).

As for the *breadth of the attentional field (Chapter 6)*, the same stimuli – pictures of the participants' mothers or unfamiliar women – were used in a different task. We developed a Dual-task paradigm (based on Ball, Beard, Roemker, Miller, & Griggs, 1988). In this paradigm, pictures of mother or unfamiliar women are presented in the centre of the visual field, and a second stimulus is simultaneously presented at a random location around this central picture either close to (10° of the visual angle) or far away (25°) from the picture. We predicted that less secure attachment will lead to increased difficulties to correctly identify stimuli when presented far from a simultaneously presented picture of mother compared to stimuli that are presented close to mother.

To test whether the influence of attachment is pre-attentive and automatic or influences later stages of attentive processing, stimuli were presented at three different presentation times: 34ms, 100ms, and 250ms. In fact, correct responses in the 34ms condition provide the most critical measure of attentional breadth because the presentation time is too brief to allow any saccades towards the target (Ball et al., 1988). Therefore, an effect of attachment at 34ms would suggest an influence on pre-attentive narrowing of attention, whereas effects at the longer presentation times would indicate that attachment-related cognitions have an influence on later stages of attentional processing implying different attachment-related visual scanning strategies. Differentiating between automatic and strategic influences on attentional narrowing is important in determining the amount of cognitive control that can be exerted on attentive processing.

Finally, we examined whether differences in attentional breadth in the context of attachment are related to the internal working model of the child or to

specific parenting styles. Although attentional breadth has never been studied in parenting research, Vansteenkiste, Simons, Lens, Soenens, & Matos (2005) found evidence suggesting that low levels of autonomy-supportive communication styles do narrow a child's attentional focus during conceptual learning. Therefore, we argue that a decrease in attentional breadth in the infant may be related to specific parenting styles. Nevertheless, building on attachment theory it can be expected that differences in attentional breadth are more proximally related to the child's internal working models than to parenting styles. As less secure attachment has been linked to higher levels of aversive parenting styles in middle childhood and early adolescence (Doyle & Markiewicz, 2005), we predicted that a potential effects of parenting styles on attentional breadth will be mediated by the child's attachment representations.

In summary

The current dissertation aims at increasing our understanding of the internal working model. In the next chapters, 5 studies will be described. Chapters 2 and 3 investigate the *role* of the internal working model of attachment in the link between *parenting and psychopathology*. Chapter 4 will investigate the link between attachment and early maladaptive schemas to increase our insight in the *content* of the internal working model. To conclude this dissertation, Chapters 5 and 6 investigate attentional biases towards the attachment figure, in order to better understand the influence of attachment experiences on *information processing*. Chapter 7 will summarize the main findings of the five studies carried out, discuss their implications for attachment, discuss their main limitations, to end with describing clinical relevance and further research opportunities.

Chapter 2

Do parenting behaviours predict externalizing behavior in adolescence, or is attachment the neglected third factor[1]

The aim of this study was to examine the role of attachment in the link between parenting behaviours (including positive parenting and negative control) and problem behaviours during adolescence. Using questionnaires, we examined 511 Flemish, Dutch-speaking adolescents ranging in age from 10 up to 18 years. We distinguished three age groups (10-12, 13-15, and 16-18 years) and conducted mediation and moderator analyses, using multiple regression analyses. Results showed that attachment towards mother and father mediates between negative control and problem behaviour in the first two age groups. The strength of the link between parenting and problem behaviour was less strong in the older age groups, while the strength of the link between attachment and parenting was equally important across age groups. Only in the youngest age group, we found some evidence for a parenting by paternal attachment interaction. These findings suggest the need for tailoring existing preventive parent management trainings: more attention should be paid to improve the quality of parent-child interactions and the forthcoming attachment bonds.

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[1] Bosmans, G., Braet, C., Van Leeuwen, K., Beyers, W. (2006). Do parenting behaviors predict externalizing behavior in adolescence, or is attachment the neglected 3rd factor? *Journal of Youth and Adolescence, 35,* 373-383.

Introduction

In research on the aetiology of behaviour problems, risk inducing or protective factors have been identified and combined in ecological models (e.g. Belsky, 1984), postulating indirect and direct relationships between these factors. These factors can be assigned to three main groups: (1) child factors such as temperament, (2) environmental factors, like social status of the neighbourhood, and (3) parental factors.

The latter can be studied from a narrow perspective - for example the study of parenting behaviours - or from a broad perspective - for example studying the link between psychopathology of parents and psychopathology of their children. Connell and Goodman (2002) showed that only a small proportion of the variance within externalizing behaviour can be explained by parenting behaviours To broaden our understanding of parental influences on the development and maintenance of externalizing problems, we investigated the role of child-parent attachment. The research literature links attachment to both externalizing behaviour (e.g. Marcus & Betzer, 1996) and to parenting (e.g. Devito & Hopkins, 2001). Until very recently (Doyle & Markiewicz, 2005) hardly any research has paid attention to the effect of the combination of both attachment and parenting on externalizing behaviour in older children.

Attachment Theory

Bowlby (1973) states that, based on the quality of early parent-child interactions, children build internal representational working models – a set of internalized beliefs and expectations – about oneself and others. These working

models in turn determine or influence the way individuals interact with their environment.

Although, historically, attachment has often been considered as a categorical construct distinguishing different sets of behaviours (e.g., Ainsworth, Blehar, Walters, & Wall, 1978), more recently attachment has been measured as a dimensional construct (e.g., Armsden & Greenberg, 1987). Individuals with a more secure attachment tend to view others as accepting and responsive, and themselves as lovable and worthy of care. Individuals who are less securely attached can have an overinvolvement in close relationships, they tend to view others as rejecting and unresponsive, or as untrustworthy and inaccessible.

Throughout adolescence, attachment relationships undergo important changes (Conolly, Paikoff, & Buchanan, 1996). At first glance, adolescents try to untie earlier bonds to parents in favour of peer relations. Adolescents do become less dependent on parents, which does not mean that the relationship becomes unimportant as a whole (Allen & Land, 1999). In fact, from early to mid-adolescence, most teens still turn to parents under conditions of extreme stress (Steinberg, 1990). Parents continue to figure as a secure base (Nickerson & Nagle, 2005), even in young adulthood (Fraley & Davis, 1997).

Attachment and Externalizing Behaviour

Although theories have always considered insecure attachment to be an important variable explaining the development of disruptive behaviour (e.g. Bowlby, 1969), a vast amount of attachment research has focused on the link between attachment and later academic adjustment, socio-emotional functioning and relationship formation (e.g., Vivona, 2000; Winefield, Tiggemann, & Winefield, 1994). Research on the link with externalizing behaviour started more recently (e.g. Greenberg, Speltz, & Deklyen, 1993; Waters, Posada, Crowell, &

Lay, 1993). Using mediation analysis, Simons, Paternite, & Shore (2001) showed that poor parent attachment predicts low self esteem and poor social cognition skills, which in turn may lead to aggression in young adolescents.

Parenting, Attachment and Externalizing Behaviour

Parenting is generally known as an important risk-factor linked with disruptive behaviour. Literature points at many various important parenting practices that have been associated with disruptive behaviour: (a) punitive discipline (yelling, nagging, threatening), (b) inconsistent discipline, (c) lack of warmth and positive involvement, (d) physical aggression (hitting, beating), (e) insufficient monitoring, (f) ineffective problem solving modelling (Larzelere, 2000; Patterson, 1986; Patterson & Stouthamer-Loeber, 1984; Strassberg, Dodge, Petit & Bates, 1994; Weiss, Dodge, Bates, & Petit, 1992). Although in adolescence, the link between parenting and externalizing behaviour endures (Steinberg & Morris, 2001), the strength of this link is harder to define: it varies across samples, contexts, and specific outcome measures (Steinberg, 2000).

Research has also established an association between parenting and attachment in young children. Mothers of securely attached 1-year old children appear to be more tender, positive, responsive and sensitive to their infants. In contrast, mothers of insecure-avoiding infants have been observed to be more rejecting of their child's attachment behaviours, more averse to physical contact, and more prone to interact in a more angry, intense and intrusive manner. In comparison, mothers of insecure-resistant infants are more inept and unsynchronised in their interactions, and more unpredictable, uninvolved, insensitive, and inconsistently responsive (Karavasilis, Doyle, & Markiewicz, 2003). For middle childhood and adolescence, positive associations were found between authoritative parenting - high levels of warm involvement,

psychological autonomy granting, and behavioural control - and secure attachment. Negligent parenting - low levels of these variables - predicted avoidant attachment (Karavasilis et al., 2003).

Little progress has been made to identify differential relationships of both parenting and attachment with psychopathology. Doyle and Markiewicz (2005) examined early adolescents in a two year follow-up design, and found evidence for attachment to mediate between parenting and different measures of adolescent adjustment, and externalizing behaviour in particular. In line with these findings, we hypothesize that the link between parenting behaviours and externalizing behaviour of the child is at least partly explained by attachment bonds.

Finding mediation effects, however, would imply that in adolescence parenting behaviours are less important than generally considered. To figure out the role of parenting, we performed moderator analyses using parenting as an interaction variable. Waters et al. (1993) already proposed a moderator model for early development of behaviour problems in which the effect of parent attachment on child aggression is moderated by child rearing practices. This model, however, has not been tested. Based on the literature (e.g. Scarr, 1992; Tannenbaum & Forehand, 1994; Winnicott, 1965) we hypothesize these interactions to be significant

Different Effects for Mother and Father Variables

As children grow older the importance of attachment to the father seems to increase. Williams and Kelly (2005) recently found father-adolescent involvement and attachment to explain a unique proportion of the variance seen in adolescents' teacher-reported externalizing and total behavioral problems at school. Other researchers have found similar results (Verschueren & Marcoen,

1999) and hypothesized that although the quality of children's functioning in intimate relationships or friendships might primarily depend on the quality of attachment towards mother, the quality of children's functioning in group (e.g., popularity) and the way children explore the world outside of the family (e.g., being socially withdrawn) primarily depend on the quality of attachment towards father.

Age and Gender Effects

Rothbaum and Weisz's meta-analysis (1994) provides evidence for the hypothesis that the association between parenting behaviours and externalizing problems is larger in samples of older children. Rice (1990) expects stronger associations between attachment towards parents and adjustment prior to important developmental transitions. Once the transition is made, the adolescent may rely on other sources for adjustment (e.g. peers).Evidence suggests that relationships with parents change when children become adolescents (Allen & Land, 1999).We hypothesize the strength of the link between parenting and externalizing behaviour to be high in pre-adolescence, moderate in early adolescence and lowest in middle adolescence, corresponding to age-related differences in the importance of established attachment patterns.

As predicted by Ainsworth (1991), Nickerson and Nagle (2005) found gender to influence peer attachment, but not parent attachment. Although boys show higher rates of externalizing behaviour compared to girls (Maughan, Rowe, Messer, Goodman, & Meltzer, 2004), Marcus and Betzer (1996) found no gender effects when studying the association between attachment and externalizing behaviour problems. Therefore we hypothesize no gender differences on the mediator and moderator analyses.

In sum, we tested the following hypotheses: (a) attachment mediates the effect of parenting on behaviour problems, (b) parenting is a moderator of the link between attachment and behaviour problems, (c) the effects will differ depending on the use of either father or mother variables in the model, (d) the effects will differ depending on age, (e) but not depending on gender.

Finding evidence for mediation models and for age or gender effects is relevant for clinical practice because it implies the need for tailoring of parent training programs. It could be that programs should pay extra attention to the quality of parent-child interactions and the forthcoming attachment bonds. Moreover, results could suggest the need for adjustment of preventive or treatment programs in line with the age or gender of the clients in focus.

Method

Participants

Participants included 511 Flemish, Dutch-speaking, elementary and high school students, ranging in age between 10 and 18 years (mean age = 13.93; *SD* = 1.78). The sample is well balanced regarding socio-economic status (Hollingshead-index; Mueller & Parcel, 1981) and age: 12% of the families in the sample have a high to moderately high, 68% a mean and 20% a low socio-economic status. Participants were divided in three cohorts, in conformity with the division in pre-, early, and middle adolescence (Neugarten & Datan, 1973): Ages ranged for the first cohort from 10 to 12 years (n = 124; 55 boys and 73 girls), the second cohort from 13 to 15 years (n = 253; 129 boys and 139 girls) and the third cohort from 16 to 18 years (n = 108; 59 boys and 56 girls). The subjects were equally distributed over the three age groups and over gender

[χ^2 (2) =,1.76, *ns*]. Percentages of externalizing behaviour problems (based on YSR *T*-scores) reflect the prevalence in the population: 6, 15, and 18% for Cohorts 1 to 3, respectively. The distribution of socio-economic status is equal for the three groups [χ^2 (8) = 7.27, *ns*].

Measures

Disruptive behaviour. The Youth Self-Report (YSR; Achenbach, 1991) was translated into Dutch by Verhulst, Van der Ende and Koot (1997). This measure lists behaviour problems that adolescents might exhibit - for example, hitting family members or peers. Using a three point scale ranging from 0 ("not true") to 2 ("very true or often true"), adolescents were asked how often they showed each problem behaviour. An externalizing score was computed by summing the scores on the Aggressive Behaviour (19 items) and Destructive Behaviour (11 items) scales (in the present sample *M* = 51.26; *SD* = 10.20; Cronbach's alpha =.84).

Attachment. Attachment to mother and father was measured with a short version of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987; translated into Dutch by Noom, Deković, & Meeus, 1999). Each version consists of 12 items (e.g. "My father/mother accepts me as I am"). Adolescents rated each item on a four point Likert-scale, ranging from "almost never" to "nearly always". Attachment was conceptualized as the quality of the relationship with mother and father: the availability of communication, trust, and the absence of alienation. The IPPA is not designed to differentiate between attachment patterns, but measures a continuum of secure versus insecure attachment. Someone who obtains a high score is more securely attached than someone who obtains a low score. The IPPA has been used to assess secure attachment in adolescents and has been related to a number of theoretically

relevant outcome variables (Crowell, Fraley, & Shaver, 1999). In the present sample the subscales were sufficiently reliable (attachment to father: Cronbach's alpha = .80; to mother: Cronbach's alpha = .85).

Parental behaviour. The Ghent Parental Behaviour Scale (GPBS, Van Leeuwen & Vermulst, 2004) is a 45-item self-rating questionnaire, designed to assess parenting behaviours based on the work of Patterson (Patterson, Forgatch, Yoerger, & Stoolmiller, 1998; Capaldi & Patterson, 1989). It describes parenting as observable parental behaviours: positive involvement, monitoring, problem solving, structure, and positive reinforcement. Though the GPBS can be administered with both parents and children or youth, for this study only the adolescents completed the GPBS

Psychometric research (Van Leeuwen & Vermulst, 2004) has revealed that it is possible to find a solid factor structure with two second-order factors– Positive parenting and Negative control. Positive parenting describes the efforts of parents to influence their children using reinforcement, involvement, providing support, granting autonomy and setting rules. Negative control refers to negative reactions to unacceptable behaviour by means of harsh punishment and ignoring. Significant correlations between ratings of parents and children for all the scales were found.

Procedure

The study was part of a larger study focusing on parenting behaviours and child characteristics (Van Leeuwen, Mervielde, Braet, & Bosmans, 2004). Participants were recruited via stratified random sampling of elementary and secondary schools. For elementary schools the sample was stratified by province (East and West Flanders), region (rural or urban), school type (public, private, or catholic schools) and grade. For secondary schools, sampling was based on

province (East and West Flanders), type of curriculum (vocational, technical, and general education) and grade. A letter addressed to the parents informed them about the goal and the procedures of the research project. The response rate was 85%. Families were visited at home by a trained psychology student. All participants signed informed consent papers.

Results

Preliminary Analyses

Preliminary analyses (Table 1) using a 3 (Cohort) X 2 (Gender) MANOVA showed that, compared to girls, boys report higher levels of negative control by mother and father [$F(1,398) = 5.19$, $p < .05$;$F(1,398) = 8.25$, $p < .01$] and lower levels of positive parenting by mother [$F(1, 398) = 1.38$, $p < .05$]. Younger children reported higher levels of attachment towards both mother and father [$F(2,398) = 3.50$, $p <.01$; $F(2.398) = 10.23$, $p <.001$] and lower levels of behavioural problems [$F(2.398) = 8.29$, $p <.001$]. No significant interaction effects between age and gender were found.

Correlations were calculated between all variables. Given the large sample size, we only report significant correlations higher than .30: between mother or father attachment and externalizing behaviours, between attachment towards father and mother, between mother or father attachment and positive parenting by mother or father, and finally between negative control by mother and father.

To minimize the probability of Type-I errors, we used the Bonferroni correction. Given the number of statistical tests we administered, effects are only to be considered as significant at $p < .01$.

Table 1

Means and Standard Deviations for Variables of Interest by Age Group and Gender

	Cohort 1				Cohort 2				Cohort 3			
	Boys		Girls		Boys		Girls		Boys		Girls	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Attachment mother	3.31	0.51	3.49	0.39	3.24	0.48	3.32	0.51	3.25	0.41	3.21	0.51
Attachment father	3.28	0.39	3.40	0.40	3.07	0.55	3.13	0.58	3.03	0.53	3.02	0.52
Negative control mother	43.33	11.87	38.34	9.86	40.90	10.10	39.39	9.16	39.89	10.87	39.02	9.87
Negative control father	40.82	10.70	36.61	10.31	39.16	9.84	36.58	8.86	38.07	10.42	35.96	8.34
Positive parenting mother	85.31	16.37	89.76	13.29	83.48	14.35	87.35	14.93	83.09	13.17	85.02	16.95
Positive parenting father	81.91	17.53	80.81	15.71	78.70	15.42	78.56	16.57	79.86	14.94	76.35	17.70
Externalizing	48.51	9.42	47.05	9.16	52.21	9.91	51.96	10.36	54.05	10.82	52.48	10.02

Mediation Analyses with Parenting by Mother as Predictor

The potential mediating role of attachment in the associations between parenting behaviour (the predictor) and level of problem behaviour (the criterion) was examined according to the criteria of Baron and Kenny (1986). In all reported analyses we have used multiple regression analysis. We have controlled for gender, and social economical status (SES), since both variables are risk factors in the development of problem behaviour (Hill, 2002). For mediation to occur, the correlations between the predictor and the criterion variable (Step 1), and between the predictor and the mediator (Step 2) should be significant. In a multiple regression analysis using both predictor and mediator together in the prediction of the criterion variable, the mediator should be a significant predictor (Step 3). The predictor (Step 4) should no longer correlate significantly (complete mediation) or significantly lower with the criterion as compared to Step 1 (partial mediation). To determine whether the correlation in Step 4 is indeed significantly lower, the Sobel-*t* test was performed using the web-based statistical tool of Preacher and Leonardelli (2005). We will discuss the results with negative control as predictor. No mediation effects could be found for the models with positive parenting, due to small correlations with problem behaviour.

Cohort 1 (10 – 12 years old). In the association between negative control by mother and behaviour problems (Table 2), all criteria were fulfilled for partial mediation of attachment towards mother (significant Steps 1, 2, 3, and Step 4 lower than Step 1). The correlation in Step 4 remained significant, implying that mediation was only partial (Holmbeck, 1997). The Sobel-*t* test was marginally significant, suggesting a trend that partial mediation occurred. Note, however, that Kenny (2003) warns that the Sobel-test yields very conservative results. Using attachment towards father as mediating variable, no mediation occurred.

This was due to the insignificant correlation between negative control by mother and attachment towards father, and due to the insignificant effect of attachment towards father on externalizing behavioural problems.

Table 2

Attachment as Mediator between Negative Control by Mother and Externalizing Behaviours

Mediating variable	Step 1	Step 2	Step 3	Step 4	Sobel-*t*
		Cohort 1			
Attachment towards mother	.43***.	-.30***	-.32***	.34***	2.30*
Attachment towards father	.43***	-.03	-.16	.46***	0.25
		Cohort 2			
Attachment towards mother	.13*	-.28***	-.32***	.03	3.42***
Attachment towards father	.13*	-.11	-.30***	.10	1.85
		Cohort 3			
Attachment towards mother	.11	-.23*	-.40***	.01	2.06*
Attachment towards father	.11	-.11	-.39***	.01	1.15

Note: Step 1 = path from the independent to the dependent variable. Step 2 = path from the independent to the mediating variable. Step 3 = path from the mediating to the dependent variable. Step 4 = path from the independent to the dependent variable, controlled for the mediator.

*$p < .05$. **$p < .01$. ***$p < .001$.

Cohort 2 (13 – 15 years old). Using attachment towards mother as mediating variable (Table 2) complete mediation occurred: correlations in Steps 1, 2, and 3 were significant, Step 4 was no longer significant, and the Sobel-*t* test

was highly significant. Using attachment towards father as mediating variable, no mediation occurred. This was due to the insignificant correlation between negative control by mother and attachment towards father.

Cohort 3 (16 – 18 years old). Using attachment towards mother as mediating variable (Table 2), no mediation occurred since the correlation in Step 1 was not significant. The marginally significant Sobel-*t* test and the significant Steps 1, and 2 imply a trend for an indirect effect of negative control by mother on externalizing behavioural problems, through attachment towards mother (MacKinnon, Lockwood, & Williams 2004). Using attachment towards father as mediating variable, no mediation occurred. This was due to the insignificant correlation between negative control by mother and attachment towards father.

Additional analyses. To test whether the mediation effects we found in this study were unidirectional, we used parenting as a mediator between attachment and externalizing behavioural problems. Hardly any significant effects were found (only in Cohort 1 negative control by mother partially mediated the effect of attachment towards mother), due to an insignificant Step 3. Results of the mediation analyses in either direction were nearly the same for boys compared to girls.

Since we hypothesized an age effect on the link between parenting, attachment and behaviour problems, we checked whether the effects of negative control by mother on externalizing behaviour (Step 1 in the test for mediator models) were indeed higher for the younger samples. We performed Fisher-*Z* transformations for partial correlations in the three groups. Cohort 1 was compared to Cohort 2 and Cohort 2 to Cohort 3. The correlation in Cohort 1 was significantly higher compared to Cohort 2 ($Z = 3.58$, $p < .05$). The correlations of Cohort 2 and Cohort 3 ($Z = .08$, $p > .05$) did not differ significantly. Similarly, age related trends in the effects of attachment towards mother on externalizing behaviour were analyzed (Step 3). We performed Fisher-*Z* transformations for

partial correlations in the three groups. We controlled for negative control. However, we found no significant differences.

Mediation Analyses with Parenting by Father as Predictor

In Cohort 1 attachment towards mother tended to be a partial mediator of the link between parenting and externalizing behaviour. In Cohort 2 the Sobel-*t* tests were significant for both the model with attachment towards father and mother as mediator, in both cases implying a complete mediation effect. In Cohort 3 neither mediating, nor indirect effects of attachment were found (Table 3).

Additional analyses revealed that the correlation between negative control by father and externalizing behavioural problems (Step 4) was significantly higher in Cohort 1 compared to Cohort 2 ($Z = 4.30$, $p < .05$). We did not find a significant difference between correlations of Cohort 2 and Cohort 3 ($Z = -0.08$, $p > .05$). The correlations between attachment towards father and externalizing behavioural problems (Step 3) did not differ significantly between cohorts. Parenting did not mediate between attachment and behaviour problems. Gender had no effect on mediations.

In order to understand why mainly attachment towards mother mediates between negative control by both mother and father and behavioural problems, we additionally calculated correlations between mother and father for negative control. Depending on age groups, correlations range from .62 till .79. We analyzed negative control by mother and father together in an MRA, but found no unique effects of mother and father negative control.

Table 3

Attachment as Mediator between Negative Control by Father and Externalizing Behaviours

Mediating variable	Step 1	Step 2	Step 3	Step 4	Sobel-*t*
			Cohort 1		
Attachment towards mother	.39***	-.23**	-.30***	.32***	2.01*
Attachment towards father	.39***	-.12	-.13	.36***	0.96
			Cohort 2		
Attachment towards mother	.14*	-.17**	-.32***	.09	2.59**
Attachment towards father	.14*	-.20**	-.29***	.08	2.82**
			Cohort 3		
Attachment towards mother	.16	-.16	-.31**	.10	1.42
Attachment towards father	.16	-.13	-.33***	.12	1.10

Note: Step 1 = path from the independent to the dependent variable. Step 2 = path from the independent to the mediating variable. Step 3 = path from the mediating to the dependent variable. Step 4 = path from the independent to the dependent variable, controlled for the mediator.

*$p < .05$. **$p < .01$. ***$p < .001$.

Tests for Moderation Effects

For each cohort eight interaction effects[2] were tested according to the criteria of Baron and Kenny (1986). To understand the meaning of interaction effects, graphics were inspected (Aiken & West, 1991). Only two interaction effects were significant. In Cohort 1 (Table 4) positive parenting by mother interacted significantly with attachment towards father (Table 4; $\Delta F_{interaction}$ = 7.74, $p < .001$). Figure 1 represents this interaction with a significant slope for the effect of attachment towards father on externalizing behaviour for high (t = -3.21, $p < 0.005$), but not for low or average positive parenting. Negative control by father interacted significantly with attachment towards father (Table 4; $\Delta F_{interaction}$ = 6.83, $p < .01$). Figure 2 represents the interaction with a significant slope for low scores on negative control (t = -2,81, $p < 0.01$). For Cohorts 2 and 3 we found no interaction effects. Three-way interactions, using gender as third interaction variable, were not significant.

[2] (a) Positive parenting by mother X Attachment towards mother, (b) Positive parenting by mother X Attachment towards father, (c) Negative control by mother X Attachment towards mother, (d) Negative control by mother X Attachment towards father, (e) Positive parenting by father X Attachment towards mother, (f) Positive parenting by father X Attachment towards father, (g) Negative control by father X Attachment towards mother, and (h) Negative control by father X Attachment towards father.

Table 4

Regressions Testing the Moderating Effects of Maternal and Paternal Parenting Behaviour

Attachment towards father X	Positive parenting by mother		Negative control by father		Negative control by mother	
	β	*ΔR²*	*β*	*ΔR²*	*β*	*ΔR²*
Step 1		.02		.02		.02
SES	-.05		-.05		-.05	
Age	.10		.10		.10	
Gender	.06		.06		.06	
Step 2		.04*		.22***		.25***
Attachment	-.20*		-.08		-.10*	
Parenting	-.02		.43***		.47***	
Step 3: Interaction	-.25**	.06**	.22**	.05**	.16*	.03*

Note. *df*(step1) = 3,12. *df*(step2) = 1,11. *df* (step3) = 1,11.

*$p < .05$. **$p < .01$. ***$p < .001$.

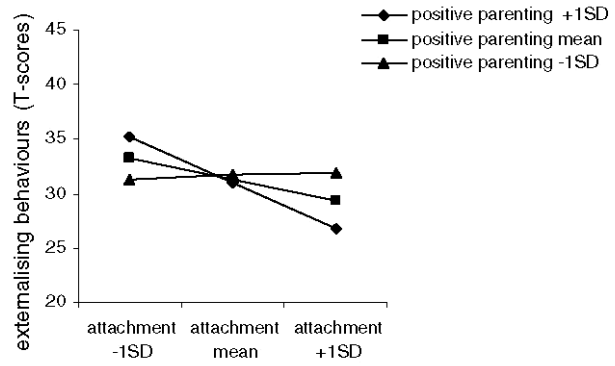


Fig. 1. Interaction of attachment towards father by positive parenting by mother in the prediction of externalizing behaviours.

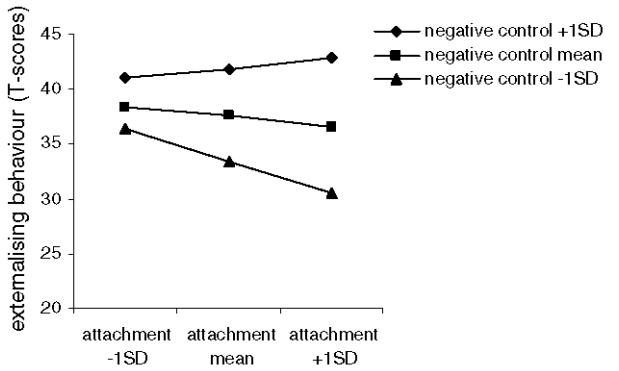


Fig. 2. Interaction of attachment towards father by negative control by mother in the prediction of externalizing behaviours.

Discussion

Results of this study confirm the previous findings of Doyle and Markiewicz (2005) that in early adolescence, attachment mediates the link between parenting and problem behaviour. The current study provides elements for a broader insight. (a) In pre- and middle adolescence respectively, only partial or no full mediation occurred. (b) This was due to age effects on the links

between negative control and problem behaviour and between attachment and problem behaviour. (c) The results were similar for both boys and girls. (d) The mediation was similar using either mother or father negative control. (e) Positive parenting did not correlate significantly with problem behaviour. (f) We found only minor support for parenting as moderator of the link between attachment and problem behaviour.

Mediation Models

The importance of parenting behaviours in the development of behaviour problems is generally accepted (e.g. Patterson, 1986). Our study confirms the findings of Doyle and Markiewicz (2005): the level of secure attachment plays an important role as the link between parenting and problem behaviour. Similar to Doyle and Markiewicz (2005) we found complete mediation in early adolescence. However, the way parenting, attachment and problem behaviour are related, differs across age.

In preadolescence, there is an association between negative control and problem behaviour, but this association is only partially determined by attachment. In middle adolescence, attachment towards mother no longer acts as a mediator. We did find a trend for an indirect effect. Although adolescent problem behaviour is no longer linked to negative control by mother, adolescents with mothers that exercise high levels of negative control are less securely attached and show more problem behaviour. As children become adolescents, environmental factors (e.g., peers) become more important (e.g., Allen & Land, 1999), parenting has less influence (e.g., Beyers & Goossens, 1999) and time spent in the family diminishes (Steinberg & Morris, 2001). Attachment seems to become a more stable influence on problem behaviour towards the end of adolescence. This statement needs further research.

The results should be interpreted with caution. Alternative interpretations of the mediation effects are possible. It could be, for example, that an adolescent who has a more secure relationship with his mother is inclined to report that his mother uses more positive parenting. However, the fact that parenting did not mediate the link between attachment and problem behaviour gives support for the direction of the links between parenting, attachment and problem behaviour outlined in this study.

Age and Gender Differences on the Effects

The link between negative control and problem behaviour is less strong in older age groups. These findings extend Rothbaum and Weisz's meta-analysis (1994), as their study compared 3-6 year olds to 10-14 year olds. The link between negative control and externalizing behavioural problems seems to develop in a curvilinear way. Initially, in preadolescence, negative control does not seem to have a major impact on behavioural problems. In early adolescence, the link becomes more important but in adolescence, the importance of negative control reduces. .

The strength of the link between attachment and parenting does not differ across age groups, but the link with behavioural problems is stronger in the older groups. This shift seems to occur when children are between 12 and 15 years old. From 15 years on attachment towards parents remains the only predictor of existing behavioural problems. The link between mother attachment and externalizing behavioural problems has been found in all age groups as was the case for example in Marcus and Betzer (1996) and Arbona and Power (2003). The link between father attachment and externalizing behavioural problems is significant once children are older than 12 years.

As expected and in line with Ainsworth (1991) and recent findings (e.g., Nickerson & Nagle, 2005) no gender effects for either the mediation or the moderation models were found.

The mediation effects were similar, independent of using negative control by either mother or father as predictor. The high correlations between mother and father negative control and the absence of separate effects of negative control by mother and father in the joint regression analysis imply that negative control by mother and father can possibly be considered as a single variable: a general pedagogical atmosphere at home. One could hypothesize that, living together, both parents influence each other's parenting style through mechanisms like modelling.

In the younger age groups parenting is linked with mother attachment whereas in the older age groups it is also linked with father attachment. Results confirm Karavasilis' (2003) findings that parenting styles, especially the ones involving a lot of negative control, mainly predict attachment to mother. This is associated with externalizing behaviour. The results confirm the abovementioned findings of Williams and Kelly (2005) and Verschueren and Marcoen (1999) that attachment towards father is more important beyond early adolescence. It is possible that the importance of attachment towards father will intensify as children grow older and investment in relationships outside the family increases.

Positive Parenting and Behaviour Problems

Contrary to the study of Doyle and Markiewicz (2005) we found attachment to mediate between negative control and problem behaviour, while we found no effects of positive parenting. However, positive parenting differs from the parental warmth variable: we measured behaviours instead of styles, and the contents of the variables differed.

The failure to find a linear effect of positive parenting on problem behaviour is not unexpected, since both absence and exaggerated levels of positive parenting can lead to higher levels of problem behaviour. Parents who provide no or low levels of positive parenting make their offspring feel rejected, which has been associated with heightened levels of aggressive behaviour (Prino and Peyrot, 1994). On the other hand, parents who apply excessive high levels of positive parenting, tend to overindulge, which is associated with higher levels of adolescent symptoms (Koeske, 1998). In our study, a test of quadratic effects for positive parenting by mother slightly supports this hypothesis in pre- and early adolescence ($F = 3.13$, $p < .05$; $F = 2.87$, $p < .06$).

Moderation Models

We found only minor evidence for the Waters et al. (1993) hypothesis that negative control interacts with attachment in the prediction of problem behaviour. Only two out of 24 moderation analyses emerged as significant. If mothers are described as using higher levels of positive parenting or if fathers are described as using lower levels of negative control, preadolescents who are less securely attached towards father will show the highest levels of problem behaviour. These contra-intuitive findings may be linked with the study of Treboux, Crowell and Waters (2004), who found discrepancies between security of attachment and security of the current relationship to predict amount of relationship conflict.

Clinical Implications

In research focusing on the treatment of disruptive children, adolescents and adults revealed that the older the patient, the less susceptible to treatment and the lower the chances of long-term change (Kazdin, 1995). Results suggest that it is worthwhile to consider whether insecure attachment could be one of the reasons why treatment of conduct problems at later ages has little effect. It may be advisable to take into account the effect of insecure attachment on the process and outcome of prevention or treatment.

Parenting behaviours as negative control and positive parenting seem to be especially important when applied to younger children who need a lot of parental support in accepting limits and rules. As children grow older and become adolescents they need less explicit help from parents to become aware of limits and rules in the world around them. The lack of moderation effects of parenting together with the mediating role of attachment and the lack of mediation effects of parenting all point at the important role of attachment for explaining problem behaviour. Early attachment seems to play a continuing role in fostering externalizing behaviour problems, especially when children become adolescents. Therapy with adolescents may be less successful compared to therapy with young children, because the focus of therapy is more difficult to determine. Interventions that try to improve parenting skills are doomed to fail because parenting styles have lost their most important influence at that age.

Methodological Limitations

Even though these results seem to be a very promising step in understanding how externalizing behaviours develop, several limitations to this

study should be taken into account. As in the Doyle and Markiewicz' (2005) study, only adolescent self-report measures were used. This entails a bias in the results, not only from a developmental perspective but also from a social desirability perspective. Although it is generally known that agreement between adolescents and parents is rather low (Achenbach, McConaughy, & Howell, 1987), and although adolescent self-report is well established as an important source of information, future studies should include multiple informants.

Although the IPPA was selected as a measure of attachment based on reported positive experiences of other researchers, it could be argued that the experienced attachment towards parents and the experienced parental style are not independent of each other. While the parenting measure reflects the adolescent's perception of parents' behaviour, the attachment measure reflects the adolescent's subjective experience of the relationship with his parents. The limitation we encountered here is one of the main problems in attachment research. Attachment has been conceptualized as a construct that includes emotional and cognitive functioning, that reflects quality of interpersonal interaction, that is supposed to reflect the way parents interacted with their children when they were young, that is supposed to measure feelings of safety, etc. We would like to stimulate researchers to try to further differentiate the construct of attachment. There is a need for constructs that are more undimensional and hence easier to interpret. Further conceptualisation as well as a more concrete operationalisation of the construct can help us understand why or how attachment plays such an important role in explaining the link between parenting and externalizing behavioural problems.

The nature of the study makes it impossible to deduct causal attributions. We investigated the link between attachment and externalizing behaviour at the same time. To overcome this limitation longitudinal research is needed. However, research indicates that the link between attachment and externalizing behaviour is much harder to identify in longitudinal studies (Hill, 2002).

Conclusions

The importance of the present study lies in the finding that antisocial behaviour is not only related to parenting behaviours but also to the way children are attached to their parents. We found that the link between parenting and externalizing behaviours becomes less important in adolescence, while the effect of attachment remains. Furthermore, we found that the effect of parenting behaviours on externalizing behaviour can often depend on the way children are attached towards their parents. These findings further qualify the quality of parent-child interactions and contribute to the understanding and treatment of behavioural problems.

Chapter 3

Why is punitive parenting associated with internalizing problems in adolescence? The mediating role of attachment[3]

To increase our understanding of the link between punitive parenting and internalizing problems in adolescence, the present study investigated the mediating role of attachment in this relationship. For this purpose, 514 families (mother, father and adolescent with age ranging from 10 to 18 years) completed questionnaires measuring punitive parenting behaviours, attachment and internalizing problems. Using Structural Equations Modelling, the mediation hypothesis was tested for the mother and father variables separately. Punitive parenting behaviours were measured multi-informant. Results indicate that the effect of punitive parenting on internalizing problems is completely mediated by attachment. This mediation-effect could be replicated across the gender of the parent and was not moderated by the gender of the adolescent.

[3] Bosmans, G., Braet, C., Beyers, W., Van Vlierberghe, L., Van Leeuwen, K. (resubmitted). Why is punitive parenting associated with internalizing problems in adolescents? The mediating role of attachment. *Journal of Youth and adolescence.*

Introduction

Mounting evidence indicates that punitive parenting is one of the risk factors related to higher levels of adolescent internalizing problems (Liang & Eley, 2005; Mcleod, Weisz, & Wood, 2007; Turner & Muller, 2004; Van Leeuwen & Vermulst, 2004; Wu, 2007). As nearly half of the children with internalizing problems retain clinical depression or anxiety diagnoses over several years (Spence, 2001), understanding the mechanisms that can explain the association between punitive parenting and internalizing problems is primordial to gain insight in these problems and to develop adequate prevention and/or treatment strategies (Bayer, Sanson, & Hemphill, 2006). Different potential mechanisms can be put forward to explain this association. In this study, it is assumed that children store frequent experiences with punitive parents in insecure attachment-related internal working models (Wu, 2007). These internal working models consist at least partly of cognitions or expectancies regarding the availability of the attachment figure (Armsden & Greenberg, 1987; Kerns, Tomich, & Kim, 2006; Mikulincer & Shaver, 2007; Waters & Waters, 2006) and this has been linked with higher levels of internalizing problems (Allen, Porter, McFarland, McElhaney, & Marsh, 2007; Rönnlund & Karlsson, 2006). Until now, this mechanism has received little research attention. The present study investigates the assumed mediating role of attachment in the association between punitive parenting and internalizing problems in adolescence.

In the present study, punitive parenting behaviours are conceptualized as parental responses aimed at punishing inappropriate conduct of a child (Douglas & Strauss, 2007). Based on their assumption that children have to feel bad in order to learn, punitive parents will use physical and/or non-physical punishments to extinguish their child's misconduct. Although this parental approach may reduce the enactment of misbehaviour, punitive parenting appears to come with a serious emotional cost for the child on both the short and the long

term (Douglas & Strauss, 2007). The detrimental effects of physical punishment on internalizing problems have been clearly demonstrated and are widely accepted (e.g. Gershoff, 2002; Straus & Kantor, 1992). More recently, research has also demonstrated an important link between levels of non-physical punishments and internalizing problems (Lau, Rijsdijk, Gregory, McGuffin, & Eley, 2007; Liang & Eley; 2005; Van Leeuwen & Vermulst, 2004). As it has been demonstrated that it is the frequency of harsh disciplining rather than the physical character of punishment per se that predicts internalizing problems (Larzelere & Kuhn, 2005; Turner & Muller, 2004; Wu, 2007), the current study will assess punitive parenting using measures of both physical and non-physical punitive behaviours.

Adolescents that are frequently exposed to parental punitive behaviours are also assumed to develop less secure attachment-related internal working models (Wu, 2007). In line with attachment theory's predictions, it has been demonstrated that differences in the quality of both early parent-child interactions and later parent-adolescent interactions are related to differences in the attachment security-related content of these internal working models (Karavasilis, Doyle, & Markiewicz, 2003; Stroufe, 2005). Specifically, less securely attached adolescents have less trust in the availability of their parents (in Bowlby's words: they have a less *secure base*; Bowlby, 1988; Kerns et al., 2006). As a consequence of the low levels of trust in availability, less securely attached adolescents will experience more anger in relation to parents in reaction to their unavailability and therefore will seek less parental support in times of distress (parents are used less as a *safe haven*; Bowlby, 1988). In line with these assumptions, it has already been demonstrated that insecurely attached adults tend to have representations of more punitive parents (Levy, Blatt, & Shaver, 1998). Furthermore, adolescents who report more negatively controlling parenting behaviours, including harsh punishment and frequent disciplining,

report being less securely attached (Bosmans, Braet, Beyers, & Van Leeuwen, 2006).

Throughout adolescence, attachment relationships undergo important changes (Conolly, Paikoff, & Buchanan, 1996) as adolescents try to untie earlier bonds to parents in favour of peer relations and become less dependent on parents. Nevertheless, this does not mean that the relationship becomes unimportant (Allen & Land, 1999). In fact, from early to mid-adolescence, most teens still turn to parents under conditions of extreme stress (Steinberg, 1990). Parents continue to figure as a secure base in adolescence (Nickerson & Nagle, 2005) as well as in young adulthood (Fraley & Davis, 1997). Most importantly, attachment relationships are particularly relevant during adolescence (Wu, 2007), since this is a period of potential stressful change and turbulence. This stressful context increases the activation of attachment-related internal working models, which makes the impact of insecure attachment in the adolescents' life more salient and probably more harmful (Lopez & Brennan, 2000).

Working models are further assumed to determine or influence the way individuals interact with their environment and they consequently influence the strategies used to regulate negative affective states across the life-span (Mikulincer, Shaver, & Pereg, 2003). Not surprisingly, longitudinal research has identified attachment insecurity as a significant predictor for the development of anxiety disorders during childhood and adolescence (Warren, Huston, Egeland, & Stroufe, 1997). Furthermore, studies in clinical and non-clinical samples found more severe depressive symptoms in insecurely versus securely attached children (Armsden, McCauly, Greenberg, Burke, & Mitchell, 1990; Kobak, Sudler, & Gamble, 1991; Laible, Carlo, & Rafaelli, 2000; Mikulincer & Shaver, 2007; Muris, Meesters, van Melick, & Zwambag, 2001).

Until recently, hardly any research paid attention to whether or not attachment and parenting uniquely contribute to internalizing problems in

adolescence. A study by DeVet (1997) suggested that parent-child connectedness mediates the relationship between physical punishment and adolescent internalizing problems in females (DeVet, 1997), but was limited due to a single informant adolescent measurement of parental punishment. Therefore, the link between punishment and internalizing problems simply might have been due to depression-related reporting bias in the adolescent. Furthermore, the relatively high age of the participants (mean age was 18.4 years) made it difficult to draw conclusions about younger adolescents. A study by Renk, McKinney, Klein, and Oliveros (2006), demonstrated how the retrospective link between parental punitive behaviours and depression is mediated by the negative feelings adolescents have about their mothers. However, this study was again conducted in an older sample (mean age was 19.8 years), with only a single-informant measurement of parental punishment. To our knowledge, until now only one study tested the specific hypothesis that attachment mediates the association between parenting and internalizing problems (Doyle and Markiewicz, 2005). They argued that insensitive parenting behaviours undermine the child's sense of self as valuable and the internal working model of the parent as a secure caregiver (Davies & Cummings, 1994; Petit & Laird, 2002). The associated lack of secure attachment would result in an increase in internalizing problems.

Nevertheless, Doyle and Markiewicz (2005) did not find evidence for this mediation . They attributed the absence of the predicted mediation effect to the Baron and Kenny (1986) approach they used to test mediation and to the low reliability of the parenting questionnaire they used. They argued that a test of the joint significance of the effects of parenting and attachment comprising the effect of attachment as intervening variable should provide the best balance of Type I error and statistical power (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). To avoid the limitations mentioned by Doyle and Markiewicz (2005), the current study tried to test the Doyle and Markiewicz (2005) mediation hypothesis using Structural Equation Modelling (SEM), thus

increasing the power of analysis (Holmbeck, 1997). Additionally, the current study used a reliable parenting questionnaire, thereby measuring concrete parenting behaviour rather than a general parenting style which enables to distinguish more clearly between the influences of parental acts as such and the quality of the parent-child attachment relation.

Research has demonstrated that the assessment of parenting behaviours and internalizing problems is influenced by the perspective of the informant (e.g. Jensen et al., 1999; Lanz, Scabini, Vermulst, & Gerris, 2001). Considering punitive parenting, parents tend to underreport their punishment behaviours (Sessa, Avenevoli, Steinberg, & Morris, 2001), whereas adolescents' might overreport punitive parenting when experiencing internalizing problems. As research has indicated that it is important to take into account the congruence between parents' and adolescents' reports to obtain a realistic assessment of parenting behaviours (Lanz et al., 2001), the current study will integrate the perspectives of the parents and the adolescent to measure punitive parenting. Maternal punitive behaviours were based on the reports of both mothers and adolescents, whereas paternal punitive behaviours were rated by fathers and adolescents.

With regard to the assessment of adolescent internalizing problems, research has demonstrated that parents are a less reliable source of information than adolescents themselves (Achenbach, McConaughy, & Howell, 1987; Puura, et al., 1998; Rubio-Stipec, Fitzmaurice, Murphy, & Walker, 2003). Parents appear to have a different perspective on adolescent internalizing problems because of several reasons. First, internalizing problems are less observable for parents in adolescence. Furthermore, as adolescents spend significantly less time with their parents, maladaptive functioning remains longer hidden for parents. Second, internalizing problems are more difficult to observe than externalizing problems as they are less visible for parents. Third, observers tend to report problems that are experienced as distressing. Internalizing problems often tend to

be less distressing for parents as they are for adolescents (for a thorough overview on informant discrepancies, see De Los Reyes & Kazdin, 2005). As recent research has demonstrated that the informant discrepancy is also due to both informants' depression (De Los Reyes, Goodman, Kliewer, & Reid-Quiñones, 2008), the current study follows the recognition that internalizing problems are preferably measured by the adolescents' perspective alone.

Finally, although attachment has often been considered a categorical construct distinguishing qualitatively different sets of behaviours (e.g., Ainsworth, Blehar, Walters, & Wall, 1978), recent research did not find convincing evidence for these categories (Fraley & Spieker, 2003, Waters & Beauchaine, 2003) and nowadays attachment is often measured dimensionally (e.g., Armsden & Greenberg, 1987, Waters & Waters, 2006). Individuals with a more secure attachment tend to have working models of others as available and responsive, and of themselves as lovable and worthy of care. Individuals who are less securely attached tend to view others as rejecting and unresponsive, or as untrustworthy and inaccessible.

Attachment theory would predict that attachment mediates the relationship between parenting behaviours and internalizing problems regardless of the gender of the adolescent (Ainsworth, 1991). Nevertheless, gender appears to have an important influence on the development of depression, with girls being more vulnerable than boys to develop internalizing problems (Galambos, Leadbeater, & Barker, 2004). However, because no evidence until now shows that gender influences parent-child attachment (Nickerson & Nagle, 2005), we did not expect to find a gender effect on the mediation mechanism.

Hypotheses

In summary, the present study was designed to increase our understanding of the link between punitive parenting and internalizing problems in a general population sample. Testing the possible mediating role of attachment is at the same time a test of a basic assumption of attachment theory. Attachment theory predicts that children and adolescents store their experiences with parents in internal working models. Less secure working models are expected to be characterized by insecure attachment cognitions and behaviours and this should be linked with an increase in internalizing problems. In the present study, we assume (a) that punitive parenting consists of physical and non-physical punishments and that (b) punitive parenting will be positively linked with adolescent internalizing problems (the direct effect). We expect that (c) punitive parenting will be associated with less secure attachment and that (d) less secure attachment will be related to internalizing problems. Finally, (e) we predict that attachment is a mediator and consequently that the indirect effect of punitive parenting on internalizing problems through the effect of attachment will be significant and that adding this indirect effect will decrease the direct effect to a non-significant level (full mediation). These hypotheses were tested for the maternal and paternal data separately, allowing us to assess whether the findings replicate across parental gender. Furthermore, the possible confounding effect of adolescent age was controlled for and the possible moderating effect of adolescent gender was examined.

Method

Participants

Participants included 514 Dutch-speaking, elementary and high school students (244 boys and 270 girls), ranging in age between 10 and 18 years (mean age = 13.93; *SD* = 1.78), 502 mothers (mean age = 41.82; *SD* = 4.45) and 469 fathers (mean age = 44.88; *SD* = 9.86). This general population sample balances nicely socio-economic status (Hollingshead-index; Mueller & Parcel, 1981): 12% of the families in the sample have a high to moderately high, 68% a mean and 20% a low socio-economic status.

Measures

Punitive parenting. The Ghent Parental Behaviour Scale (GPBS, Van Leeuwen & Vermulst, 2004) is a 45-item self-rating questionnaire, designed to assess current parenting behaviours based on the work of Patterson, who described parenting as observable parental behaviours (Capaldi & Patterson, 1989; Patterson, Forgatch, Yoerger, & Stoolmiller, 1998). The GPBS was completed by both parents and the adolescents: mother behaviour was assessed by mother (GPBS-M) and the adolescent (GPBS-AM); father behaviour was assessed by father (GPBS-F) and the adolescent (GPBS-AF). For this study we were particularly interested in the two subscales measuring punitive parenting behaviours: harsh punishment assess the use of physical punishments (five items such as: I slap my child when it has done something forbidden) and disciplining assess the use of non-physical punishment (six items such as: If my child does something which was not allowed, I punish him/her by taking away something

fun: I do not let him/her watch TV or I give him/her house arrest). All items were answered on a 5 point Likert-scale, ranging from 1 (never) to 5 (always) with higher scores reflecting more frequent harsh punishment or disciplining. The disciplining subscale was highly reliable for all informants: maternal disciplining reported by mother $\alpha = .84$ and reported by the adolescent $\alpha = .85$; paternal disciplining as reported by father $\alpha = .83$ and by the adolescent $\alpha = .84$. The harsh punishment subscale was sufficiently reliable for all informants: maternal harsh punishment as reported by mother $\alpha = .59$ and by the adolescent $\alpha = .81$, paternal harsh punishment as reported by father $\alpha = .70$ and by the adolescent $\alpha = .84$.

Internalizing problems. The Youth Self Report (YSR: Achenbach, 1991) is a self-report questionnaire that is administered to the adolescent. Symptoms of psychopathology are assessed with 112 items that were translated in Dutch by Verhulst, Van der Ende and Koot (1997). On a three point Likert-scale, ranging from 0 (never) to 2 (often) adolescents were asked to indicate the occurrence of each symptom. Items aggregate to eight 'syndrome scales'. For the purpose of the current research questions we were particularly interested in the three syndrome scales that measure internalizing problems according to the manual, namely the 'anxious/depressed', 'withdrawn/depressed' and 'somatic complaints' syndrome scales. The YSR is considered as a reliable and valid instrument (Verhulst, Achenbach, Van der Ende, et al., 2003). In the present study, Cronbach α's of the syndrome scales were high: for withdrawn/depressed $\alpha = .72$, for somatic complaints $\alpha = .70$, and for anxious/depressed $\alpha = .85$.

Attachment. Attachment to mother and father was measured with a short version of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987; translated into Dutch by Noom, Deković, & Meeus, 1999). Adolescents rated each item in the mother and father version on a four point Likert-scale, ranging from 1 (almost never) to 4 (nearly always). Attachment was conceptualized as the quality of the relationship with mother (IPPA-M) and

father (IPPA-F) measuring three subscales each: trust (4 items, e.g., "I trust my mother/father"), communication (4 items, e.g., "I tell my mother/father about my problems and troubles), and alienation (4 items, e.g., "My mother/father doesn't understand what I am going through these days"). The IPPA is not designed to differentiate between attachment patterns, but measures a continuum of secure attachment. Someone who obtains a higher score is more securely attached. The IPPA has been used to assess attachment in adolescents and has been related to a number of theoretically relevant outcome variables (Crowell, Fraley, & Shaver, 1999; Ridenour, Greenberg, & Cook, 2006). In the present sample the subscales were sufficiently reliable (attachment to mother: trust $\alpha = .73$; communication $\alpha = .71$; alienation $\alpha = .62$; attachment to father: trust $\alpha = .74$; communication $\alpha = .73$; alienation $\alpha = .67$).

Procedure

The study was part of a larger research project focusing on parenting behaviours and child characteristics (Van Leeuwen, Mervielde, Braet, & Bosmans, 2004). Participants were recruited via stratified random sampling of elementary and secondary schools. For elementary schools the sample was stratified by province (East and West Flanders), region (rural or urban), school type (public, private, or catholic schools) and grade. For secondary schools, sampling was based on province (East and West Flanders), type of curriculum (vocational, technical, and general education) and grade. A letter addressed to the parents informed them about the goal and the procedures of the research project. Families were visited at home by a trained psychology student. All participants signed informed consent papers. The present data were gathered during the follow-up measurement, where we had a response rate of 85%.

Plan of the Analyses

First, we computed correlations among all study variables and we examined gender differences on 17 variables while controlling for possible age-effects using ANCOVA. To minimize the probability of Type-I errors, we used the Bonferroni correction for the ANCOVAs. Effects are only to be considered as significant at $p < .002$.

Second, we conducted SEM to investigate the mediating role of Attachment in the link between Punitive Parenting and Internalizing Problems. To evaluate the models' goodness of fit, the Standardized Root Mean Square Residual (SRMR) and the Root Mean Squared Error of Approximation (RMSEA) were selected. Combined cut-off values close to .08 for SRMR and close to .06 for RMSEA indicate good model fit (Hu & Bentler, 1999). All analyses were performed for mother and father variables separately. The structural model with mother variables consisted of Maternal Punitive Parenting, Attachment towards mother, and Internalizing Problems. The structural model with father variables consisted of Paternal Punitive Parenting, Attachment towards father, and Internalizing Problems. We first investigated the measurement models for these two structural models with confirmatory factor analysis. To test for mediation, we followed the procedure suggested by Holmbeck (1997). First, only direct pathways between the Punitive Parenting, Secure Attachment and Internalizing Problems latent variables were tested. Then, a model with an indirect effect between parenting and internalizing problems through attachment was tested. In the final step the direct effect of Punitive Parenting on Internalizing Problems was assessed simultaneously with the indirect effect through Attachment. If the direct effect becomes non-significant, while the indirect effect proves to be significant, complete mediation has occurred. Instead, if both the direct and indirect effects remain significant,

but the direct effect has decreased in the final model, partial mediation has occurred. In all SEM analyses, age was a control variable, and possible moderating effects of gender were tested using multigroup modelling (Bollen, 1989).

Results

Preliminary Analyses

Overall, 5% of the data was missing completely at random (Little's MCAR test was not significant: $\chi^2(7195) = 3815.67$, *ns*). Therefore, the expectation maximization method was used to estimate the missing data. Four girls were left out of the analyses, because the data of all relevant subscales were missing. Means and standard deviations of the study variables are shown in Table 1. Gender-analyses revealed two effects: (a) boys reported higher levels of Harsh Punishment by father ($M = 5.95$, $SD = 2.95$) than girls ($M = 5.15$, $SD = 2.28$), $F(1, 484) = 12.48$ ($p < .001$), which was confirmed by the fathers (Boys: $M = 5.02$, $SD = 2.09$; Girls: $M = 4.53$, $SD = 1.21$), $F(1, 484) = 9.73$ ($p = .002$). (b) Girls reported more somatic complaints compared to boys (Boys: $M = 2.61$, $SD = 2.34$; Girls: $M = 3.26$, $SD = 2.61$). Inspection of the correlations revealed highly significant correlations between the majority of the observed variables. Only somatic complaints (YSR) and communication with father (IPPA-F) did not correlate with the maternal and paternal punitive parenting variable. However, these observed variables did correlate with all the other variables under study. In the total sample, 16.3% of the children obtained a t-score of 63 or higher, indicating clinical significant levels of internalizing problems in this general population sample.

Table 1: Correlations, means and standard deviations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Disc(m)	1																
2. Harsh(m)	.13**	1															
3. Disc(cm)	.41***	.16***	1														
4. Harsh(cm)	.20***	.30***	.35***	1													
5. Disc(f)	.47***	.14**	.33***	.19***	1												
6. Harsh(f)	.09*	.19***	.01	.11*	.18***	1											
7. Disc(cf)	.30***	.14**	.67***	.18***	.40***	.06	1										
8. Harsh(cf)	.19***	.22***	.31***	.64***	.22***	.33***	.33***	1									
9. Withdrawn	.11*	.03	.14**	.11*	.07	-.03	.13**	.09*	1								
10. Somatic	.04	-.02	.08	.07	-.02	-.03	.02	.03	.37***	1							
11. Anxious	.07	.02	.12**	.14**	.07	-.01	.12**	.12**	.70**	.49***	1						
12. Com(cm)	-.14**	-.10*	-.15**	-.20***	-.09*	-.10*	-.11*	-.17***	-.27***	.08	-.23***	1					
13. Alien(cm)	-.08	-.11*	-.25***	-.25***	-.08	.01	-.14**	-.17***	-.36***	-.31***	-.43***	.46***	1				
14. Trust(cm)	-.19***	-.18***	-.21***	-.34***	-.19***	-.12**	-.14**	-.28***	-.31***	-.18***	-.31***	.67***	.56***	1			
15. Com(cf)	-.08	.06	-.08	-.05	-.03	-.02	-.05	-.12**	-.20***	.11*	-.19***	.54***	.31***	.38***	1		
16. Alien(cf)	.01	-.03	-.13**	-.12*	-.05	.04	-.17***	-.21***	-.25***	-.19***	-.29***	.25***	.43***	.24***	.55***	1	

Note: Disc(m): Maternal Disciplining observed by mother; Harsh(m): Maternal Harsh Punishment observed by mother; Disc(cm): Maternal Disciplining observed by the child; Harsh(cm): Maternal Harsh Punishment observed by the child; Disc(f): Paternal Disciplining observed by father; Harsh(f): Paternal Harsh Punishment observed by father; Disc(cf): Paternal Disciplining observed by the child; Harsh(cf): Paternal Harsh Punishment observed by the child; Intern(m):Internalizing problems of the adolescent according to mother; Withrawn: Withdrawn/depressed according to the adolescent; Somatic: Somatic Complaints according to the adolescent; Anxious: Anxious/depressed according to the adolescent; Com(cm): Communication with mother according to the child; Alien(cm): Alienation from mother according to the child; Trust(cm): Trust in mother according to the child; Com(cf): Communication with father according to the child; Alien(cf): Alienation from father according to the child; Trust(cf): Trust in father according to the child.

$p < .05$; ** $p < .01$; *** $p < .001$

Measurement Models

SEM with latent variables was performed, using LISREL 8.72 software (Jöreskog & Sörbom, 1993) and solutions were generated on the basis of maximum-likelihood estimation. The Maternal and Paternal Punitive Parenting variables were measured with the subscales harsh punishment and disciplining. Maternal Punitive Parenting was assessed by the adolescent (GPBS-AM) and the mother (GPBS-M), paternal Punitive Parenting by the adolescent (GPBS-AF) and the father (GPBS-F). As it is common practice to take into account the correlations between error variances across informants that evaluate the same variables, errors variances of harsh punishment were correlated across informants, as were error variances of disciplining. The latent Internalizing Problems variable was measured with the withdrawn/depressed, the somatic complaints, and the anxious/depressed subscales of the YSR. The latent Attachment towards Mother and Father variables were measured with the three attachment subscales communication, alienation, and trust for mother (IPPA-M) and father (IPPA-F). A correlation between the error variances of the observed variables trust and communication was allowed in the measurement models of both parents. Most importantly, trust and communication consist of positively worded indicators, whereas the items of alienation are negatively worded. This causes common method variance that is not related to attachment and should be left out of the structural model.

Data screening of the subscale scores (the observed variables) indicated data non-normality, both at the univariate and multivariate level. Therefore, in all subsequent models we used the asymptotic covariance matrix between all indicators as input and inspected the Satorra-Bentler Scaled chi-square (SBS-χ^2, Satorra & Bentler, 1994).

Measurement models showed a good fit for the mother model (SBS-$\chi^2(36) = 82.13$, SRMR = .04, RMSEA = .05) and the father model (SBS-$\chi^2(36) = 70.39$, SRMR = .04, RMSEA = .04). All loadings of the observed variables on the latent variables were higher than .30 except for the loading of harsh punishment according to father on Paternal Punitive Parenting. Therefore we left this observed variable out of the measurement model with father variables, which made its fit increase (SBS-$\chi^2(28) = 45.78$, SRMR = .04, RMSEA = .04)

Attachment towards Mother as a Mediator between Maternal Punitive Parenting and Internalizing Problems

Following Holmbeck (1997), the three direct pathways between the latent variables were calculated. (1) The model with the direct pathway between Punitive Parenting and Internalizing Problems had a good fit and revealed a significant pathway (SBS-$\chi^2(16) = 27.15$, SRMR = .04, RMSEA = .04; $\beta = .15$, $p < .01$). (2) The model linking Punitive Parenting to Attachment showed a good fit and revealed a significant pathway (SBS-$\chi^2(15) = 47.96$, SRMR = .04, RMSEA = .07; $\beta = -.57$, $p < .001$). (3) The model linking Attachment and Internalizing Problems showed a good fit and revealed a significant pathway (SBS-$\chi^2(1) = 25.35$, SRMR = .03, RMSEA = .05; $\beta = -.54$, $p < .001$). Finally, we tested (4) the model that assesses the direct and indirect pathways simultaneously. The fit of the model remained satisfactory after adding the indirect pathway (SBS-$\chi^2(36) = 82.13$, SRMR = .04, RMSEA = .05). The direct pathway between Punitive Parenting and Internalizing Problems was reduced to non-significance ($\beta = -.12$, *ns*), while the indirect effect proved to be significant ($\beta = .35$, $p < .001$). These results suggest that complete mediation has occurred. Age was significantly associated with Attachment towards mother ($\beta = -.27$, $p <$

.001). An overview of this model is presented in Figure 1. This model explained 33% of the variance in Internalizing Problems.

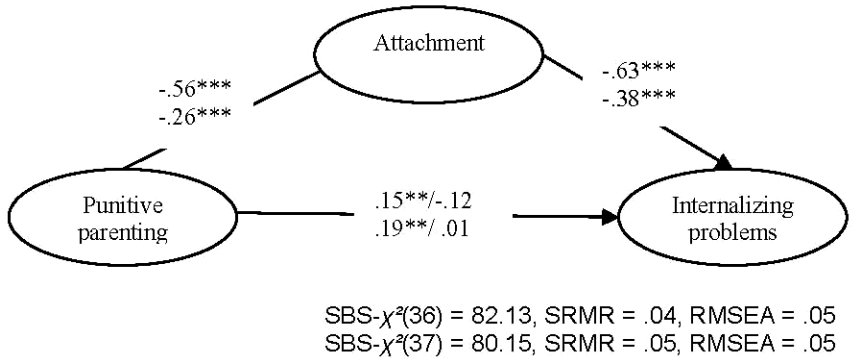


Figure 1: Attachment mediates the effect of Punitive Parenting on Internalizing problems: *β*-values and fit-summary for the mother (first line) and father variables (second line)

To identify the influence of gender, a multi-group test was used with boys and girls as different groups. For this purpose we compared a model where the pathways between the latent variables were assessed separately for boys and girls with a model where the pathways were fixed to be equal across gender. These two models did not differ in quality of fit (SBS-$\chi^2\Delta(3) = 1.39$, *ns*) which indicates that the relationships between the variables are the same for boys and girls.

Attachment towards Father as a Mediator between Paternal Punitive Parenting and Internalizing Problems

The three direct pathways between the latent variables were calculated. (1) Punitive Parenting was related to Internalizing Problems (SBS-$\chi^2(16)$ = 38.69, SRMR = .04, RMSEA = .05; β = .19, $p < .01$). (2) Punitive Parenting was linked with Attachment (SBS-$\chi^2(10)$ = 39.76, SRMR = .04, RMSEA = .08; β = -.39, $p < .001$). (3) Attachment was associated with Internalizing Problems (SBS-$\chi^2(12)$ = 15.92, *ns*, SRMR = .03, RMSEA = .03; β = -.34, $p < .001$). Finally, (4) the model that assesses the direct and indirect pathways simultaneously (see Figure 1) showed a good fit (SBS-$\chi^2(37)$ = 80.15, SRMR = .05, RMSEA = .05). The direct pathway between Punitive Parenting and Internalizing Problems was reduced to non-significance (β = .01, *ns*), while the indirect effect proved to be significant (β = .10, $p < .001$). These results suggest that complete mediation has occurred. This model explained 15% of the variance in internalizing problems. The relationships were the same for boys and girls (SBS-$\chi^2\Delta(3)$ = .46, *ns*). Age was significantly associated with Attachment towards father (β = -.30, $p < .001$).

Discussion

The present study tested the hypothesis that Punitive Parenting has an emotional cost for the adolescent, looking at the association between Punitive Parenting and Internalizing Problems and the mediating role of Attachment in this association. With regard to our research questions, the results confirm that in a general population sample (a) Punitive Parenting does consist of both frequent physical and non-physical punishment behaviours, (b) Punitive Parenting is associated with higher levels of Internalizing Problems, (c) Punitive Parenting is linked with Attachment and (d) Attachment is associated with Internalizing

Problems. Most importantly, the results show that (e) the link between Punitive Parenting and Internalizing Problems was completely mediated by Attachment. The associations between these variables did not vary in strength across the gender of the adolescents. All models appeared to be valid for both the mother and father data, which emphasizes the replicability and relevance of these findings.

Both physical and non-physical punishment behaviours loaded significantly on the latent Maternal and Paternal Punitive Parenting variable. In line with the findings of Van Leeuwen and Vermulst (2004), this result implies that both forms of discipline have some maladaptive variance in common, probably reflecting the overlapping frequency of these punitive behaviours (Turner & Muller, 2004). Whereas both physical and non-physical punishment behaviours as assessed by mother and adolescent loaded significantly on Maternal Punitive Parenting, physical punishment as assessed by the father did not significantly load on the latent Paternal Punitive Parenting variable. This finding indicates that fathers judge their physical punishment behaviours differently compared to their non-physical punishment behaviours and compared to adolescents' view of their behaviour. Even though social desirability might explain this difference (Peterson, Tremblay, Ewigman, & Popkey, 2002), further research is needed to fully understand this result. Although we did argue that punishing parents belief that children need to suffer to learn, their pedagogic approach might, at times, be also an expression of insecurely attached parent's affect regulation strategies (e.g. Berry, Barrowclough, & Wearden, 2007; Gerlsma & Luteijn, 2000). As this alternative hypothesis is substantiated by the important mediating role of attachment demonstrated in this study, future research should assess the parents' own attachment style in addition to parenting behaviour.

This study confirms that punitive parenting does come with an important emotional cost for the child as it corroborates the link between punitive

parenting and internalizing problems (Liang & Eley, 2005; Turner & Muller, 2004; Van Leeuwen & Vermulst, 2004; Wu, 2007) and less secure attachment (e.g. Levy, et al., 1998). Furthermore, the often established link between attachment and internalizing problems (e.g. Muris et al., 2001) is confirmed. Thus, all conditions were met to conduct a mediation analysis.

This study found clear evidence for the mediating role of attachment in the link between parenting and internalizing problems. The link between punitive parenting behaviours and adolescents' reports of internalizing problems was completely explained by attachment. This mediation effect was found with a multiple-informant measurement of punishment behaviour and could be replicated across parental gender, which emphasizes the importance of the effect. No evidence was found for moderating influences of adolescent's gender on the underlying process. Thus, our study confirms the assumption that the role of the attachment system is functionally equal across gender (Ainsworth, 1991; Nickerson & Nagle, 2005).

Our results differ from the findings of Doyle and Markiewicz (2005) who failed to find evidence for this mediation effect. The current study differs from theirs as parenting behaviours instead of styles were measured. Furthermore, Doyle and Markiewicz (2005) already argued that the absence of an effect in their study was probably due to the methodological and statistical limitations of their approach. In response to that limitation, the large sample size of this study enabled SEM as an alternative to hierarchical multiple regression analyses to investigate the mediation effect (Holmbeck, 1997).

The present results are particularly important as our multi-informant measurement of parenting behaviour decreases the likelihood that the link between parenting and internalizing problems is only influenced by emotion-related memory biases. Although effect sizes seem relatively small, the statistical approach combining different informants assures that only true relationships are

reflected. The multi-informant approach also prevents the measure of parenting from being too contaminated by attachment, although attachment and parenting have always been considered diverse constructs (Richaud De Minzi, 2006), the correlations between parenting styles and attachment found in previous studies often could at least partly be explained by common variance through item or content overlap. In the current study, however, frequency of violent and non-violent punishment has no content-overlap with the items measuring trust, communication and alienation.

Although all analyses were performed controlling for the effect of age, age was only linked to attachment. Older adolescents reported less secure attachment to mother and father. This result is in line with the finding that the quality of parent-child relationships slightly decreases as adolescents grow older (Meeus, Iedema, Maassen, & Engels, 2005). The absence of an age-effect on Punitive Parenting suggests that maladaptive parenting does not adapt to the developmental changes adolescents undergo. The absence of an association between age and internalizing problems is unexpected, as these problems are known to increase throughout adolescence (Twenge & Nolen-Hoeksema, 2002). When investigating the associations between age and the adolescent self-reported internalizing variables, we did find significant but small correlations (withdrawn/depressed $r = .12$, $p < .01$; somatic complaints $r = .10$, $p < .05$; anxious/depressed $r = .10$, $p < .05$).

In spite of the relevance of the findings, several limitations of this study should be noted. First of all, we used the IPPA as it is considered to be a sound adolescent attachment questionnaire with repeatedly demonstrated and in the current study replicated strong reliability and validity (e.g., Dwyer, 2005; Ridenour et al., 2006; Mikulincer & Shaver, 2007). In spite of the quality of the questionnaire we used, the current results should be expanded in future research as we have not measured dimensions of attachment anxiety and attachment avoidance. Indeed, when applying our results to the affect-regulation model

proposed by Mikulincer and Shaver (2007), one could argue that the IPPA measures cognitions and emotions that can be linked to the first appraisal in their affect-regulation model: is the attachment figure available? It has been demonstrated that this appraisal represents a core component of attachment-related internal working models (e.g. Kerns et al. 2006; Waters & Waters, 2006). When the attachment figure is evaluated as unavailable, this model predicts that a second appraisal – if proximity seeking is or is not a viable option – might lead to psychopathology through two different pathways reflecting two different secondary attachment-related affect regulation strategies. If insecurely attached individuals consider proximity seeking to be a viable option, they are regarded as more anxiously attached. They are assumed to be more vulnerable for psychopathology as they continue to focus on negative emotions and fear to be abandoned. If they consider proximity as non-viable, they are more avoidantly attached and vulnerable as they will deactivate their emotions and stress their independence. Internalizing problems have been linked with both attachment dimensions, showing more robust links with attachment anxiety than with attachment avoidance (Mikulincer & Shaver, 2007).

Nevertheless, until now, the attachment-related affect-regulation model applies mainly to adults and older adolescents. The validity of the model in younger samples is yet to be established (e.g. Armsden & Greenberg, 1987) and questionnaires should be developed to measure attachment anxiety and avoidance dimensions in younger samples. This will also make it possible to investigate the relationship between the above mentioned attachment dimensions and the IPPA. Until now, only the Preoccupied and Avoidance Coping Scale (Finnegan, Hodges, & Perry, 1996) has been designed to measure these attachment dimensions. However, research demonstrated that its preoccupied scale might not measure a maladaptive feature (e.g. Kerns, Tomich, Aspelmeier, & Contreras, 2000). This finding might be due to questionnaire-related limitations but might also reflect differences between younger and older

samples. It could be for example that in younger samples it is more adaptive to call anxiously for the availability of the mother in cases where the child experiences some fear to be abandoned by the attachment figure. Therefore, we would like to argue that, given the limitations of the existing attachment measurement instruments, the IPPA at this moment is a valid and reliable measure to investigate our current research question that attachment acts as a mediator in the relationship between parenting and internalizing problems.

Furthermore, the cross-sectional character of this study does not allow to infer causal pathways. Therefore, new longitudinal research or a further follow-up of this sample would be very useful. Although the current study is important as it identifies the mediating role of attachment-related cognitions in the link between parenting behaviours and psychopathology, this study cannot explain why attachment is of such importance. Future research should therefore try to increase our understanding of the mechanisms that are assumed to be guided by the internal working model concept. Also, it is important to take into account that it was our intention to explore the mediating role of attachment. However, moderating mechanisms are possible as well. It could be, for example, that less secure adolescents with more punitive parents experience more internalizing problems compared to secure adolescents who experience a similar level of punishment by their parents, confirming the buffering role of secure attachment. However, there is an important conceptual difference between mediators and moderators. A mediator can hardly be a moderator at the same time in relation to the same variable. Given our theory driven predictions, the strong fit of the current mediation models and the absence of evidence of an interaction effect between parenting and attachment in previous studies (e.g. Bosmans et al., 2006), we would like to argue against a moderator model. Nevertheless, future research should continue to investigate this alternative mechansim.

The present study has important implications for clinical practice, as these results indicate that merely trying to influence the punitive behaviours of

parents might not have an immediate or sufficient impact on children's internalizing symptoms, nor on the less secure attachment-related cognitions that are associated with experiences with punitive parents. Our results demonstrate that especially the less secure attachment-related cognitions are related to internalizing problems. Therefore, in adolescence it might become more important to work on these maladaptive cognitions. Offering new relational experiences in a therapeutic context (e.g. Young, Klosko, & Weishaar, 2003), improving the relationships with attachment figures (e.g. in Attachment Based Family Therapy: Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002), or strengthening positive relationship memories (e.g. Carr, 1998) are examples of possible therapeutic strategies that might help to lessen the impact of negative experiences with attachment figures on internalizing problems.

In sum, this study has tried to increase our insight in the association of punitive parenting with internalizing problems, and the mediating role of attachment. Results demonstrate that punitive parenting can be conceptualized as the common variance of physical and non-physical punishment. Higher levels of punitive parenting were associated with more internalizing problems and less secure attachment-related cognitions. Most importantly, these attachment-related cognitions could explain the association between punitive parenting and internalizing problems. The large sample of families, the use of a multi-informant measurement of parenting behaviours, the use of well-established measures of our main variables, and the replication of our findings across parental gender all emphasize the strength of the current study and the importance of the findings.

Chapter 4

Attachment and symptoms of psychopathology: Early maladaptive schemas as a cognitive link?[4]

This study investigated whether early maladaptive schemas can explain the relation between attachment anxiety and avoidance dimensions and symptoms of psychopathology. For this purpose, 289 Flemish, Dutch-speaking late adolescents participated in a questionnaire study. Using a non-parametric resampling approach, we investigated whether the association between attachment and psychopathology was mediated by early maladaptive schemas. Results indicate that the association between attachment anxiety and psychopathology is fully mediated by cognitions regarding rejection and disconnection and other-directedness. The association between attachment avoidance and psychopathology is partly mediated by cognitions regarding rejection and disconnection.

[4] Bosmans, G., Braet, C & Van Vlierberghe, L. (under revision). Attachment and Symptoms of Psychopathology: Early Maladaptive Schemas as a Cognitive Link? *Clinical Psychology and Psychotherapy.*

Introduction

Attachment theory has originally been formulated to explain the development of emotional disturbances (Bowlby, 1969). Early experiences with less sensitive and supportive caregivers have been demonstrated to lead to less secure attachment (e.g. Ainsworth, Blehar, Waters, & Wall, 1978). These attachment-related inter-individual differences have been captured in two attachment dimensions: attachment anxiety – expectations about losing attachment figures and not being able to cope without them – and attachment avoidance – expectations about the unavailability of attachment figures and about the need to cope without support of others (Mikulincer & Shaver, 2007). High scores on both attachment dimensions have been linked with symptoms of psychopathology due to the related affect-regulation strategies. Attachment anxiety has been associated with hyperactivating emotion regulation strategies – very energetic, insistent attempts to attain proximity, support and love –, and attachment avoidance with deactivating emotion regulation strategies – deactivated proximity seeking, inhibited quest for support, and active attempts to handle distress alone (Mikulincer & Shaver, 2007). The question remains which mechanism can explain these associations.

Bowlby (1969) initially explained the affect-regulating influence of attachment throughout the life-span by suggesting that early relational experiences are stored in cognitive structures called Internal Working Models (IWMs). Although IWMs form the theoretical cornerstone of attachment theory, the metaphorical formulation of this concept has led to a lack of research (Hinde, 1988; Thompson, 2008) and to an increase in theoretical controversy regarding (a) the unpredicted cross-temporal instability of IWMs found in several longitudinal studies, (b) the functioning of IWMs, and (c) the content of IWMs (Pietromonaco & Feldman Barrett, 2000; Thompson & Raikes, 2003).

To fill this conceptual gap, IWMs have been increasingly approached as cognitive schemas (e.g. Baldwin, Fehr, Keedian, Seidel, & Thompson, 1993; Bretherton, 1990), which are mental structures for screening, coding, recalling, and evaluating impinging stimuli (Clark, Beck,& Alford, 1999). This perspective can provide a theoretical answer to the controversial topics mentioned above. (a) Cognitive theory assumes that a specific maladaptive cognitive schema remains latent without influencing a person's behaviour until a schema-congruent context or an increase in distress reactivates that schema: this diathesis-stress characteristic might help explain attachment's variable cross-temporal stability (e.g. Fraley, 2007; Sroufe, Egeland, & Kreutzer, 1990). (b) Research has clearly demonstrated that activated schemas influence attention to, recall, and interpretation of schema-congruent information: these information biases have been demonstrated for IWM's as well (e.g. Bosmans, De Raedt, & Braet, 2007). (c) The content of cognitive schemas is expected to stem from specific early parent-child experiences. Therefore, it has been suggested that cognitive schemas hold the very beliefs IWMs consist of (Chorpita & Barlow, 1996; Holmes, 1993; Mason, Platts, & Tyson, 2005).

To identify the IWMs' content, Sibley (2007) has demonstrated that IWMs can indeed be linked to Beck's depressogenic cognitions. However, the content of Beck's cognitive schemas remains broad and little specific. Therefore, Young (Young, Klosko, & Weishaar, 2003) has used his clinical experience to develop a taxonomy of several "early maladaptive schemas" (EMSs) that are different with regard to cognitive content. An EMS is defined as a broad pervasive theme or pattern that is comprised of memories, emotions, cognitions and bodily sensations regarding oneself and one's relationships with others, resulting from unmet core emotional needs in childhood, elaborated throughout one's life and dysfunctional to a significant degree. The EMSs Young distinguished, can be grouped in five schema-domains: Disconnection/rejection, Impaired Autonomy/Performance, Impaired Limits, Other-Directedness,

Overvigilance/Inhibition (for a description of these domains and an overview of the related EMSs, see Appendix C).

Previous research has demonstrated that attachment styles are associated with EMSs in a clinical sample (Mason et al., 2005), but the categorical approach in this study led to descriptive statistical analyses and did not provide information about the interplay between attachment, EMSs, and symptoms of psychopathology. Nevertheless, associations have been found between attachment insecurity and EMSs (Mason et al., 2005) and between EMSs and symptoms of psychopathology (Schmidt, Joiner, Young, & Telch, 1995). Therefore, the present study was designed to investigate the prediction that the influence of attachment anxiety and attachment avoidance on symptoms of psychopathology is mediated by EMSs.

Method

Participants

Participants were 289 students (26 men, 241 women, 22 missing) with a mean age of 21 years (*SD* = 1.92). In the total sample, 71% of the students had their biological parents still living together, 16% had divorced parents, 4% had a parent living alone after the death of their partner, 6% had parents who had started a new relationship after divorce. Also, 13.3% of the students reported having had psychotherapy, and one percent had been in psychiatric hospitalization.

Measures

Experiences in Close Relationships Scale revised (ECR-revised; Fraley, Waller, & Brennan, 2000). The ECR-r consists of 36 items that have to be rated on a 7-point Likert scale. The items were designed to asses two dimensions of attachment: attachment anxiety (18 items about fear of abandonment and need for contact) and attachment avoidance (18 items about discomfort with closeness). The reliability and validity of these scales is well documented (Fraley, et al., 2000) and the internal and external validity of the Dutch version is comparable to the American version (Conradi, Gerlsma, van Duijn, & De Jonge, 2006). In the current sample Cronbach alpha was high for both subscales (α =.93).

Symptom Check List-90 (Derogatis, Lipman, & Cavi, 1973). The SCL-90 is an established measure of general psychiatric distress and is widely used to screen for psychiatric symptoms. Psychometric evaluations have reported good internal consistency (alpha coefficients .77 to .90) , good test-retest reliability, and good concurrent, construct and discriminant validity (Derogatis, 1983, 1994; Morgan, Wiederman, & Magnus, 1998). The 90 items are divided into nine subscales: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, anger-hostility, phobic anxiety, paranoid ideation, psychoticism, which can be summed up in one total problem score. The cronbach alpha in the current sample for the total problem score was .96.

Young Schema Questionnaire – Short Version (YSQ: Young & Brown, 1994). The YSQ is a 75-item adult self-report questionnaire that assesses 15 maladaptive schemas as identified by Young. Each item is phrased as a negative belief regarding the self, to be rated on a Likert scale from 1 (‘completely untrue for me’) to 6 (‘describes me perfectly’). An individual schema score is obtained by averaging scores on the five items each schema. A schema domain score is

obtained by averaging the scores of the schemas each domain consists of. The Dutch translation of the YSQ - Long version (Sterk & Rijkeboer, 1997) demonstrates good psychometric properties in clinical and non-clinical adult populations (Rijkeboer & van den Bergh, 2006; Rijkeboer, van den Bergh, & van den Bout, 2005). However, administering the 205-item long version in adolescents and young adults raises concerns regarding reliability. Moreover, in adult populations, the short and the long version of the YSQ show comparable psychometric properties (Waller, Meyer, & Ohanian, 2001). Therefore, corresponding items constituting the short version, were extracted from the Dutch long version for adults. These items were rephrased so to be comprehensible for adolescents and young adults and fit in their living environment. This Dutch adolescent short version (Van Vlierberghe, Rijkeboer, Hamers, & Braet, 2004) was backtranslated and sent to the original author for approval. Cronbach alpha's for the differing schemas in the present study range from .64 (Entitlement/Grandiosity) to .90 (Failure). To decrease the number of analyses, the five domain scores were computed by adding up the relevant schema scores (see Appendix C).

Procedure

At the beginning of a lecture, students were invited to participate in the study. It was emphasized that participation was not obliged. The students who agreed to participate, filled in an informed consent. Then the questionnaires were administered in a random order (four versions) to avoid order effects in the data.

Results

Maladaptive Domains and Attachment Dimensions

Less than 1% of the data was missing. To prevent the results to be contaminated by item-overlap between the early maladaptive schemas and the attachment dimensions, we performed several exploratory factor analyses eliminating the items that had cross-loadings higher than .30 on a non-intended scale, after every analysis. The procedure was repeated until a solution without cross-loadings was found. Following this method, we eliminated three of 36 attachment items and nine of 75 schema items (that belonged to the domains of Disconnection/Rejection and Overvigilance/Inhibition). After item deletion, the subscales remained reliable. Table 1 describes the descriptive statistics and the correlations between the variables under study. The correlation between attachment anxiety and attachment avoidance was .45 ($p < .001$). Both attachment dimensions were significantly linked with all schema-domains.

To decide which schema domains to use as mediator in the link between the attachment dimensions and symptoms of psychopathology, two Hierarchical Multiple Regression Analyses (HMRAs) were computed to investigate which of the five schema-domains are uniquely associated with each attachment dimension. Given the high correlation between attachment anxiety and attachment avoidance, in every HMRA the associations with one attachment dimension were computed while controlling for the effect of the other attachment dimension. Results show significant unique associations between attachment anxiety and Disconnection/Rejection ($\beta = .17$, $t = 2.22$, $p < .05$) and Other-Directedness ($\beta = .18$, $t = 2.98$, $p < .01$), and between attachment avoidance and Disconnection/Rejection ($\beta = .24$, $t = 2.93$, $p < .01$) and Impaired Autonomy/Performance ($\beta = -.21$, $t = -2.99$, $p < .01$)

Table 1

Correlations between the main study variables.

	1	2	3	4	5	6	7
1. Anxiety	-						
2. Avoidance	.49***	-					
3. Disconnection/Rejection	.47***	.34***	-				
4. Other-Directedness	.44***	.28***	.60***	-			
5. Impaired Autonomy	.36***	.12*	.66***	.50***	-		
6. Overvigilance	.31***	.24***	.57***	.40***	.42***	-	
7. Impaired Limits	.19**	.13*	.34***	.21***	.34***	.30***	-
8. SCLTOT	.39***	.36***	.60***	.53***	.50***	.42***	.26***

Note: SCLTOT = Total Score on the SCL-90

* = $p < .05$; ** = $p < .01$; *** = $p < .001$

Maladaptive Domains as a Mediator in the Link between Attachment and Psychopathology

Following the results of the HMRA, a multiple mediation analysis was performed using only the domains that had a unique association with the attachment dimensions. Given the different set of mediators for the two attachment dimensions, mediation analyses were performed for the two attachment dimensions separately, but again always using the alternative attachment dimension as a control variable. For mediation to occur, significant correlations should be found between the attachment dimensions and psychopathology (c-path), between the attachment dimensions and the maladaptive domains (a-path) and between the maladaptive domains and

psychopathology, after controlling for the attachment dimensions (b-path). Finally, the indirect path from attachment to psychopathology through the maladaptive domains (the ab-path) should be significant, and adding this indirect effect to the model, the remaining direct effect of attachment on psychopathology (c'-path) should no longer be significant (complete mediation) or be lower compared to the c-path (partial mediation).

A nonparametric, resampling approach (bootstrapping procedure; see Preacher & Hayes, 2008) was used to test this mediation model. One of the strengths of this analysis, beyond not relying on the normality assumptions of classic regression analysis, is that it takes into account the correlations between the mediators and that it can take into account the effect of a control variable. Therefore, any reported mediation effect can be considered as pure effects, independent of the influence of other mediators or control variables. The SPSS Macro provided by Preacher and Hayes (2004) was used to perform this bias-corrected bootstrap with 5000 resamples to derive the 99% confidence interval (CI) for the indirect effects.

Attachment anxiety. The mediating effects of the domains Disconnection/Rejection and Other-Directedness were investigated. Results confirm the association between attachment anxiety and Disconnection/Rejection and Other-Directedness (the a-paths; respectively b = .97, se = .14, $p < .001$ and b = .18, se = .03, $p < .001$). Disconnection/Rejection and Other-Directedness are linked with psychopathology (the b-paths; respectively b = .05, se = .007, $p < .001$ and b = .15, se = .04, $p < .001$). The true total indirect effect of Disconnection/Rejection and Other-Directedness (the ab-path) is estimated to lie between .04 and .13 with 99% CI. More in detail, the indirect effect of Disconnection/Rejection is estimated to lie between .02 and .09, whereas the indirect effect of Other-Directedness is estimated to lie between .01 and .05. Because zero is not in the 99% CI for the total and the separate indirect effects, we can conclude that for these variables the indirect effect is

significantly different from zero at $p < .01$ (two tailed). Finally, the originally significant direct link between attachment anxiety and psychopathology (the c-path; $b = .09$, $se = .02$, $p < .001$) becomes non-significant (the c'-path; $b = .01$, $se = .02$, *ns*) when adding the indirect effects, which implies that full mediation has occurred. The entire model explains 42% of the variance in psychopathology.

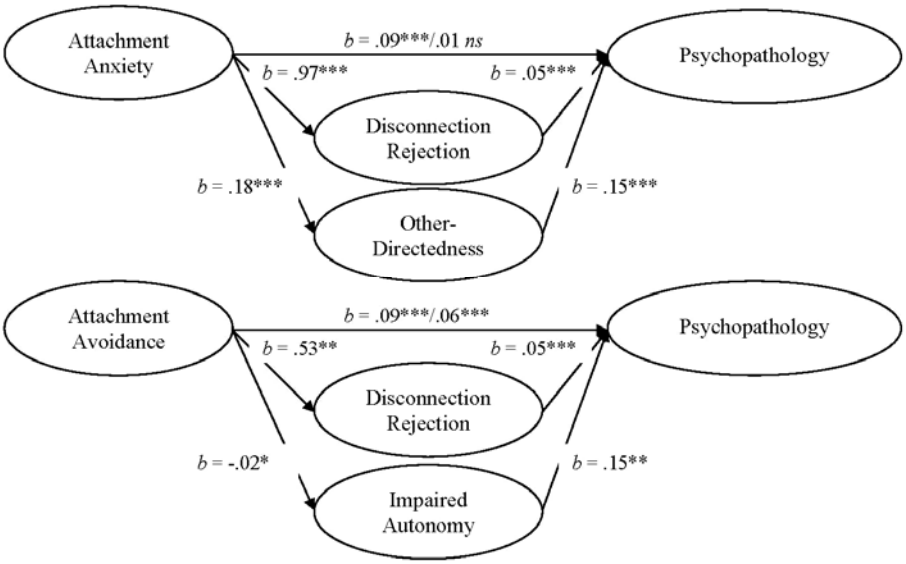


Figure 1: Multiple mediation analyses

Attachment avoidance. The mediating effect of the domains Disconnection/Rejection and Impaired Autonomy were investigated. Results indicate that attachment avoidance is indeed linked with Disconnection/Rejection but not with Impaired Autonomy (the a-paths; respectively $b = .53$, $se = .18$, $p < .01$ and $b = -.02$, $se = .03$, *ns*). Disconnection/Rejection and Impaired Autonomy are linked with psychopathology (the b-paths; respectively $b = .05$, $se = .008$, $p < .001$ and $b =$

.15, *se* = .05, $p < .01$). The true total indirect effect of Disconnection/Rejection and Impaired Autonomy (the ab-path) is estimated to lie between -.01 and .08 (*se* = .02) with 99% CI which indicates that the total indirect effect is not significant. While the indirect effect of Impaired Autonomy is not significant as it is estimated to lie between -.02 and .01., the indirect effect of Disconnection/Rejection is significant as it is estimated to lie between .001 and .08. Finally, the originally significant direct link between attachment avoidance and psychopathology (the c-path; *b* = .09, *se* = .02, $p < .001$) decreases, but remains significant (the c'-path; *b* = .06, *se* = .02, $p < .001$) when adding the indirect effect, which implies that partial mediation has occurred. The entire model explains 41% of the variance in psychopathology.

Discussion

This study aimed at demonstrating a link between attachment anxiety and attachment avoidance, and early maladaptive schema domains. The results show that both attachment dimensions are associated with all five schema domains. However, when forced in one analysis with all schema domains simultaneously and controlling for the effect of the other attachment dimension, Disconnection/Rejection and Other-Directedness appeared to be uniquely linked with attachment anxiety and Disconnection/Rejection and Impaired Autonomy were uniquely linked with attachment avoidance. Finally, the effect of attachment anxiety on symptoms of psychopathology was completely mediated by the effect of Disconnection/Rejection and Other-Directedness. The effect of attachment avoidance was partly mediated by Disconnection/Rejection.

The complete mediation of the effect of attachment anxiety on symptoms of psychopathology suggests that the anxious attachment IWM might be dominated by Disconnection/Rejection and Other-Directedness schema contents.

The partial mediation of the effect of attachment avoidance suggests that the avoidant attachment IWM might consist of Disconnection/Rejection schema contents, but that the entire association with symptoms of psychopathology needs to be examined further. It might be that other cognitive contents should be taken into account or that other processes are important.

The finding that both attachment dimensions are associated with the same schema domains, can help explain why attachment anxiety and attachment avoidance are often highly correlated (Conradi et al., 2006; Mikulincer & Shaver, 2007). Interestingly, after controlling for the effect of the other attachment dimension, unique associations between schema domains and attachment anxiety or attachment avoidance were found. This finding indicates that attachment anxiety and attachment avoidance might have similar contents in common that are differently linked with the two attachment dimensions. These cognitive contents reflect Mikulincer and Shaver's (2007) assumption that attachment anxiety is related to a submissive, accommodating approach toward attachment figures' demands, while individuals scoring high on attachment avoidance will display less signs of weakness or dependency.

These findings should be interpreted with caution due to several limitations. Firstly, although EMSs and attachment insecurity have often been studied in community samples, the current findings are in need for replication in a clinical sample. However, we used the present sample as the large number of participants made it more interesting to carry out correlational analyses. Secondly, the mediation analysis seems to suggest causal pathways, but such conclusions require longitudinal designs, focusing also on the relationships between these variables in younger samples. Finally, all variables were studied using self-report measures, and although the results are important as they were found after controlling for item-overlap between the items measuring EMSs and IWMs, this approach has the disadvantage that both proximal constructs are assessed through self-report by the same informant. For future attachment

research, so-called implicit measures increasingly promise to be an interesting alternative measurement strategy (Bosmans et al., 2007; Dewitte, De Houwer, & Buysse, 2008). For now, self-report remains the best strategy to investigate cognitions. Above all, the confirmation of the present study's strong hypothesis that EMSs mediate the relation between IWMs and symptoms of psychopathology in spite of the proximal nature of both constructs substantiates the importance of our findings.

Linking the IWM and EMS concept might prove interesting for the development of strategies to treat attachment-related symptoms of psychopathology, as Young has developed an effective schema-focused therapy with specific strategies to treat EMS-related problems (e.g. Van Asselt, Dirksen, Arntz, et al. 2008). Attachment research has increasingly invested in the development of strategies to treat both adults' and children/adolescents' attachment-related problems such as for example mentalization-based treatment (e.g. Bateman & Fonagy, 2008) or attachment-based family therapy (e.g. Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002). These treatment strategies focus respectively on improving the disrupted ablity to implicitly and explicity interpret actions of ourselves and others and on rebuilding the attachment bond with the parent or main caregivers. With regard to these treatment strategies the demonstration of the mediating role of EMSs advocates the incorporation of not only classic CBT (cognitive behavioural therapy) techniques such as challenging cognitions, but also of techniques such as limited reparenting. Limited reparenting refers to the therapist's attempts to meet those core emotional needs that were frustrated by the patient's parents. The therapist tries to achieve this through creating a warm and accepting environment during the session, allowing the patient to seek proximity whenever needed, while maintaining appropriate professional boundaries (Kellogg & Young, 2006). Finally, these results also suggest that clinicians treating attachment-related problems should be aware of the possible relapse of clients: research has

demonstrated that old schemas are not wiped out, but replaced by new ones (e.g. Bouton, 2004). Therefore, as schema-related contexts may reactivate the dormant schemas (Bouton, 2004), it might be important to develop treatment strategies that help (former) patients to cope with attachment-related relapse (Paykel, Scott, Teasdale, et al., 1999).

The present findings support the association between attachment and EMSs, explaining completely or partially the relation of attachment with symptoms of psychopathology. Thus, these results add to a growing research literature trying to increase the insight in the content of IWMs.

Chapter 5

The invisible bonds: Does the secure base script of attachment influence children's attention towards their mother?[5]

The internal working model of attachment can be conceptualized as a cognitive schema to provide testable hypotheses. Thus, this study predicts a relationship between attachment and attentional bias towards the mother using an emotional modification of the exogenous cueing task. The content of the cues (mother versus unknown women) and the duration of the presentation of the cues (200 ms versus 1000 ms) were varied. The test was administered to 40 non-referred children (9 to 13 years of age), divided into high and low secure attachment groups. As predicted, low secure children directed their attention more quickly towards mother than towards unknown women at later stages of attentional processing (long presentation), Furthermore, low secure children showed more maintained attention towards mother compared to unknown women and showed significantly more maintained attention towards mother compared to high secure children.

[5] Bosmans, G., De Raedt, R., & Braet, C. (2007). The invisible bonds: Does the secure base script of attachment influence children's attention towards their mother? *Journal of Clinical Child and Adolescent Psychology. 36,* 557-567.

Introduction

Attachment theory has provided insight into the importance of early parent-child relationships for later development (e.g. Ainsworth, 1973; Bowlby, 1969; Shaver & Mikulincer, 2002). However, the main concepts of this theory are rather vague, making it hard to empirically test hypotheses based on this theory (Hinde, 1988; Rutter, 1995; Waters & Waters, 2006). This study aims to improve the operationalization of one basic concept of attachment: the internal working model.

One of the basic assumptions of attachment theory is that a baby is born with the propensity to elicit care from adults. According to Bowlby (1973), crying will provoke adults to help the child by stopping the negative arousal by soothing or feeding. The reactions of the parents on attempts to seek proximity and the experience of the child that these reactions alter their affective state contributes to the development of the expectation that caregivers can function as a secure base. The secure base concept is central to Bowlby's attachment theory as it is crucial for the development of a secure or insecure attachment system (Waters & Cummings, 2000). It gives children the opportunity to explore their environment with the certainty that once they become too aroused, they can rely on the caregiver to help them manage the discomfort. Essentially, the exploration system leads children and adolescents to explore the world on their own, thereby distancing themselves from their parents and helping them to learn new things about themselves and the world that enrich their regulatory skills (Bowlby, 1969).

Bowlby (1973) hypothesized that the child's attempts of proximity seeking and the results of these attempts are stored in internal working models. Originally based on Craik's (1943) notion of mental models, Bowlby described these internal working models as devices that monitor and integrate information

and initiate behavior that is directed towards a goal (Bowlby, 1969). This goal was initially formulated as proximity and access to the caregiver, then reformulated as a sense of felt security (Stroufe & Waters, 1977) and more recently as the regulation of negative affect (e.g. Schore, 2000; Shaver, Mikulincer, & Pereg, 2003).

However, the working model concept has mainly been used as a conceptual metaphor, rather than a testable construct (Hinde, 1988). This may be due to the fact that the notion of internal working models is possibly too all encompassing and lacks explanatory power (Rutter, 1995; Waters & Waters, 2006). Waters and Waters (2006) suggested that, since the formulation of attachment theory, the knowledge on mental models has been elaborated. Based on the suggestion of Bretherton (e.g. 1990), they argued that research in cognitive psychology has elaborated on important aspects of mental functioning and has introduced the construct of "schema". . Beck (1964) defined schemas as "…relatively enduring internal structures of stored generic or prototypical features of stimuli, ideas or experiences that are used to organize new information in a meaningful way thereby determining how phenomena are perceived and conceptualized (p. 564)".

On a content level, schemas may include concepts, beliefs, or attitudes and ideas about oneself, the personal world, and the future. Situations or stimuli that match with a particular schema activate those contents (Clark, Beck, & Alford, 1999). Waters and Waters (2006) demonstrated that an internal working model consists partly of script-like representations of secure base experiences: an event schema that summarizes commonalities across a class of events (e.g. main character(s), a causal chain of events, and resolution or ending). Consequently, high correlations have been found between adulthood attachment patterns and the scales from Young's (1990) Early Maladaptive Schema Questionnaire (Cecero, Nelson, & Gillie, 2004; Mason, Platts, & Tyson, 2005). On a process-level, a cognitive schema will dominate the information processing system. It

will produce schema-congruent biases in attention, interpretation and memory (Clark, Beck, & Alford, 1999). In this way, cognitive schema theory has inspired research into attentional bias for schema congruent information (e.g. Dalgleish et al., 2003; Koster, De Raedt, Goeleven, Franck & Crombez, 2005). Remarkably, only a few studies have tried to investigate the influence of attachment representation on attentional processing. More specifically, the effect of attachment on attention towards mother has never been investigated.

In line with Ainsworth's work (Ainsworth, Blehar, Waters, & Wall, 1978) on the organization of inter-individual differences in attachment behaviour in distinct secure, avoidant and anxious attachment styles, attachment theory predicts vigilance to threat in anxious persons and avoidance to threat in avoidant persons. However, little evidence has been found for differences in attention allocation across these abovementioned insecure styles. In studies with children, it has been found that insecurely attached children direct attention away from both disturbing information and information that is threatening for attachment after elongated presentation (Main, Kaplan, & Cassidy, 1985; Kirsh & Cassidy, 1997). Adult research shows similar results, whereby a tendency to turn attention away from negative information and attachment threat was found in insecurely attached people, without evidence for differences across insecure attachment styles (Dewitte, Koster, De Houwer, & Buysse, in press; Zeijlmans van Emmichoven, van IJzendoorn, de Ruiter, & Brosschot, 2003).

It is not clear whether specific distinctions in within the basic insecure and secure attachment styles is crucial for attachment theory in general and the secure base script in particular (Waters & Beauchaine, 2003; Frayley & Spieker, 2003). Based on the following arguments, a dimensional approach (insecure vs. secure) to studying attachment schemas seems most appropriate. First, research showing differences in information processing across the different attachment styles primarily used mood induction to prime the attachment system (e.g. Pereg & Mikulincer, 2004). In contrast, studies on attentional bias for attachment threat

tended not to use mood-induction. They followed the rationale that the detection of attachment threat must specifically be measured in neutral mood contexts, since negative mood is considered to be the result of threat detection. These studies did not find evidence for differences across insecure styles. Second, research has generally focussed on coping with negative information, whereas the current study tries to demonstrate how children direct their attention towards a main caregiver in an emotionally neutral situation. In line with our research question, the current study does not use mood-induction to minimize a possible confound with coping effects. Consequently, we predict only an effect of high versus low secure attachment.

An interesting paradigm to explore attention allocation towards a stimulus is the Exogenous Cueing Task (ECT, Posner, 1980). In this task (see Figure 1) participants are asked to focus attention on a cross in the middle of a computer screen. Then, at the left or right side of the screen, one cue (stimulus) appears and disappears followed by the appearance of a target-stimulus either on the same (valid trial) or opposite side of the cue (invalid trial). Participants are instructed to react as quickly as possible to the target, by pressing a key. If cues are presented with a Stimulus Onset Asynchronity (SOA: the time between the onset of the stimulus and the onset of the target) less than 300 ms, participants generally react faster on valid trials (called the cue validity effect). If cues are presented with a long SOA (e.g. 1000 ms), participants tend to react faster on invalid trials because they turn attention away from the already scanned cue to explore the other location. This robust Inhibition Of Return effect (IOR: Posner, 1980) has been demonstrated at 16-18 weeks after birth (Butcher, Kalverboer, & Geuze, 1999) and is expected to become fully acquired during childhood (MacPherson, Klein, & Moore, 2003).

In adult studies, modified versions of the ECT have shown differences in attention allocation depending on the content of specific cue stimuli. These differences in attentional processing have been described as specific attentional

biases (e.g. Fox, Russo, Bowles, & Dutton, 2001; Yiend & Matthews, 2001). Three ECT scores can be calculated: (1) maintained attention or how long attention remains directed towards a stimulus, measured with the cue validity index (CVI: RTinvalid - RTvalid); (2) attentional engagement or attention towards a stimulus, measured with an engagement score (in our study: RTvalid/mother - RTvalid/unknown women); and (3) the time it takes to direct attention away from a stimulus, measured with a difficulty to disengage score (in our study: RTinvalid/mother - RTinvalid/unknown women).

Studies with ECT have revealed heightened engagement towards anxious stimuli in phobic patients (e.g. Koster, Crombez, Van Damme, Verschuere, & De Houwer, 2005), towards angry faces in depressed individuals (Leyman, De Raedt, Schacht, & Koster, in press), maintained attention and a difficulty to disengage from negative words in dysphoric and depressed individuals (Koster, et al., 2005; Leyman, et al., in press). In children, Pollak and Tolley-Shell (2003) used the modified ECT together with event-related potentials (ERPs) to measure the effect of physical abuse on selective attention to happy, angry and neutral facial expressions. Using the ECT, they demonstrated an engagement effect for angry faces in the abused population. No evidence was found for a disengagement effect using the ECT. However, ERPs were indicative of the existence of a disengagement effect.

In the current study, stimuli were presented at two different SOAs. At an SOA of 200 ms, the ECT measures early attentional processes where no IOR is expected, and where an engagement effect reflects early vigilance – faster direction of attention towards the mother (Calvo & Eysenck, 2000). At an SOA of 1000 ms, the ECT measures later stages of processing where either IOR or maintained attention can be expected and where an engagement effect reflects enhanced attention for a stimulus – i.e. children remain focussed on the mother and do not explore the visual environment. On the other hand, the interpretation of the disengagement effect is independent of SOA.

At an SOA of 1000 ms, hypotheses derived from Bowlby's theory are straightforward: children who are less securely attached are expected to show difficulties distancing themselves from their parents. This effect should be reflected in higher maintained attention towards mother, enhanced attention, and more difficulty to disengage. At an SOA of 200 ms, attachment theory does not provide information to formulate specific hypotheses and no other studies using short presentation times were found (Niedenthal, Brauer, Robin, & Innes-Ker, 2002; Fraley, Davis, & Shaver, 1998). However, the assumption that the secure base script acts as a cognitive schema, leads to the prediction that attachment does not influence early engagement processes. If attentional bias should occur at an SOA of 200 ms, the attentional bias would be more stimulus-driven. If the bias occurs only at 1000 ms, then results would be indicative of a schema-driven attentional bias (see the time course analyses in Koster, Verschuere, Crombez, & Van Damme, 2005).

In summary, we specifically predict (1) an interaction-effect of attachment security and type of stimulus on maintained attention at an SOA of 1000 ms: a significantly higher CVI score for mother stimuli compared to unknown women stimuli in low secure children (LS) and no differences between both stimuli in high secure children (HS). We predict (2) no differences on engagement between the LS and HS group at an SOA of 200 ms. At an SOA of 1000 ms, we predict higher engagement scores in the LS group as compared to the HS group. Finally, we predict (3) higher difficulty to disengage scores for the LS group as compared to the HS group at both SOAs.

Method

Participants

Forty elementary school children (20 girls and 20 boys) with ages ranging from 9 to 13 years (M = 10.67; SD = .78) participated in the study. All participants were fifth and sixth graders. Two girls were excluded from the study because of unreliable data (see Results section). Compared to the total Belgian sample (Statistics Belgium - EU-SILC, 2005), 8% of the families had an average monthly family net income below the first quintile, 12% between the first and the second quintile, 30% between the second and the third quintile, and 50% between the third and fourth quintile. No families had incomes higher than the fifth quintile.. Furhtermore, 2.6% of the mothers had only completed elementary school, 2.6% of the fathers had completed special education, 21.1% of the mothers and 31.6% of the fathers only had completed secondary school, 47.4% of the mothers and 31.6% of the fathers had completed higher education, and 28.9% of the mothers and 28.9% of the fathers had completed university. In the total sample, 84% of the children lived together with both biological parents, 5% lived together with one parent and a stepparent, and 11% lived with mother alone.

Measures

Emotionally modified Exogenous Cueing Task. To measure attentional processing, a pictorial exogenous cueing task (ECT) was administered to the children. The task was programmed in INQUISIT Millisecond software, and was run on a Windows XP portable computer with a 15-inch colour monitor. Stimuli

were presented on the computer screen placed in front of the participant (viewing distance approximately 60 cm) (See Figure 1). The baseline display was composed of a small white central cross (0.5 cm x 0.5 cm) and two identical white peripheral rectangles (6.8 cm wide by 8.3 cm high), presented against a black background (full screen). The middle of both rectangles was 7.5 cm from the central fixation cross. Cues and targets were presented in the rectangles. The cues consisted of 20 pictures (all edited to 4.5 cm wide by 6 cm high), divided in two categories: 10 pictures of mother (ten different photos, focussing on the mother's face, avoiding bright colours in the pictures and asking the mother to have a neutral face, as much as possible without showing her teeth to avoid salience effects) and pictures of 10 different women unknown to the participants to minimize potential effects of resemblance to own mother, attractiveness, or influences of other salient properties (all women were mothers themselves). The experimental pictures were taken during the home visit by the experimenter using a digital photo camera. The target stimulus was a black square (1.0 cm x 1.0 cm).

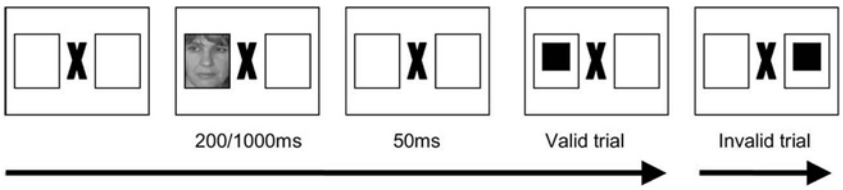


Figure 1: stimulus presentation of the ECT

Participants were instructed to remain focussed on the central cross throughout the experiment, to ignore the cues and to detect the peripheral targets as fast as possible, without loss of accuracy. In order to make sure that the participants remained focussed on the fixation cross throughout the experiment, a number (between '1' and '4') appeared at the center of the screen, replacing

the fixation cross, in an additional 32 random trials (hereafter referred to as 'fixation check trials'). For these trials, participants were instructed to press the key corresponding with the number on an AZERTY keyboard, as fast and accurately as possible. For all other trials, participants were instructed to respond to each target by pressing either the 'q' or the 'm' key on the keyboard, depending on whether the target appeared in the left or right peripheral box, with either their left or right index finger respectively.

All relevant instructions were projected on the computer screen prior to testing and participants were given the opportunity to ask questions for clarification when needed. Also, a 2-minute training-session (32 trials; 16 in each block) was included to familiarize participants with the procedure. In the training sessions only pictures of unknown women were used as cues.

The test phase consisted of 280 trials. An equal number (140 trials) of valid (left cue/left target and right cue/right target) and invalid trials (left cue/right target and right cue/left target) were projected. Cues were presented in two separate SOA blocks of 200 and 1000 ms (to minimize temporal uncertainty and hence the variance on responding, see Koster, et al., 2005a). The order sequence of the blocks was counterbalanced to exclude any order effects. There was a short break after the first sequence of 140 trials. Targets were programmed to appear 50 ms after the cue had disappeared and remained on screen until a response was made. In total, 8 categories were created, each containing 35 trials (valid mother cues at SOA = 200 ms, invalid mother cues at SOA = 200 ms, valid unknown cues at SOA = 200 ms, invalid unknown cues at SOA = 200 ms, valid mother cues at SOA = 1000 ms, invalid mother cues at SOA = 1000 ms, valid unknown cues at SOA = 1000 ms and invalid unknown cues at SOA = 1000 ms). The occurrence of right and left targets was randomized so that stimulus-response compatibility could not affect the measures of alerting, orienting or reorienting attention.

The Relationship Questionnaire for Children – Mother version (RQC-M; Bartholomew & Horowitz, 1991). The RQC-M presents four different vignettes representing four attachment styles: secure, anxious, fearful avoidant and dismissing avoidant and is expected to measure attachment representation. The formulation of the questionnaire was adapted for children. Children were asked to assess for each vignette how well it described their own relationship with their mother on a Likert scale with scores ranging from 1 *(not at all)* to 7 *(very much)*. Several studies have provided evidence of good psychometric properties and validation (e.g. Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994; Scharfe & Bartholomew, 1994). The questionnaire has strong predictive validity for adjustment outcome and interpersonal functioning (Griffin & Bartholomew, 1994). Calculated on the four scale scores, in this sample a Cronbach alpha of .84 was found. Given our secure base hypothesis, we only describe analyses performed on the secure vignette.

Inventory of Parent and Peer Attachment (*IPPA; Armsden & Greenberg, 1987; translated into Dutch by Noom, Deković, & Meeus, 1999)*. The IPPA consists of 12 items (e.g. "My mother accepts me as I am") designed to assess the quality of the relationship with mother: the availability of communication, trust, and the absence of alienation. The IPPA is not designed to differentiate between attachment patterns and does not measure attachment representations, but measures a continuum of secure versus insecure attachment. Someone who obtains a high score is more securely attached than someone who obtains a low score. Children rated each item on a four point Likert-scale, ranging from "almost never" to "nearly always". The IPPA has been used to assess secure attachment in adolescents and pre-adolescents and has been related to a number of theoretically relevant outcome variables such as internalizing and externalizing behavior problems (e.g. Crowell, Fraley, & Shaver, 1999; Bosmans, Braet, Van Leeuwen, & Beyers, 2006). In this sample the scale was adequately reliable (α = .66).

The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001). The CBCL lists child behavior problems such as hitting family members or peers. Using a three point scale ranging from 0 ("not true") to 2 ("very true or often true"), parents were asked how often they had observed each behaviour. The questionnaire consists of 113 items, which are summed into nine subscales: Anxious/Depressed, Withdrawn, and Somatic Complaints (the internalizing scales), Aggressive Behavior and Delinquent Behavior (the externalizing subscales), Social Problems, Thought Problems and Attention Problems. The CBCL has good discriminant validity (Achenbach & Rescorla, 2001). It can significantly distinguish between children with psychiatric disorders and non-disordered children (Novik, 1999). Furthermore, problem behaviours assessed with CBCL can predict poor outcome four years later (Koot & Verhulst, 1992).

Procedure

For the current study, a total of 180 leaflets were distributed in fifth and sixth grades of 3 elementary schools, corresponding to ages ranging from 9 to 13 years. The leaflets informed the parents about the content of the study and asked their approval to participate. Once participation was granted, the parents were contacted by phone and a home visit was scheduled. After the child agreed to take part of the study, ten pictures were taken from the mother. While mother and child completed the questionnaires independent from each other, the photos were integrated into the INQUISIT computer program. Once integrated, the children were submitted to the task. All children were tested individually. The local ethics committee approved the study design.

Design and Analytic Plan

Given the skew distribution of responses on the secure attachment vignette of the RQC-M (Skewness: -1.13, SE = .38) it is defendable to use median split (MacCallum, Zhang, Preacher, & Rucker, 2002). A box-plot depicting the crucial difference score [CVI1000mother – CVI1000unknown] for the two attachment groups was visually inspected and revealed that the mean difference score of the LS group is clearly situated outside the reliability interval. This supported our decision to use median split despite possible loss of information about individual differences. With me = 6, we created a high secure (HS) group of 24 children (scores of 6 and 7) and a low secure (LS) group of 16 children (with scores ranging from 2 to 5). Reaction times were subjected to a 2 (cue type: mother/unknown women; within-subjects) x 2 (presentation duration: 200 ms /1000 ms; within-subjects) x 2 (cue validity: valid /invalid; within-subjects) x 2 (attachment groups: high versus low securely attached; between-subjects) repeated measures Analysis of Variance (ANOVA). We calculated partial eta squared (η_p^2) effect sizes: a η_p^2 between .01 and .06 can be interpreted as a small effectl, a η_p^2 between .06 and .14 as moderate and above .14 as large (Cohen, 1988). If the 4-way interaction, including SOA, cue type, cue validity and attachment group, proved significant, reaction times were further examined using two methods. At first, the cue validity indices CVIs were calculated separately for the two attachment groups as a measure of overall attention (Koster et al., 2005a; MacLeod & Mathews, 1988). Positive scores indicate attention towards the cue representing a cue validity effect, called maintained attention at an SOA of 1000ms. Negative scores, however, indicate attention away from the cue representing the IOR effect at this SOA (Koster et al., 2005b). To test the interaction hypothesis we calculated the difference score [CVI1000mother – CVI1000unknown]. Secondly, in order to examine the specific components of attention, engagement and difficulty to disengage scores

were calculated separately for each attachment group. A positive engagement score indicates that attention is directed more easily to pictures of mother compared to unknown pictures (denoting facilitated attentional engagement to mother, implying attentional bias). A positive difficulty to disengage score indicates difficulties in shifting attention away from mother compared to unknown women (measuring attentional fixation to mother). Negative scores imply easier shifting away from mother. All the scores were compared to zero using one sample t-tests and compared between the two attachment groups using independent t-tests. We calculated Cohen's d effect sizes (*d*): *d*s between .2 and .5 are small, between .5 and .8 moderate and higher than .8 high (Cohen, 1992).

Participants successfully answered on the fixation check trials (2% errors). Trials with errors (1.2%) and trials with RTs shorter than 150ms and longer than 750ms (4.6%) were left out (see Koster et al., 2005). Only participants with less than 20% loss of data were accepted in the study (leaving out two girls from the low secure group that originally consisted of 26 children).

Results

Group Characteristics

The high and low secure groups did not differ significantly with respect to age, F (1, 36) = 1.40, p = ns, d = .38. The HS group consisted of significantly more boys[6], $\chi^2(1)$ = 8.66, p < .01, and reported on the RQC-M significantly

[6] The disproportional distribution of gender across the conditions, could be a possible explanation of group-effects. However, we did not find a significant four-way interaction effect when using gender as between-subjects variable (F(1, 36) =.006, p = .938, η_p^2 = .01).

lower levels of anxious, $t(20.48) = 2.36$, $p < .05$, $d = .83$, fearful avoidant, $t(14.89) = 3.25$, $p < .01$, $d = 1.05$, and dismissing avoidant attachment, $t(36) = 3.26$, p <.01, $d = 1.2$. The HS group reported significantly higher self reported attachment on the IPPA, $t(36) = -2.18$, $p < .05$, $d = .66$. The groups did not significantly differ with respect to measures of psychopathology (see Table 1).

Overall effects

The ANOVA revealed a strong validity-effect, $F(1, 36) = 14.29$, $p < .001$, $\eta_p^2 = .28$, and an effect of cue type, $F(1, 36) = 6.30$, $p < .05$, $\eta_p^2 = .15$. Significant interactions emerged between cue type and validity, $F(1, 36) = 4.01$, $p = .05$, $\eta_p^2 = .10$, SOA and attachment groups, $F(1, 36) = 6.11$, $p < .05$, $\eta_p^2 = .15$ and between cue type and attachment groups, $F(1, 36) = 5.77$, $p < .05$, $\eta_p^2 = .14$. Moreover, we found a significant interaction between SOA, validity and attachment groups, $F(1, 36) = 6.32$, $p < .05$, $\eta_p^2 = .15$, and, as predicted, the crucial significant interaction between all four variables, $F(1, 36) = 5.82$, $p < .05$, $\eta_p^2 = .14$.

In order to interpret the effect of SOA on the RTs, separate analyses were conducted for the two SOAs. For the 200 ms condition, a 2 (cue type) X 2 (validity) X 2 (attachment groups) ANOVA revealed a significant effect of cue validity, $F(1, 36) = 11.53$, $p < .01$, $\eta_p^2 = .24$, a trend for the interaction between cue type and attachment groups, $F(1, 36) = 2.78$, $p = .10$, $\eta_p^2 = .07$, and a significant interaction between validity and attachment groups, $F(1, 36) = 8.13$, $p < .01$, $\eta_p^2 = .18$.

Table 1.

Differences between the High Secure and Low Secure Groups on Attachment Measures and CBCL *T*-scores

	High Secure		Low Secure		
	M	*SD*	*M*	*SD*	*D*
Attachment:					
RQC-M Anxious	1.71	1.12	2.86	1.61	.83
RQC-M Dismissing avoidant	1.58	.77	3.57	2.21	1.20
RQC-M Anxiously avoidant	1.75	1.11	3.14	1.51	1.05
IPPA	41.29	3.34	38.57	4.27	.66
Psychopathology					
CBCL Anxious depressed	54.74	7.58	54.57	5.80	.03
CBCL Withdrawn depressed	55.35	6.12	51.86	3.70	.69
CBCL Somatic problems	54.78	5.27	55.00	6.58	.04
CBCL Social problems	55.00	6.05	52.14	2.80	.61
CBCL Thought problems	54.09	5.44	54.19	5.44	.02
CBCL Attention	53.35	4.42	53.50	3.61	.03
CBCL Rule breaking behaviour	52.65	3.88	51.64	1.82	.33
CBCL Aggressive behaviour	53.09	5.37	52.21	3.58	.19
CBCL Internalizing behaviour	52.53	8.09	49.50	9.96	.33
CBCL Externalizing behaviour	47.74	9.18	47.07	6.69	.08
CBCL Total problems	49.22	8.54	48.43	7.85	.10
ECT Overall Response time	3778	502	3972	527	.37

Note: RQC-M = Relationship Quectionnaire Child about Mother version; IPPA = Inventory of Parent and Peer Attachment; CBCL = Child Behavioral Check List; ECT = Exogenous Cueing Task

For the 1000 ms condition, results show a significant effect of cue validity, $F(1, 36) = 10.43$, $p < .01$, $\eta_p^2 = .23$, a trend for the effect of cue type, $F(1, 36) = 3.03$, $p < .10$, $\eta_p^2 = .08$, a significant interaction between cue type and validity, $F(1, 36) = 6.57$, $p < .05$, $\eta_p^2 = .15$ and, interestingly, the crucial significant interaction between validity, cue type and attachment groups, $F(1, 36) = 7.78$, $p < .01$, $\eta_p^2 = .18$. To get a clear view on the meaning of the crucial interaction effects Cue Validity, Engagement and Disengagement indices were calculated for the two attachment groups separately.

Table 2.

Cue Validity Indices across Attachment Groups

SOA 200		High Secure			Low Secure			
Cue type	Validity	*M*	*(SD)*	CVI	*M*	*(SD)*	CVI	*d*
Mother	Invalid	478	(61)		504	(78)		
	Valid	455	(68)	23***	502	(70)	2	.72
Unknown	Invalid	473	(60)		514	(74)		
	Valid	458	(53)	15***	513	(76)	1	.66
SOA 1000		High Secure			Low Secure			
Cue Type	Validity	*M*	*(SD)*	CVI	*M*	*(SD)*	CVI	*d*
Mother	Invalid	485	(70)		495	(72)		
	Valid	472	(73)	13†	465	(69)	30**	.55
Unknown	Invalid	486	(75)		491	(74)		
	Valid	472	(78)	14*	489	(75)	2	.37

Note: CVI = Cue Validity Index; SOA = Stimulus Onset Ansynchronity

CVI differs from zero: † $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Cue Validity Indices

At an SOA of 200 ms, comparing invalid and valid trials, the HS group displayed a positive cue validity effect for both types of cues (pictures of mother: $t(23) = 3.80$, $p < .001$, $d = .35$; pictures of unknown women: $t(23) = 3.67$, $p < .001$, $d = .28$, see Table 2). In the LS group no validity effect was found (for both mother, $t(13) = .25$, $p =$ ns, $d = .02$, and unknown women $t(13) = .23$, $p =$ ns, $d = .01$).

At an SOA of 1000 ms, one-sample *t*-tests revealed only marginally significant positive CVIs for both types of cues in the HS group (pictures of mother: $t(23) = 1.96$, $p = .06$; $d = .18$; pictures of unknown women: $t(23) = 2.27$, $p = .03$, $d = .18$), whereas in the LS group only the CVI for mother stimuli was significantly positive, (pictures of mother: $t(13) = 3.65$, $p < .005$, $d = .5$; pictures of unknown women: $t(13) = .28$, $p =$ ns, $d = ..03$). As predicted in the first hypothesis, an independent sample *t*-test on the difference score CVImother-CVIunknown, revealed a significant effect of attachment groups, $t(36) = 2.79$, $p < .01$, $d = .93$. Paired samples *t*-tests revealed a significantly higher CVI for the pictures of mother compared to unknown women stimuli in the LS group, $t(13) = -3.36$, $p < .01$, $d = .88$, and not in the HS group [$t(23) = 0.17$, $d = 0.04$]. These results demonstrate that children from the LS group show more maintained attention and are more interested in their mothers compared to unknown women, whereas for the HS group this attentional bias was not found.

Attentional Engagement and Disengagement Indices

At an SOA of 200 ms (see Table 3) no significant engagement effects were found (for both the HS, *t(23)* = .46, *p* = ns, *d* = .05, and the LS group, *t*(13) = 1.4, *p* = ns, *d* = .3) and groups did not differ [*t*(36) = 0.82, *p* = ns, *d* = 0.28]. At an SOA of 1000 ms, in line with hypothesis 2, we did find an engagement effect towards mother stimuli for the LS group, *t*(13) = 3.85, *p* < .01, *d* = .4, but not in the HS group t(23) = .12, *p* = ns, *d* = .01. This implies only an attentional bias in the LS, but not in the HS group. An independent sample *t*-test revealed that this engagement score of the LS group was significantly higher compared to the HS group, *t*(36) = 2.88, *p* < 01, *d* = .96.

Table 3.

Engagement and Disengagement Scores across Attachment Groups

SAO 200	High Secure		Low Secure		
	M	*(SD)*	*M*	*(SD)*	*d*
Engagement	3	(30)	11	(28)	.28
Disengagement	4	(25)	10	(23)	.59
SAO 1000	High Secure		Low Secure		
	M	*(SD)*	*M*	*(SD)*	*d*
Engagement	.6	(25)	24**	(24)	.96
Disengagement	2	(26)	3	(25)	.02

Note: SOA = Stimulus Onset Asynchronity.

Measure differs from 0: ** p = .01

Even though the results pointed in the proposed direction, contrary to our third hypothesis, we did not find significant disengagement effects at both SOAs (at 200ms: HS group, $t(23) = .82$, p = ns, $d = .07$, and LS group, $t(13) = 1.68$, p = ns, $d = .1$; at 1000ms: HS group, $t(13) = .33$, p = ns, $d = .03$, and LS group, $t(13) = .49$, p = ns, $d = .04$; see Table 3). At 200 ms, the difference between the LS and HS group was marginally significant (a stronger difficulty to disengage effect for the LS group: $t(36) = -1.76$, $p < .10$, $d = .59$), but there was no significant difference at 1000ms: $t(36) = 0.58$, p = ns, $d = 0.02$.

Discussion

In line with Waters and Waters' assumptions (2006) and current cognitive schema theory, we found evidence for an attentional bias towards mother at later stages of attentional processing in the low secure group. As predicted, at an SOA of 1000 ms, the significant interaction effect indicated that the low secure group maintained longer interest in mother cues compared to photos of unknown women. The high secure group apparently was less interested in the mother cues and was equally interested in the unknown women. As predicted in hypothesis 2, we found a stronger engagement effect for the low secure group at an SOA of 1000 ms. At an SOA of 200 ms no significant engagement effects were observed. Finally, contrary to hypothesis 3, we found no disengagement effects at both SOAs.

These results seem to suggest that at long presentation times, attention of less securely attached children remains longer with mother compared to unknown women, whereas this effect was not found in more securely attached children. It can be easily hypothesized that this attentional bias might be one of the processes through which children with an impaired secure base script explore their environment to a lesser extent. Consequently, we hypothesize that the more

securely attached children, whereby attentional processes were not biased, seem to have more opportunities to explore the world and to discover new strategies to regulate their negative affect (Bowlby, 1969; Shaver et al., 2003).

Interestingly, contrary to the significant difference in engagement between the low and high secure group in the 1000 ms condition, this difference was not found at an SOA of 200 ms. Although attachment theory does not provide clear hypotheses on 200 ms engagement, these results can be interpreted as an indication that the secure base script does act as a cognitive schema. These results might suggest that the attentional bias is apparently not influenced by the stimulus alone, but rather by the meaning the stimulus has at later stages of attentional processing (Koster et al., 2005c). The absence of attachment-related biases of early attentional engagement is not in line with the significant correlations between velocity of recognition of emotional stimuli and dimensions of both dismissive and preoccupied attachment that were found in earlier research (Maier, Bernier, Pekrun, et. al., 2005). We argue that this difference might also be due to differences in approach – the latter study measures thresholds of perceptual processing, using several successive presentations of the same stimuli but with increasing duration. However, if replicated in larger samples, it could be possible that the present results may help to understand the role of attachment in automatic attentional activities (Niedenthal, et al., 2002).

Surprisingly, the hypothesized disengagement effect was not found. This result is difficult to explain, because in adult experimental psychopathology research the ECT has proven to be a promising paradigm to measure disengagement (e.g. Koster et al., 2005). Interestingly, the only other study using ECT in children was also not able to demonstrate a disengagement effect contrary to their predictions. However, in the latter study, simultaneously measured ERPs were indicative of a disengagement effect (Pollak and Tolley-Schell, 2003). Given our results, we think more experience with the use of ECT

in several different child populations is needed to see whether this pattern of results reoccurs before trying to find a thorough explanation of this phenomenon.

As predicted, based on differences in secure attachment the ANOVA demonstrated a significant four way interaction. Previous research on attention towards attachment threat also found evidence for only a general effect of insecure attachment (Dewitte, et al., in press; Kirsh & Cassidy, 1997; Zeijlmans van Emmichoven, et al., 2003). The question remains if the effects would be the same across different insecure attachment styles. Exploratory, we repeated the same analyses on the three other attachment styles. No significant effects were found: anxiously attached [$F(1, 36) = 1.56$, $p = .22$, $\eta_p^2 = .04$], dismissing avoidant [$F(1, 36) = 3.24$, $p = .08$, $\eta_p^2 = .08$] and anxious avoidant [$F(1, 36) = 1.63$, $p = .21$, $\eta_p^2 = .04$]. Furthermore, in the analyses on CVI, engagement and disengagement, although insignificant, results pointed in the same direction (although not reaching significance) as the results with the analysis on the high and low secure group. These results are in line with the statement that attachment theory neither requires nor predicts different insecure attachment styles (Fraley & Spieker, 2003; Waters & Beauchaine, 2003). This topic requires further investigation as the results can be attributed to two confounds. Either the absence of mood-induction in the experimental design or children's inclination to prefer answering positively formulated questions about their mother instead of negatively formulated questions, could explain the absence of an effect of insecure attachment styles.

Not using mood-induction provides the opportunity to assess the influence of the secure base script in an emotionally neutral environment, but raises the question whether the secure base script was activated at all. However, given that children were asked about their relationship with their parents, and given that the tests were administered at the home environment, one might argue that this context has adequately activated the secure base script (for a review on the link between context and behaviour, see Bouton, 2004).

There are limitations in most measures of attachment in childhood (Dwyer, 2005). Self-report measures suffer from the fact that not all insecurely attached individuals tend to describe themselves as insecure (Ainsworth, 1985). Since this was the first study using this methodology, we chose to use a widely accepted self-report measure to assess attachment. We demonstrated that our distinction in a high and low secure group reflected a significant difference on other (as well more categorically as dimensionally oriented) attachment measures. However, future research should try to distinguish groups based on other criteria, using for example behavioral measures like the opportunity to explore a novel environment.

These results are also in need of replication in clinical populations. The current study focused on a normal population. The fact that we did not find group differences on measures of psychopathology, implies that in this sample, low levels of attachment security are not pathologically low. Although the relevance of the results is underscored by the fact that hypothesis-driven differences were found in a normal population and in the current sample IPPA scores displayed a broad range, future research should be directed towards children with more pronounced pathological levels of attachment security.

These results are in line with the hypothesis that the internal working models of attachment could be conceptualized as a cognitive schema (Waters & Waters, 2006; Platts, Tyson, & Mason, 2002). However, according to Beck's definition of cognitive schemas (1964), a cognitive schema should not only lead to attentional bias towards mother, but should also guide other information processes (Clark, et. al., 1999). Previous research has revealed an influence of attachment style on mood congruent recall of emotional information (Pereg & Mikulincer, 2004; Belsky, Spritz, & Crnic, 1996). Nevertheless, future research should also be directed at memory and interpretation biases involving attachment figures in children.

Although including pictures enhances the ecological validity, each paradigm has its drawbacks. It can be questioned whether the reaction times on ten pictures taken from the same mother could be compared with reaction times on ten different mothers. These results might reflect a difference between presenting the same picture versus variation in presented stimuli. However, presenting ten pictures of one unknown woman could confound with variables like resemblance to own mother, attractiveness or other influences.

There are also several possible alternative interpretations for our results. The differences in attentional processing of mothers versus unknown women could be explained by (a) the novelty of the stimulus; (b) the emotional relevance of pictures of mother; or (c) a preconscious orientation towards safety cues and avoidance of novel stimuli by participants who were anxious. However, we would argue that differences between mother pictures and unknown women due to novelty of the stimuli can not account for the differences between the attachment groups. In addition, if mothers have indeed more emotional relevance for the insecure children, these findings would still be consistent with attachment theory.

Implications for Future Research, Policy, and Practice

In summary, we established an attentional bias towards attachment figures in a group of children showing signs of insecure attachment. Compared to the high secure group, the low secure group directed attention towards mother more easily, and was only interested in mother and not in unknown women. These findings are consistent with the hypothesis that the internal working model of attachment can be conceptualized as a cognitive schema and seems to provide insight in one possible underlying mechanism that explains why less securely attached children do not succeed in exploring their world, in distancing themselves from their mother and thereby impairing their possibilities to learn

how to independently regulate negative emotional states. More research is needed to explore how relational experiences influence the development of maladaptive cognitive schemas.

Although these results are premature, they are a first attempt to increase our understanding of a component of attachment theory: the internal working model. A clearer definition of the internal working model and the processes underlying a maladaptive attachment development, might have both theoretical and practical advantages. On a theoretical level this can provide a more universal attachment vocabulary, contrary to the current broad and overly generalized use and interpretation of attachment concepts. On a clinical level, these insights can help parents and other care-givers develop new perspectives to understand their children's problem behaviour and to adapt their parenting behaviors to the needs of their child.

Chapter 6

Attachment security and attentional breadth towards the attachment figure in middle childhood[7]

To increase our understanding of the cognitive processes involved in internal working models of attachment, this study investigated the relationship between secure attachment and attentional breadth to mother using a dual task design. The content of the cues (mother versus unfamiliar women) and the duration of the presentation of the cues (34ms, 100ms and 250ms) were varied. The test was administered to 40 children between 9 and 12 years of age. As predicted, less securely attached children had a more narrow attentional field around mother at 34ms. Lower levels of maternal Autonomy Support, were similarly linked with a more narrow attentional field. In conformity with attachment theory, this effect was fully mediated by the child's level of Trust towards mother.

[7] Bosmans, G., Braet, C, & De Raedt, R. (in press). Attachment security is linked with attentional breadth in middle childhood. *Journal of Clinical Child and Adolescent Psychology.*

Introduction

The influence of parent-child interactions on cognitive functioning has been captured in early models of attachment theory (Bowlby, 1969, 1988). In this theory it is assumed that the child stores experiences with caregivers (also referred to as attachment representations) in internal working models, which influence later interactions, cognitions and behavior, as well as the degree of secure or adaptive attachment and the development of psychopathology (e.g. Ainsworth, 1973; Bowlby, 1969; Mikulincer, Shaver, & Pereg, 2003). Although this theory quite clearly describes the influence of the internal working model on later information-processing, the internal working model's definition has been rather vague and has only recently been linked with contemporary cognitive theories (Bretherton, 1990; Waters & Waters, 2006). Therefore, empirical research into the dynamic relation between attachment-related cognitions, and information processing mechanisms is still in its infancy. Although it is not yet clear how adaptive and maladaptive attachment guide information processing, attentional processes are considered to be important in the regulation of emotional states (Derryberry & Reed, 1996). Moreover, studying basic processes to clarify core concepts of attachment theory is important in understanding developmental psychopathology. Attachment insecurity is a primordial risk factor in the development of psychopathology. Insight into these concepts can eventually lead to a better understanding of children and adolescents' psychopathology and the development of treatments that are closely tied to their relational experiences and internal working models.

The influence of cognitions on attentional information-processing is typically investigated within experimental psychopathology using computerized experimental tasks that allow fully standardized and precise presentations of stimuli. However, participants need to have accomplished sufficient cognitive

maturation to successfully perform such tasks. Research has demonstrated that children as young as 5 years have a visual sensitivity that is only marginally lower than that of adults (Tschopp et al., 1999). However, during the school-age years attentional efficiency increases with age (Schul, Townsend, & Stiles, 2003). In line with these findings, middle childhood seems to be a promising age-group to investigate attentional biases related to the attachment figure. First, the cognitive maturation of school-age children allows them to perform well on the computerized tasks (Schul et al., 2003). Second, although it is assumed that in this age-period the goal of the attachment system shifts from physical proximity seeking to mental availability of the attachment figure, contrary to older populations, the original main attachment figure still retains its predominate importance (Kerns, Abraham, Schlegelmilch, & Morgan, 2007). Finally, these children are increasingly capable of reporting on their relationships with their caregivers (Dwyer, 2005).

To investigate attachment-related attentional processing, we followed Derryberry and Tucker's (1994) model that distinguishes two separate influences of emotions on attention. According to their model, emotions may alter the ability to *orient attention* towards or away from emotionally relevant stimuli and they influence the *breadth of the focus* of attention. These two processes have been linked to separable brain activation systems (Tucker & Williamson, 1984). With regard to the orienting of attention, Bosmans, De Raedt, and Braet (2007) used an exogenous cueing task to investigate the influence of attachment security on attention orientation towards their mother in 10-12 year old children. In their paradigm, a picture of either the participants' mother or an unfamiliar woman was presented at one side of the screen, with a target following on the same (valid trials) or the opposite side (invalid trials). Response latencies indicated that the low secure group showed enhanced attention towards mother compared to unfamiliar women. Specifically, attentional engagement towards mother was significantly higher in the low secure group compared to the high secure group.

These findings suggest that attachment representations influence attentional orienting to attachment-related information.

The present study examined attachment influences on breadth of attentional focus and was designed to investigate three major questions. Firstly, in line with the distinction by Derryberry and Tucker (1994) we examined whether maternal attachment and subsequent attachment-related cognitions influence the breadth of attention towards the attachment figure (i.e., mother). The prediction that less secure attachment is associated with enhanced attentional narrowing towards the attachment figure is based on the observation of reduced exploration of their environment and novel stimuli in less securely attached infants (Bowlby, 1969; Mikulincer et al., 2003). Although infants' physical exploration and children's attentional exploration might reflect different processes, they may be guided by similar cognitions about the possible unavailability of the caregiver (i.e. the mother). That is, the unreliability of the attachment figure enhances the infants' need for physical presence of the attachment figure, which in children is translated in cognitive processing aspects of proximity seeking, for example influencing attentional breath. Specifically, the focus of attention will be smaller for stimuli that are emotionally most relevant (Easterbrook, 1959). Therefore, we predicted that children who are less securely attached will demonstrate a narrower attentional focus when pictures of mother are presented. To measure attentional breadth, we developed a Dual-task paradigm (based on Ball, Beard, Roemker, Miller, & Griggs, 1988). In this paradigm, pictures of mother or unfamiliar women are presented in the center of the visual field, and a second stimulus is simultaneously presented at a random location around this central picture either close to (10° of the visual angle) or far away (25°) from the picture. We predicted that less secure attachment would lead to increased difficulties in correctly identifying stimuli when presented far away from a simultaneously presented picture of mother compared to stimuli that are presented close to mother.

Secondly, little is known about the time-course of attachment-related influences on attentive processing (Niedenthal, Brauer, Robin, & Innes-Ker, 2002). To test whether the influence of attachment is pre-attentive and automatic or influences later stages of attentive processing, stimuli were presented at three different presentation times: 34ms, 100ms, and 250ms. Correct responses in the 34ms condition provide the most critical measure of attentional breadth because the presentation time is too brief to allow any saccades towards the target (Ball et al., 1988). Therefore, an effect of attachment at 34ms would suggest an influence on pre-attentive narrowing of attention, whereas effects at the longer presentation times would indicate that attachment-related cognitions have an influence on later stages of attentional processing implying different attachment-related visual scanning strategies. Differentiating between automatic and strategic influences on attentional narrowing is important in determining the amount of cognitive control that can be exerted on attentive processing.

Finally, we examined whether differences in attentional breadth in the context of attachment are related to the internal working model of the child or to specific parenting styles. Although attentional breadth has never been studied in parenting research, Vansteenkiste, Simons, Lens, Soenens, and Matos (2005) found evidence suggesting that low levels of autonomy-supportive communication styles do narrow a child's attentional focus during conceptual learning. Therefore, we argue that a decrease in attentional breadth in the infant may be related to specific parenting styles. Nevertheless, building on attachment theory it can be expected that differences in attentional breadth are more proximally related to the child's internal working models than to parenting styles. As less secure attachment has been linked to higher levels of aversive parenting styles in middle childhood and early adolescence (Bosmans, Braet, Van Leeuwen, & Beyers, 2006; Doyle & Markiewicz, 2005), we predicted that a potential effects of parenting styles on attentional breadth will be mediated by the child's attachment representations.

In examining these three questions, it is important to discuss three important facets of the present study. First, there is an ongoing discussion about applying a categorical or continuous approach to attachment-representations. Although the introduction of the strange situation procedure (Ainsworth, Blehar, Waters, & Wall, 1978) caused attachment research to approach inter-individual attachment differences in terms of different attachment styles (secure, anxious, and avoidant), original attachment theory has never predicted different categories (Waters & Beauchaine, 2003). Indeed, Frayley and Spieker (2003) failed to find statistical evidence for the categorical approach and argued that a dimensional approach would be more appropriate. One widely accepted theoretical approach distinguishes two attachment dimensions in adults: attachment anxiety and attachment avoidance (Mikulincer & Shaver, 2007). This model predicts dimension-related differences in attentional processing of emotional stimuli. Anxious individuals fear abandonment and are expected to be hypervigilant to attachment cues. Avoidant individuals prefer not to rely on attachment figures and tend to direct their attention away from these cues . However, studies on attentional bias for attachment threat in adults did not find evidence for differences across insecure dimensions (e.g. Dewitte, Koster, De Houwer, & Buysse, 2007). Moreover, the validity of this two-dimensional framework still needs to be established in middle childhood (Kerns et al., 2007). Finally, research with adolescents did find evidence that one-dimensional inter-individual differences exist in cognitions about availability of the caregiver (Waters & Waters, 2006). As our previous study found attentional differences across a general secure versus insecure dimension (Bosmans et al., 2007), we predicted similar effects for the present study.

Second, to measure attachment-related cognitions, we decided to use two widely accepted self-report questionnaires that directly assess these cognitions: (a) levels of trust and alienation and (b) attachment representations (Armsden & Greenberg, 1987; Bartholomew & Horowitz, 1991). Although we acknowledge

that assessing attachment styles with diagnostic interviews such as the Child Attachment Interview is important, attachment interviews and attachment questionnaires tend to measure different aspects of attachment (Kerns et al., 2007). For the present study, we used questionnaires because they have the advantage that participants have to directly evaluate tangible cognitions, whereas interviews usually measure attachment styles derived from the way children cope with the interview-questions (Target, Fonagy, & Shmueli-Goetz, 2003). Although it has been suggested that questionnaires might underidentify avoidantly attached individuals as they idealize their attachment relationships, research with adults has put this argument in perspective: the main goal of avoidantly attached individuals is directed towards stressing their independence instead of idealizing the relationship (Mikulincer & Shaver, 2007). Lastly, to ensure that the effects measured are attachment-related and not anxiety-related, the potential effect of trait anxiety should be taken into account.

Some researchers have found information processing differences related to different attachment styles when mood induction was applied to prime the attachment system (e.g. Pereg & Mikulincer, 2004). However, provided that the present study is the first to examine attentional breadth for attachment-related material, we decided to investigate attachment in an emotionally neutral situation. An additional reason for this decision stems from the finding that general arousal can influence attentional breadth (Easterbrook, 1959), thus mood primes can easily be confounded with stimulus specific influences on attentional breadth.

In summary, we predicted that less secure attachment–related cognitions would be associated with a decreased attentional breath and an increased focus on pictures of mother and not on pictures of unfamiliar women. We explored the stage of information processing at which attachment influences attentional breadth. Furthermore, we predicted that parenting styles are related to attachment and consequently have similar effects on attentional breadth. In correspondence

with attachment theory, we expected the relationship between parenting and attentional breadth to be mediated by attachment representations.

Method

Participants

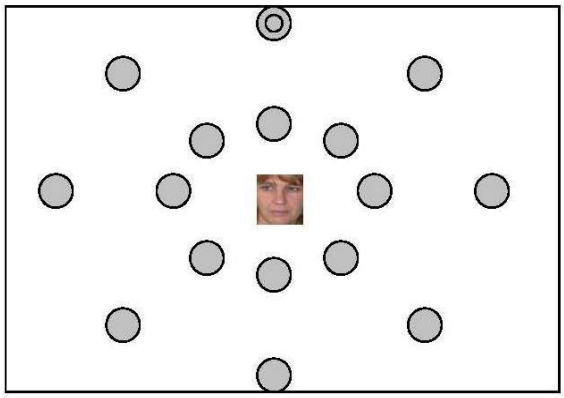
The sample consisted of 40 elementary school children (22 boys, 18 girls) with ages ranging between 9 and 12 years old (M = 10.67, SD = .97). From the total sample, 38 children lived with their biological mother and two children were adopted immediately after birth. During their first year of life, 30 children had mainly contact with mother, while the remaining ten had an equal amount of contact with both mother and father. Ten children had divorced parents, but they lived with mother most of the time. The fathers of three children were deceased.

Measures

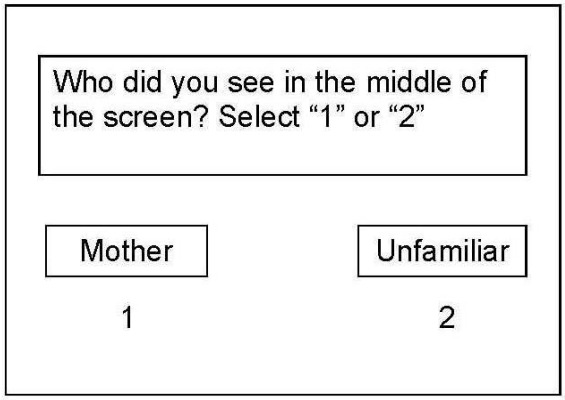
Attentional breadth was measured using a new Dual task paradigm programmed in INQUISIT, Millisecond software, and presented on an IBM compatible computer. Participants were seated in front of a 19" CRT-computer screen, at a distance of exactly 27 cm from the screen using a chin rest to ensure accurate positioning and a computer mouse for the answers. At each trial, in the center of the screen one picture appeared edited to 3 cm wide by 4 cm high. The pictures were divided into two categories: ten different pictures of mother were taken, focussing on the mother's face, and avoiding bright colors in the pictures. The mother was asked to show a neutral face, as much as possible without

showing her teeth to avoid salience effects. Next, ten pictures were taken of ten different women unfamiliar to the participants. We chose to use ten different women instead of the same woman to minimize potential effects of resemblance to own mother, attractiveness, or influences of other salient properties. All unfamiliar women were mothers themselves. The pictures of mother were taken by the experimenter using a digital photo camera. Simultaneously with the presentation of the central picture, 16 grey dots with a diameter of 2 cm appeared at 4.5 cm from the central picture (close trials at 10° of the visual angle) and at 11.2 cm from the central picture (far trials at 25°). The grey dots were arranged in pairs of two (one close and one far dot, situated on one of eight imperceptible axes that came together in the central point were the central picture was shown).Together with the dots, in one of these dots a smaller black circle with a diameter of 1.3 cm appeared either in one of the close or in one of the far dots. This black circle was the target stimulus that participants had to identify.

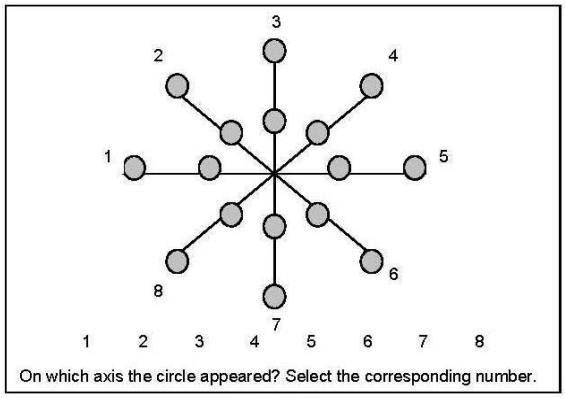
After each trial a screen appeared with the question which picture they had seen (mother or unfamiliar woman). The amount of correct responses on this question shows whether the participants were looking at the center of the screen. Then a second screen appeared with the question on which of eight axes the target stimulus was located. The test phase consisted of 192 trials. In total, 12 categories were created with two picture types (mother versus unfamiliar women), three presentation times (34ms, 100ms, and 250ms), and two distances (target stimulus presented close or far from the central picture), each containing 16 trials (mother close at 34ms, mother far at 34ms, unfamiliar close at 34ms, unfamiliar far at 34ms, mother close at 100ms, mother far at 100ms, unfamiliar close at 100ms, unfamiliar far at 100ms, mother close at 250ms, mother far at 250ms, unfamiliar close at 250ms, unfamiliar far at 250ms). The trials were randomly presented in two blocks of 96 trials each, separated by a short break.



Screen 1 (far trial)



Screen 2



Screen 3

Figure 1: Stimulus presentation of the Dual Task.

All relevant instructions were projected on the computer screen and read together with the experimenter prior to testing and participants were given the opportunity to ask questions for clarification when needed. Participants were instructed to maintain their gaze on the center of the screen throughout the experiment and to use the chinrest to control the viewing distance. Also, a training-session with eight trials was included to familiarize participants with the procedure.

People In My Life Questionnaire: Mother Scale (PIML, Cook, Greenberg, & Kusche, 1995). The underlying structure of the measure is intended to assess behavioral aspects (communication) and two cognitive aspects of the internal working model (Armsden & Greenberg, 1987). For the analyses only the cognitive aspects were used: (1) the positive affective/cognitive experiences of Trust in the accessibility and responsiveness of attachment figures (10 items, e.g. "I can count on my mother to help me when I have a problem"), and (2) the negative affective/cognitive experiences of Alienation and anger or hopelessness resulting from unresponsive or inconsistently responsive attachment figures (5 items, e.g. "I feel angry with my mother"). The PIML has been designed to measure 10 to 12-year-old children's representations of attachment figures. In a group of disabled children, the subscales significantly predicted social, behavioral and emotional adjustment (Murray & Greenberg, 2006). For the current study only the questions regarding mother were used. The children could respond on a 4-point Likert-scale ranging from 1 (almost never true) to 4 (almost always true). The items were translated into Dutch and back-translated by a bilingual translator. Correspondence between the original and back-translated questionnaire was evaluated by a native English speaker. In a sample of 500 Flemish children, the three PIML subscales correlated significantly with the attachment representations measured by the Relationship Questionnaire – Child over Mother version (Bosmans, Braet, Soenens & Verschuere, 2008). In our Flemish sample we found a high reliability for the

Trust scales (α = .89), but less for the Alienation scale. Factor analysis revealed that the item 'I feel scared in my home' loaded inadequately on the Alienation scale (β = .076). We decided to delete this item from the Alienation scale, leaving 4 items in this scale. Although this scale was internally more consistent (Cronbach α had increased to.63), α remained too low, so we dropped this scale for the remaining analyses.

Relationship Questionnaire – Child over Mother version (Bartholomew & Horowitz, 1991). The RQC-M presents four different vignettes for four attachment representations: Secure, Anxious, Preoccupied, and Dismissing representations. Each vignette is expected to measure one attachment representation. The questionnaire was translated into Dutch and adapted for children (Roelofs, Meesters, Ter Huurne, Bamelis, & Muris, 2006), who were asked to assess for each vignette how well it described their own relationship with their mother on a Likert-scale with scores ranging from 1 *(not at all)* to 7 *(very much)*. (e.g. the secure vignette: "I think it is easy to do lots of things together with my mum. I feel at ease when I can trust her and she can trust me. I am hardly ever scared to be abandoned by my mum or that our relationship would become too close."). Thus, the questionnaire obtains for each vignette one score. Several studies have provided evidence of good psychometric properties and validation (e.g. Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994; Scharfe & Bartholomew, 1994). The questionnaire has strong predictive validity for adjustment outcome and interpersonal functioning (Griffin & Bartholomew, 1994). The four scores were interrelated in our Flemish sample (α = .69) and correlated significantly with other attachment measures and with attachment related predictors and outcome measures (Bosmans et al., 2008).

Parenting style: Maternal Autonomy Support was measured using 7 items from the Autonomy Support Scale of the Perceptions of Parents Scale which can be administered to children of 8 years and older (PO*PS; Grolnick, Ryan, & Deci, 1991:* e.g. "My mother allows me to make my own decisions"*)*,

Psychological Control was measured using the 8-item Psychological Control Scale – Youth Self-Report (PCS-YSR; Barber, 1996: e.g. "My mother avoids eye-contact whenever I have let her down"), this questionnaire is strongly validated, but there is little specific information on the age-group studied in this experiment. Responsiveness was measured using 7 items from the Child Report of Parent Behavior Inventory (Schaefer, 1965; Schludermann & Schludermann, 1988: e.g. "My mother makes me feel better, whenever I feel down"). All items have been translated into Dutch and used in previous research (e.g. Soenens, Vansteenkiste, Duriez, & Goossens, 2006, Beyers & Goossens, 1999). The children had to score all items on a 5-point Likert-scale. In the current study Psychological Control ($\alpha = .76$) and Responsiveness ($\alpha = .89$) were reliable. The reliability of Autonomy Support ($\alpha = .67$) was slightly below the .70 threshold.

Trait Anxiety was measured using the Trait Anxiety subscale of the State-Trait Anxiety Inventory for Children (Spielberger, Edwards, Lushene, Montuori & Platzek, 1973), translated into Dutch by Bakker, van Wieringen, van der Ploeg and Spielberger (1989), which was administered to the children. In the current sample we found a high reliability for Trait Anxiety ($\alpha = .82$).

Procedure

Using a letter distributed in the classrooms of the fourth, fifth and sixth grade of elementary schools, we invited volunteering children and their parents to the laboratory for a study on the relationship between children and their mother in return for two access tickets to the movie theatre. The letter informed the parents about the content of the study and asked their approval to participate. Approximately 44% of the parents who received a letter gave their informed consent. All invited children chose to participate after being personally informed about the content and the methodology of the study and about their right to

refuse participation. Ten pictures were taken from the mother. At the beginning of the experiment every child was individually interviewed about their mother by a trainee in clinical psychology. The interview questions were based on questions found in the literature. Following the theoretical assumptions of attachment interviews, talking with children about their mother should activate the attachment system (e.g. Target, Fonagy, & Shmueli-Goetz, 2003). Comparable strategies have already been used to activate the attachment system in adult attachment research (e.g. Dewitte et al., 2007). While the child and the mother completed the questionnaires, the photos were integrated into the attentional task. Afterwards, the children were presented with the task. All children were tested individually. The local ethics committee approved the study design.

Design and Analytic Plan

For all analyses, we only used the trials in which the picture was correctly identified, which ensures that attention was focused to the middle of the screen. The proportion of correctly identified targets on trials with correctly identified pictures served as the main dependent variable. Performance on the attentional breadth task was examined by performing an overall 2 (picture) X 3 (presentation time) X 2 (distance) repeated measures ANOVA on the accuracy rates. Overall, more errors are expected at longer distance and at faster presentation times.

After this analysis, Trust, the four (Secure, Anxious, Preoccupied, and Dismissing) attachment representations (attachment scales), and Autonomy Support, Psychological Control, and Responsiveness (parenting styles) were added successively as covariates to the repeated measures ANOVA. If a significant four-way interaction emerged, we performed analyses for each

presentation time separately. To assess the effect of distance on amount of correctly identified target stimuli, we calculated Attentional Narrowing Indices [ANI = stimulus close to picture – stimulus far from picture] for trials with mother picture and unfamiliar women pictures separately. Higher ANI scores imply that more distance from the central picture leads to less correct answers. To investigate the picture X attachment security interaction effect on attentional breadth, we calculated the correlations between the attachment and parenting scales and an ANI difference effect [ΔANI = ANI(mother) – ANI(unfamiliar)]. Higher ΔANI scores imply a stronger Attentional Narrowing when mother pictures are presented compared to the attentional breadth when unfamiliar women are presented. Finally, we investigated the interrelations between the attachment scales, parenting styles and ΔANI. Following recent recommendations by MacKinnon, Lockwood and Williams (2004), a nonparametric, resampling approach (bootstrapping procedure; see Preacher & Hayes, 2008) was used to test a mediation model in which attachment security is hypothesized to mediate the relation between parenting style and ΔANI.

Results

Overall Performance

All trials in which the central picture was incorrectly identified were deleted: 3% of the trials at 34ms, 2% at 100ms, and 1% at 250ms. The 2 (picture) X 3 (presentation time) X 2 (distance) ANOVA (see Table 1) on the accuracy of target detection yielded the predicted main effect of presentation time ($F(2, 38) = 148.11$, $p < .001$, $\eta_p^2 = .89$) and of distance ($F(1, 39) = 586.62$, $p < .001$, $\eta_p^2 = .94$) and a significant presentation time X distance interaction

effect ($F(2, 38) = 4.39$, $p < .05$, $\eta_p^2 = .19$) indicating the largest number of correct answers at the combination of 250ms presentations at short distances.

Table 1

Means and Standard Deviations for proportion correctly identified targets per condition in the Attentional Breadth Task, with overview of the ANOVAs' results

	Mother		Unfamiliar	
	Close	Far	Close	Far
34ms	.64 (.18)	.17 (.10)	.61 (.19)	.19 (.09)
100ms	.88 (.13)	.37 (.18)	.85 (.15)	.34 (.16)
250ms	.94 (.09)	.46 (.19)	.91 (.12)	.48 (.22)

Overview of ANOVA results

Analysis	*F(df)*	*p*	η_p^2
Picture	$F(1,39) = 2.35$	.13	.06
Presentation time	$F(2,38) = 148.22$	.00	.89
Distance	$F(1,39) = 586.62$	.00	.94
Picture X Presentation time	$F(2,38) = 0.97$	.39	.05
Picture X Distance	$F(1,39) = 3.92$	.06	.09
Presentation time X Distance	$F(2,38) = 4.39$	.02	.19
Picture X Presentation time X Distance	$F(2,38) = 1.05$	.36	.05

Age had no effect on differences in accuracy ($F(1, 38) = 1.9$, *ns,* $\eta_p^2 = .05$). To test the effect of fatigue on accuracy, we compared mean accuracy in the first versus the second block. Results indicate enhanced accuracy in the second block on the close trials and no differential effects between blocks on the far trials. Table 2 provides descriptive statistics for each key measure across the entire sample.

Attentional Breadth and Attachment

Adding Trust as covariate revealed a significant four-way 2 (picture) X 3 (presentation time) X 2 (distance) X Trust interaction effect [$F(2, 37) = 7.93$, $p < .001$, $\eta_p^2 = .24$]. An ANOVA for each representation time separately, revealed that the significant 2 (picture) X 2 (distance) X Trust interaction only occurred at 34ms ($F(1, 37) = 13.08$, $p < .001$, $\eta_p^2 = .26$). Trust was strongly correlated with ΔANI_{34ms} ($r = -.51$, $p = .001$, $d = 1.16$).

Adding the Secure score resulted in an insignificant four-way interaction effect with a moderate effect-size [$F(2, 37) = 2.08$, $p = .14$, $\eta_p^2 = .10$]. The 2 (picture) X 2 (distance) X Secure Vignette interaction analysis demonstrated a trend towards significance at 34ms ($F(1, 38) = 3.50$, $p = .07$, $\eta_p^2 = .08$) with correlation between the Secure Vignette and ΔANI_{34ms} ($r = -.29$, $p = .07$, $d = .59$) that supported this trend. As expected, no effects were found for the Dismissing (F (2, 37)= 1.27, *ns,* $\eta_p^2 = .06$), the Preoccupied (F (2, 37) = 73, *ns,* $\eta_p^2 = .04$), and the Fearful scores (F (2, 37) =.15, *ns,* $\eta_p^2 = .01$).

The four-way interaction effect with Trait Anxiety as covariate was small and insignificant [$F(2, 37) = .51$, *ns*, $\eta_p^2 = .03$]. To further explore whether Trait Anxiety moderated the link between attachment and attentional breadth, we used Hierarchical Multiple Regression Analyses (HMRA). No effects were

found of interactions between Trust or the four attachment representations and Trait Anxiety on the three ΔANI indices[8].

Attentional Breadth and Parenting Styles

Adding the parenting variables as covariate revealed a strong four-way interaction effect [$F(2, 37) = 3.57$, $p < .05$, $\eta_p^2 = .16$] for Autonomy Support. The 2 (picture) X 2 (distance) X Autonomy Support interaction was only found at 34ms ($F(1, 38) = 4.04$, $p < .05$, $\eta_p^2 = .10$) with a correlation between Autonomy Support and ΔANI_{34ms} ($r = -.32$, $p < .05$, $d = .66$). No effect was found for Psychological Control [$F(2, 37) = .54$, *ns*, $\eta_p^2 = .03$] or Responsiveness [$F(2, 37) = 1.93$, *ns*, $\eta_p^2 = .09$]

Mediational Analyses

Since the Psychological Control and Responsiveness parenting styles demonstrated no effect on the attentional narrowing process and thus there was no direct pathway between these parenting styles and ΔANI, no mediation effects could be tested for Psychological Control or Responsiveness. Consistent with Baron and Kenny's (1986) definition of mediation, adding in an HMRA the Trust and Secure score attachment variables as predictors to the link between Autonomy Support and ΔANI_{34ms}, reduced the effect of Autonomy Support ($\beta = -.001$, *ns*, $d = .00$, complete reduction). For mediation to occur, the indirect effect of Autonomy Support on ΔANI_{34ms} via the hypothesized mediators (the two attachment variables) has to be significant.

[8] All the tables concerning these analyses can be requested.

Table 2

Correlations, means and standard deviations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. ΔANI34ms	1											
2. ΔANI100ms	.15	1										
3. ΔANI250ms	-.06	-.14	1									
4. Trust	-.51***	.20	-.08	1								
5. Secure score	-.29†	-.17	.17	.39**	1							
6. Preoccupied score	.11	.23	-.06	-.38*	-.30†	1						
7. Fearful score	-.03	.08	.08	-.30†	-.35*	.51***	1					
8. Dismissing score	.15	.26	-.12	-.20	-.22	.54***	.38*	1				
9. Responsiveness	-.30	.16	.03	.69***	.42**	-.36*	-.19	-.07	1			
10. Psychological control	.22	.17	-.02	-.59***	-.35*	.65***	.54***	.41**	-.32*	1		
11. Autonomy Support	-.32*	.18	.05	.58***	.50***	-.33*	-.29†	-.18	.37*	-.46**	1	
12. Trait Anxiety	.15	-.06	.09	-.12	-.05	.26	.23	.43**	.05	-.15	-.03	1
Mean	.05	.001	.04	35.11	5.80	1.93	2.18	2.28	30.04	16.22	27.92	32.64
SD	.17	.17	.17	4.61	1.67	1.40	1.43	1.63	5.65	5.44	4.22	6.73

† $p = .07$; * $p < ..05$; ** $p < .01$; *** $p < .001$

Given the small sample size and following MacKinnon, et al. (2004), we used a nonparametric resampling method (bias-corrected bootstrap for multiple mediators, Preacher and Hayes, 2008) with 5000 resamples drawn with replacement from the original sample (n = 40) to derive the 95% confidence interval (CI) for the indirect effect. To that end, we used the SPSS Macro provided by Preacher and Hayes (2004). The true total indirect effect of Trust and the Secure scores, expressed in unstandardized regression weights, was estimated to lie between -.02 and -.004 (*SE* = .005). with 95% CI. The indirect effect of Trust was estimated to lie between -.02 and -.005, whereas the indirect effect of the Secure score was estimated to lie between -.01 and .005. Because zero is not in the 95% CI for the total effect and for Trust, we can conclude that the total indirect effect, and more specifically the indirect effect of Trust, is significantly different from zero at $p < .05$ (two tailed), implying that this variable acts as a mediator[9](see Figure 2). This model explains 27% of the variance in ΔANI_{34ms}.

[9] As the internal consistency of the Autonomy Support scale was only borderline acceptable, it might be that the statistical relationships found are less reliable. Therefore, we repeated our analyses using factor scores for Autonomy support. Calculating factor scores for a scale has the advantage that the error-variance responsible for the lower Cronbach α is no longer taken into account. Although the use of factor scores slightly reduced the strength of the relationship between Autonomy Support and ΔANI_{34ms} (β = -.28, p = .09, d = .58), adding the mediators strongly reduced this relationship (β = -.06, *ns*, d = .12). Importantly, the true total indirect effect was estimated to lie between -1.64 and -.08 (*SE* = .38). with 95% CI. With again a significant indirect effect of Trust that was estimated to lie between -.02 and -.005, but no indirect effect of the Secure score. This model explains 22% of the variance in ΔANI_{34ms}.

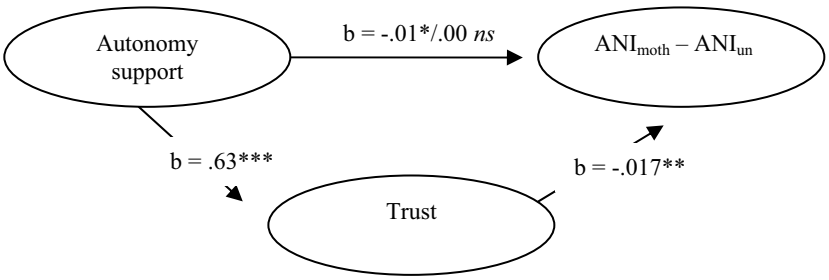


Figure 2: Mediation analyses.

Note: ANI_{moth} = Attentional Narrowing Index for mother pictures; ANI_{un} = Attentional Narrowing Index for unfamiliar pictures; values before the backslash indicate the direct effect before adding the indirect pathway, values after the backslash indicate the direct effect taking into account the effect of the indirect pathway; * p < ..05 ; ** p < .01 ; *** p < .001

Discussion

This study investigated the influence of attachment security on the breadth of the attentional focus around mother. With regard to our research questions, the results demonstrated that (1) less secure attachment-related cognitions are associated with a reduced attentional focus on pictures of mother; (2) these cognitions influence the attentional breadth specifically at pre-attentive stages of information-processing; and (3) influences of parental style on attentional breadth are mediated by attachment-related cognitions. These results provide crucial support for core tenets of the attachment theory and are discussed in turn.

Our study confirms that attachment-related cognitions influence the attentional breadth when a picture of mother appears in children's visual field. Children with lower levels of Trust have a reduced breadth of attention.

Although the effect of the Secure representation did not reach full significance, the moderate effect size accentuates the importance of this finding, as we tested a stringent hypothesis aimed at replicating the effect of our previous study (Bosmans et al., 2007). In line with our previous work, no effects on attentional breadth were found for the three other attachment representations (Preoccupied, Fearful and Dismissing scores). In spite of the difficulty to interpret null findings due to the small sample size, it is encouraging that this study on 40 participants has a power of .86.

The current results are in line with our proposal that less secure attachment reduces children's cognitive ability to explore the environment. Although this is a plausible explanation, alternative explanations should be taken into account. For example, one could argue that this attachment-related attentional bias might be especially linked to children's social openness to strangers, with less secure children being more strongly focused to mother. More importantly however, one could argue that the decrease in attentional breadth can better be explained by a general influence of anxiety (Easterbrook, 1959). However, it is noteworthy that these results cannot be explained by elevated trait anxiety levels in less secure attachment as trait anxiety did not correlate with attentional breadth, nor did trait anxiety influence the link between attachment and attentional breadth. More importantly, if there was a general anxiety effect this would affect attentional breadth across trials whereas we observed modulation of attentional breadth on a trial-by-trial basis in function of the nature of the middle stimulus.

With regard to the time-course of attachment influences on the attentional breadth, findings were restricted to the 34 ms presentation duration. This is the only condition that provides a measure of the breadth of the attentional field that is unconfounded by any other attentional effect, as children cannot perform additional saccades to search for the target stimulus at 34ms (Ball et al., 1988). Furthermore, this indicates that attachment influences operate

at very early stages of information-processing implying an effect on attentional breath, but not on visual scanning.

To our knowledge, the present study was the first to examine whether parental styles influence the information processing of attachment-related material and whether this link is mediated by attachment representations. As hypothesized, attentional narrowing was found in children with lower levels of Autonomy support. Autonomy support reflects a parenting style that becomes increasingly important in late childhood and is related to attachment security (Avery & Ryan, 1988; Dwyer, 2005). The effect of Autonomy support on the attentional processing of the attachment figure was completely mediated by Trust. Thus, in line with Bowlby's (1969) assumptions, the link between parenting style and the functioning of the internal working model (i.c. attentional breadth when mother is presented), can be explained through attachment-related cognitions regarding trust in the availability of the attachment figure. Although promising, results should be interpreted with caution as they are exploratory and in need of replication and extension. Moreover it is noteworthy that the reliability of Autonomy Support was slightly below the accepted level. Nevertheless, the substantial percentage of the variance in attentional breadth explained by the mediation model, the strength of the effects found, and the significant indirect effect we found using reliable factor scores, all underscore the relevance of the present study's results.

Problems have been noted with regard to all measurement instruments of attachment representations (Dwyer, 2005) with an underestimation of attachment insecurity being the main concern (Ainsworth, 1985). Also, the significant correlations between parenting and attachment measures can be partly due to shared response tendencies. On a content level one could argue that there might be a strong relationship between the parenting and the attachment subscales. Even though the preliminary analyses do not reveal excessively high correlations between these variables, future research should also include multi-informant

measures. Nevertheless, the present data clearly indicate that predictions from attachment models can be scrutinized through experimental research.

Implications for Research, Policy, and Practice

Building on these promising findings, future research could continue to investigate the cognitive processing of attachment figures using similar experimental paradigms to increase our understanding of internal working models. As for the present experimental design, one might argue that the presentation of ten pictures taken from the same mother is not comparable to the presentation of ten different unfamiliar women. However, our approach has important strengths. The adaptation of the design to the individual participant increases the ecological validity of the study and presenting ten pictures of ten different unfamiliar women decreases possible confounds with variables like resemblance to own mother, attractiveness or other influences. Future research should also focus on differences between mother and other familiar people such as classmates.

The current experimental procedure only demonstrated an attentional narrowing effect, but no scanning effect. The current results do not indicate that children continue to show such narrowing in real life interactions. However, the current results imply that decreased social contacts or decreased exploration do not occur when only pictures of the mother are presented. In the mother's actual presence, however, it might be that the effects will continue throughout the scanning phase. It might be the case that in the current experimental design children soon consciously realize that the mother is not actually there, leading them to broaden their focus, whereas in situations where mother is actually present, they might continue to restrict their attentional focus to the mother. However, these findings could be due to the small sample size or the low error

rates of particularly the close trials in the longer presentation times. Also, it remains a question whether our findings are restricted to pictures of mothers or generalize to other individuals who function as attachment figures.

The present study raises a number of important questions with regard to the relevance of the attentional narrowing effects we demonstrated. For instance, at this point it is unclear whether enhanced attentional narrowing towards mother is a problematic cognitive feature and is associated with behavioural characteristics like reduced exploration or reduced social contacts with others. One way to examine whether attentional narrowing can indeed be considered an impairment for exploration would be to apply prospective designs examining whether attentional narrowing indices predict levels of distress in children upon attachment-related primes (e.g., separation). Moreover, the relationship between attentional narrowing and relational behaviour can be investigated by linking the narrowing effect to approach-avoidance action tendencies.

Linking attachment and cognitive schemas helps us to gain a better understanding of the processes through which early experiences with the caregiver increase the vulnerability to develop psychopathology. If the internal working model functions as a cognitive schema, one would predict that the schema will be activated by relevant stimuli. Indeed, confronting individuals with an abandonment prime influences attachment-related approach-avoidance tendencies (Dewitte et al., 2007). This insight may help explain several clinical phenomena: e.g., a child with a history of parental maltreatment and rejection in a residential youth centre that after an initial difficult adaptation develops well for years, but relapses the day her individual educator leaves the center. Furthermore, increasing our understanding of the functioning and the content of the internal working model can help develop adequate attachment-directed therapeutic interventions: knowing that the internal working model consists of attachment schemas underscores the relevance of therapeutic cognitive

interventions such as the approach Young (1991) has developed to treat attachment-related problems.

In summary, the current study demonstrates how less secure attachment-related cognitions narrow the breadth of the focus of attention at a pre-attentive stage when mother pictures are presented. Interestingly, the same effect was found when looking at the influence of the level of trust and secure representations separately. Finally, this study is the first to show that attachment–related cognitions mediate the association between parenting style and cognitive processing of the attachment figure.

Chapter 7

General discussion

Philosophy seems at present to be in a stage of transition between the a priorism of the past and perhaps an experimental philosophy in the future.

(Kenneth Craik, 1943)

Within attachment theory, the internal working model is a crucial concept to explain why early parent-child interactions influence later functioning (Bowlby, 1969; Cassidy, 1999). The internal working model was conceptualized as a mental structure representing past experiences with the parent and influencing the information processing of future interpersonal experiences. In spite of its relevance, this concept has been understudied due to its vague definition (e.g., Hinde, 1988; Rutter, 1995). Therefore, the studies carried out in this dissertation aimed at evaluating whether a more clearly defined conceptualization of the construct can be found in order to increase our understanding of the role, the functioning, and the content of the internal working model. For this purpose, the internal working model concept was linked to the cognitive schema concept, which leads to the research questions addressed in the previous chapters.

The first aim of this dissertation was to test Bowlby's (1969) central hypothesis that the internal working model mediates the association between parenting styles or parenting behaviours, and psychopathology. The second aim of this dissertation was to explore if the internal working model concept can be linked to the cognitive schema concept, investigating thereby the relation between content-specific early maladaptive schemas and the dimensions attachment anxiety and attachment avoidance. The final aim of the dissertation was to test the strong assumption that the internal working model guides attentional biases related to the attachment figure. The last two aims are important as they are derived from approaching the internal working model from what we will further describe as an attachment schema perspective.

The general discussion will summarize the main findings of this dissertation's five studies, their implications for attachment theory, their main strengths and limitations, to end with describing future research opportunities and clinical relevance.

I. Overview of the main results

Aim 1: The Internal Working Model as a Mediator between Parenting and Psychopathology

Firstly, we investigated the assumption that the relation between parent-child interactions and psychopathology can be explained by the associated attachment quality. For this purpose, we investigated the mediating role of attachment on the link between negative parenting styles and externalizing behaviour problems (**Chapter 2**) and between punitive parenting and internalizing behaviour problems (**Chapter 3**) in adolescence.

Results of **Chapter 2** did confirm previous findings of Doyle and Markiewicz (2005) that in early adolescence, attachment indeed mediates the link between parenting and externalizing problem behaviour. Furthermore, the findings expanded our insight in the interrelationship between the variables under study. (a) In pre- and middle adolescence respectively, only partial mediation or no mediation occurred. (b) This was due to age effects on the links between negative control and problem behaviour and between attachment and problem behaviour. (c) The results were similar for both boys and girls. (d) The mediation effect was similar for both parents' negative control. (e) Positive parenting did not correlate significantly with problem behaviour. (f) We found only minor support for parenting as moderator of the link between attachment and problem behaviour.

Results of **Chapter 3** demonstrated that (a) punitive parenting was associated with higher levels of internalizing problems and (b) with lower levels of secure attachment, (c) which was associated with internalizing problems. Most importantly, the results revealed that (e) the link between punitive

parenting and internalizing problems was completely mediated by secure attachment. The associations between these variables did not vary in strength across the gender of the adolescents. All models appeared to be valid for both the mother and father data, which emphasized the replicability and relevance of these findings.

In summary, both studies confirmed the hypothesis that attachment mediates the relationship between parenting and psychopathology. The results of both studies may have three important theoretical implications. The findings suggest that (a) the attachment system functions similarly in boys and girls. Furthermore, results suggest that (b) the assumed relations between interpersonal experiences, the corresponding internal working models, and symptoms of psychopathology are comparable, independently of the attachment figure's gender. Finally, (c) the same effects were found irrespective of the content of the symptoms of psychopathology. The apparent absence of influences of possible moderating variables on this mediation effect confirms the importance of the effect found.

While the results in **Chapter 2** were above all a confirmation of Doyle and Markiewicz's (2005) finding that attachment security mediates the link between parenting and externalizing behavior problems, the study in **Chapter 3** was the first to demonstrate the mediating role of attachment security in the association between parenting and internalizing problems. Indeed, the study of Doyle and Markiewicz (2005) failed to demonstrate this mediation effect. However, Doyle and Markiewicz (2005) already suggested that their study was limited by their measurement of parenting styles, and the small sample size which did not allow performing more powerful structural equations modeling (SEM) techniques (Holmbeck, 1997). Therefore, the study in **Chapter 3** measured tangible parenting behaviours. Also, the large sample allowed performing SEM analyses. This could explain why our study did find evidence for a mediation effect.

The study in **Chapter 2** was limited due to its single-informant design. Interestingly, the SEM approach in **Chapter 3** did also allow combining the information of the parents and the adolescents to assess the parenting behaviours. This has proven to be an important analysis to reveal the interrelations between the three variables under study, as it has demonstrated true links between punitive parenting and attachment and between punitive parenting and psychopathology. Thanks to this analysis it is possible to suggest that the mediation effects found – certainly in **Chapter 3**, and probably in **Chapter 2** as well – are not solely due to a reporting bias.

Aim 2: The Content of the Internal Working Model

After demonstrating the mediating influence of attachment in the association between parenting and psychopathology, we investigated how the internal working model directly affects a person's functioning. To better understand the internal working model, we followed recent evolutions in the conceptualization of the construct. Waters and Waters (2006) have described how attachment theory has progressively described the internal working model from a cognitive schema perspective (e.g. Baldwin et al., 1996; Bretherton, 1990; Nelson, 1986; Schank, 1982, 1999), leading them to predict that the internal working model at least partly exists of what they called a secure base script. They define this script as "the expectation that your primary caregiver (indeed, secure base figures in general) will always be there for you, and that they will be wise enough and powerful enough to save you and restore balance to your ongoing activities" (pp. 187). The secure base script can be described as a cognitive schema concept on two conditions: first, internal working models must have a schema-like *content*, and second, comparable to the schema-congruent information processing biases, internal working models must

influence the information *processing* of attachment-related information (Clark, Beck, & Allford, 1999).

Chapter 4 was designed to identify a link between the content of the internal working model and the content of widely recognized cognitive schemas (see Beck, 1967; Young, Klosko, & Weishaar, 2003). Establishing this association is important for our overall research aim, as it would confirm the validity of the cognitive schema perspective to approach internal working models. Starting from the observation that less secure attachment can be considered an important risk factor in the development of psychopathology (which was demonstrated in **Chapter 2** and **Chapter 3**), we hypothesized that less secure internal working models consist of early maladaptive schemas (Young et al., 2003). Like internal working models, these early maladaptive schemas are supposed to have developed during early childhood experiences with caregivers, increasing a person's vulnerability to develop psychopathology. Therefore, to explore the cognitive schema hypothesis, we investigated whether the relation between individual differences in symptoms of psychopathology and the dimensions of attachment anxiety and attachment avoidance can be explained by these early maladaptive schemas (grouped in five theoretically assumed and empirically acknowledged schema domains, see Van Vlierberghe, Braet, Bosmans, Bögels, & Rosseel, 2008; Young et al., 2003).

The results of **Chapter 4** demonstrate that both attachment dimensions are associated with all five schema domains. However, when forced in one analysis with all schema domains simultaneously and controlling for the effect of the other attachment dimension, many correlations disappeared. The domains Disconnection/Rejection and Other-Directedness remained uniquely linked with attachment anxiety, while Disconnection/Rejection and Impaired Autonomy were uniquely linked with attachment avoidance. Finally, the effect of attachment anxiety on symptoms of psychopathology was completely mediated

by the effect of Disconnection/Rejection and Other-Directedness. The effect of attachment avoidance was partly mediated by Disconnection/Rejection.

This clear link between attachment and early maladaptive schemas, adds to the existing evidence that the internal working model might be better operationalized based on the insights of cognitive schema theory (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Bretherton, 1990; Nelson, 1986; Schank, 1982, 1999; Waters & Waters, 2006). These results are also in line with previous research linking the content of cognitive schemas to attachment avoidance and attachment anxiety (Onishi, Gjerde, & Block, 2001; Sibley, 2007). Furthermore, compared to the often global measures that have been used to identify the content of internal working models in earlier research (Pietromonaco & Feldman Barrett, 2000), the early maladaptive schemas reflect very detailed cognitions individuals hold about the self, the other, and interpersonal relations.

The strong association between the Disconnection/Rejection domain and both attachment dimensions might help explain why these dimensions are so highly correlated (Conradi, Gerlsma, van Duijn, & de Jonge, 2006; Mikulincer & Shaver, 2007), in spite of the original conceptualization that attachment anxiety and attachment avoidance are orthogonal dimensions (Brennan, Clark, and Shaver, 1998). Nevertheless, important differences between the attachment anxiety and attachment avoidance dimensions remain.

Firstly, results have demonstrated that both attachment dimensions have a unique link with a second early maladaptive domain. Attachment anxiety was uniquely linked with cognitive schemas reflecting an excessive focus on the desires, feelings and responses of others at the expense of one's own needs in order to gain love and approval, maintain one's sense of connection or avoid retaliation (Other-Directedness). Attachment avoidance was uniquely but inversely linked with expectations about oneself and the environment that

interfere with one's perceived ability to separate, survive, function independently or perform successfully (Impaired Autonomy/Performance). These cognitive contents are in line with Mikulincer and Shaver's (2007) assumption that attachment anxiety will lead to a submissive, accommodating approach toward attachment figures' demands, whereas individuals scoring high attachment avoidance will display less signs of weakness or dependency.

In addition to the finding that both dimensions are also linked to a domain they do not share, the mediation analyses reveal another important difference between attachment anxiety and attachment avoidance. Whereas the effect of attachment anxiety on psychopathology is completely mediated by the associated EMS domains, the effect of attachment avoidance is only partly mediated by the Disconnection/Rejection domain. This finding needs further clarification. It can be that attachment avoidance and symptoms of psychopathology are associated through other mediating processes, or even that attachment avoidance has a direct effect on the development of psychopathology. In line with this last explanation, it has been demonstrated that experiential avoidance – the unwillingness to remain in contact with private experiences, painful thoughts and emotions – is an important risk factor in the etiology of maladaptive behaviour (for a review, see Chawla & Ostafin, 2007).

The unique associations discovered here confirm that the two attachment dimensions in Shaver and Mikulincer's (2002) affect-regulation model represent two different coping strategies that reflect on the one hand the same evaluation regarding the unavailability of the attachment figure (the first step in the attachment-related affect-regulation model), but on the other hand reflect different cognitions regarding how to deal with distress while confronted with unavailability of the attachment figure. Whereas more anxiously attached individuals are assumed to focus cognitively on their dependence on unreliable attachment figures to deal with distress, avoidantly attached individuals are assumed to focus cognitively on their autonomy to deal with distress. These

cognitive evaluations can be linked to the second step of the attachmetnt-related affect-regulation model as they reflect different evaluations of the viability of proximity seeking (Mikulincer & Shaver, 2007).

Aim 3: The Internal Working Model and Attentional Processing of the Attachment Figure

As argued above, two conditions need to be fulfilled to substantiate our central claim that internal working models can be conceptualized as cognitive schemas. **Chapter 4** has provided evidence for the first condition that the maladaptive content of less secure internal working models can be captured in terms of early maladaptive schemas (see Aim 2). The last aim of this dissertation was to investigate the second condition that internal working models must influence the information *processing* of attachment-related information. Therefore, we have investigated the attentional processing of this information. To develop a suiting research paradigm, we have built upon recent developments within attachment research in which the influences of attachment styles on affect-regulation are investigated with experimental designs.

Given the secure-base script hypothesis (Waters & Waters, 2006), that can be linked to the first step of Mikulincer and Shaver's (2007) attachment-related affect-regulation model, and for which we found evidence in **Chapter 4**, we have hypothesized that it should be possible to demonstrate a secure base script related attentional bias for the attachment figure. To investigate attachment-related attentional processing, we followed Derryberry and Tucker's (1994) model that distinguishes two separate influences of emotions on attention. According to their model, emotions may alter the ability to *orient attention* towards or away from emotionally relevant stimuli and they influence the *breadth of the focus* of attention. These two processes have been linked to

separable brain activation systems (Tucker & Williamson, 1984). **Chapter 5** investigated the attentional orienting towards attachment figures with an adapted version of the Exogenous Cueing Task (Posner, 1980). **Chapter 6** investigated the breadth of the attentional focus with a newly developed version of the Dual-task paradigm (based on Ball, Beard, Roemker, Miller, & Griggs, 1988). For both experiments, participants were presented with pictures of their own mother and pictures of unfamiliar women.

Results of **Chapter 5** (a) demonstrated an attentional bias towards mother at later stages of attentional processing in a low secure group. At an SOA (Stimulus Onset Asynchronity) of 1000 ms, the low secure group remained longer interested in mother cues compared to pictures of unknown women. The high secure group appeared to be less interested in the mother cues and was equally interested in the unknown women. (b) Furthermore, an engagement effect was found for the low secure group at an SOA of 1000 ms. (c) At an SOA of 200 ms no significant engagement effects were observed. (d) Finally, against expectations, we found no disengagement effects at both SOAs.

These results seem to suggest that at long presentation times, attention of less securely attached children remains longer with mother compared to unknown women, whereas this effect was not found in more securely attached children. Interestingly, contrary to the significant difference in engagement between the low and high secure group in the 1000 ms condition, this difference was not found at an SOA of 200 ms. Although attachment theory does not provide clear hypotheses on 200 ms engagement, these results can be interpreted as an indication that the secure base script does act as a cognitive schema. These results might suggest that the attentional bias is apparently not influenced by the stimulus alone, but rather by the meaning the stimulus has at later stages of attentional processing (Koster et al., 2005c). The absence of attachment-related biases of early attentional engagement is not in line with the significant correlations between velocity of recognition of emotional stimuli and dimensions

of both dismissive and preoccupied attachment that were found in earlier research (Maier, Bernier, Pekrun, et. al., 2005). We argue that this difference might also be due to differences in approach – the latter study measures thresholds of perceptual processing, using several successive presentations of the same stimuli but with increasing duration. However, if replicated in larger samples, it could be possible that the present results may help to understand the role of attachment in automatic attentional activities (Niedenthal, et al., 2002).

Surprisingly, the hypothesized disengagement effect was not found. This result is difficult to explain, because in adult experimental psychopathology research the ECT has proven to be a promising paradigm to measure disengagement (e.g. Koster et al., 2005). Interestingly, the only other study using ECT in children was also not able to demonstrate a disengagement effect contrary to their predictions. However, in the latter study, simultaneously measured ERPs were indicative of a disengagement effect (Pollak and Tolley-Schell, 2003). Given our results, we think more experience with the use of ECT in several different child populations is needed to see whether this pattern of results reoccurs before trying to find a thorough explanation of this phenomenon.

Results of **Chapter 6** showed that (a) Less secure attachment-related cognitions reduced the attentional focus on pictures of mother; (b) These cognitions influenced the attentional breadth specifically at pre-attentive stages of information-processing; (c) Influences of parental style on attentional breadth were mediated by attachment-related cognitions.

This study confirms that attachment-related cognitions influence the attentional breadth when a picture of mother appears in children's visual field. Children with lower levels of Trust have a reduced breadth of attention. Although the effect of the Secure representation did not reach full significance, the moderate effect size accentuates the importance of this finding, as we tested a stringent hypothesis aimed at replicating the effect of **Chapter 5**. In line with

our previous work, no effects on attentional breadth were found for the three other attachment representations (Preoccupied, Fearful and Dismissing scores). In spite of the difficulty to interpret null findings due to the small sample size, it is encouraging that this study on 40 participants has a power of .86.

With regard to the time-course of attachment influences on the attentional breadth, findings were restricted to the 34 ms presentation duration. This is the only condition that provides a measure of the breadth of the attentional field that is unconfounded by any other attentional effect, as children cannot perform additional saccades to search for the target stimulus at 34ms (Ball et al., 1988). Furthermore, this indicates that attachment influences operate at very early stages of information-processing implying an effect on attentional breath, but not on visual scanning.

In summary, both studies revealed very comparable effects in spite of having measured two different processes with two entirely different methodologies leading to different dependent variables – response latencies and number of correct responses. Children who described themselves as less securely attached, displayed a longer maintained attention towards mother and had a more narrow attentional field when mother pictures were presented.

One possible explanation for these results might be found in Bowlby's (1969) suggestion that the activation of the exploratory system and the attachment system are intricately interconnected. As described in **Chapter 1**, the evaluation of the attachment figure as a "secure base from which to explore" (Bowlby, 1969; Ainsworth, 1991) is a central notion within attachment theory. The attachment and exploration behavioural systems are expected to be continuously in balance (Ainsworth, Bell, & Stayton, 1971) depending on the child's assessment of the environment's characteristics and the caregiver's availability. For instance, children are unlikely to explore an environment that is experienced as potentially harmful. Additionally, observations have learned that

infant's exploration and play decline after activation of the attachment system due to separation. Contrary, when the attachment figure is available and the attachment system is not activated, exploration is enhanced (Cassidy, 1999). Thus, when the attachment system becomes activated in times of perceived threat or danger, gaining access to the attachment figure may be conceived as the set goal of attachment.

Based on these observations of less securely attached infants' reduced exploration of their environment and novel stimuli (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969; Shaver et al., 2003), we predicted that in middle childhood less secure attachment is associated with longer maintained attention towards mother and an enhanced attentional narrowing towards the attachment figure. Although infants' physical exploration and children's attentional exploration might reflect different processes, we argued that they may be guided by similar cognitions about the possible unavailability of the caregiver (i.e. the mother). That is, the unreliability of the attachment figure enhances the infants' need for physical presence of the attachment figure, which in children might be translated into cognitive processing aspects of proximity seeking, for example influencing attentional orienting and attentional breadth.

We predicted an effect of secure attachment (evaluations regarding availability, the first step of the attachment-related affect-regulation model) on the attentional processing of attachment cues and not of the different insecure attachment dimensions (the second step of the affect-regulation model) Nevertheless, attachment theory predicts attachment anxiety to be linked with hypervigilance (Eysenck, 1997) and attachment avoidance to be linked with attentional avoidance (Dewitte, Koster, De Houwer, & Buysse, 2007). In **Chapters 5** and **6** we investigated this alternative prediction, but found no attention-related effects of different insecure attachment dimensions. Although these results suggest that indeed this attentional bias is only linked to the first step of the affect-regulation model, our findings might also be the consequence

of our experimental procedure. Attachment anxiety and attachment avoidance lead to two different coping styles when activated under distress and after assessing the attachment figure to be unavailable. Research on biases in the information processing of emotional information tends to find differential effects of attachment anxiety and attachment avoidance after mood-induction. It might be that in our studies links with the insecure attachment dimensions would have become more clear after mood induction. However, we deliberately decided not to use a mood-induction procedure as now we have measured the effect of the internal working model in an emotionally neutral environment, which gives an interesting insight in basic attachment processes.

Interestingly, the results of **Chapter 6** allowed us also to examine the interrelations between child-reported parenting experiences, child-reported attachment security, and attentional narrowing. Completely in line with attachment theory's predictions, these analyses revealed that the effect of maternal autonomy support on the attentional narrowing effect was fully mediated by attachment-related cognitions. Although these findings were tentative and might have been influenced by biases due to the use of only one informant, they do seem to suggest that parenting experiences are linked with secure base cognitions, which in turn seem to have an impressive impact on cognitive functioning. This study was the first to test and demonstrate this important implication of attachment theory.

II. Implications for attachment theory

The current findings confirm the growing assumption that the internal working model can be conceptualized as a cognitive schema (e.g., Baldwin et al., 1996; Bretherton, 1990; Nelson, 1986; Schank, 1982, 1999). The results demonstrate that the internal working model is indeed associated with cognitive schema contents and guides information processing. As predicted from the secure base script conceptualization (Waters & Cummings, 2000; Waters & Waters, 2006), results demonstrate the essential role of disconnection/rejection related cognitive schemas to explain the link between attachment dimensions and psychopathology (**Chapter 4**): less securely attached individuals report more expectations that their needs for security, safety, stability, nurturance, empathy, sharing of feelings, acceptance and respect will not be met in a predictable manner. In line with our predictions, the presented studies have shown that this lack of trust in the availability of the attachment figure is associated with more maintained attention (**Chapter 5**) and a more narrow attentional focus on the attachment figure (**Chapter 6**). Given the theoretical link between the attachment system and the exploration system (Cassidy, 1999), we have argued that the demonstrated attentional bias can be interpreted as a reduction in attentional exploration due to the absence of a stable secure base. Finally, in line with the central assumption of attachment theory, the current results suggest that experiences with parents can be directly linked with the cognitive processes guided by the internal working (**Chapter 6**) and that the internal working model mediates the relationship between experiences with parents and psychopathology (**Chapters 2 and 3**). Interestingly, the theoretical implications of these findings contribute to the clarification of some of the points of discussion described in **Chapter 1**.

The organization of internal working models

The studies in this dissertation confirm that the internal working model is functionally equivalent to a cognitive schema that at least partly consists of beliefs regarding the availability and the secure base quality of an attachment figure. Therefore, we would like to argue that our findings confirm that instead of "internal working model", one might as well use the term "attachment schema" to describe attachment-related cognitive contents. This term has been used before by for example Rowe and Carnelley (2003) and is related to what has been called the "current state of mind with respect to attachment" in the Adult Attachment Interview (Cassidy, Lichtenstein-Phelps, Sibrava, Thomas, & Borkovec, 2009). Although our studies do not provide information regarding the interrelationships between different internal working models within the same person, the attachment schema perspective can be integrated in the very recent connectionist approach to describe the organization and continuity of internal working models (**Chapter 1**; Fraley, 2007; Mikulincer & Shaver, 2007). Based on connectionist models, we predict that these attachment schemas are the emergent properties of the activity of networks of massively interconnected neurons. The content of a specific active attachment schema will depend on which set of units in the neural network is activated.

The stability of internal working models

Even though attachment theory predicts cross-temporal stability of the internal working model in a trait-like fashion (Bowlby, 1973), longitudinal research has led to mixed evidence for this trait-like characteristic of internal working models (Baldwin & Fehr, 1995; Fraley, 2007; Pietromonaco & Feldman Barrett, 2000; Shaver & Mikulincer, 2007; Thompson & Raikes, 2003).

Although the influence of so-called lawful discontinuities (**Chapter 1**) might partly explain the cross-temporal variance found, it has been argued that this explanation might not be sufficient (Thompson & Raikes, 2003). In the next paragraphs we will argue that the results of the presented studies might help explain another part of the instability found.

Whereas the original conceptualization of internal working models wrestles with the sometimes low levels of cross-temporal stability found, the attachment schema perspective has the advantage that it instead leads to the prediction that cross-temporal stability will be less high. One of the strengths of Beck's cognitive schema concept is its diathesis-stress characteristic (Clark et al., 1999). The diathesis-stress model has been proposed to explain the development, maintenance and relapse/recurrence of depression. Beck (Beck, 1967; Kovacs & Beck, 1978) has predicted that once a person develops a depressive cognitive schema (during stressful early childhood experiences), this cognitive schema can lay dormant until activated by stimuli that are associated with the context from which the schema originated. Once activated, the depressive cognitive schema is expected to influence information processing enhancing the development of a depressive disorder. Segal and Ingram's (1994) research further elaborated on this activation idea. They demonstrated that indeed activation can occur due to exposure to a stimulus that corresponds to the content of existing negative schemas. This has been called *direct activation*, as the activating stimulus corresponds to something of relevance to the person by virtue of resembling the information represented in the schema. Next, a schema can get *indirectly activated* due to its relation with other more fully activated schemas. The relations between schemas differ in strength: based on the similarity of their content some schemas are stronger interrelated than others. If one schema becomes fully activated, this activation will spread to associated schemas. Both priming research – even with children as young as 8 years, e.g. Timbremont and Braet (2004) – and longitudinal research have provided strong

evidence for this cognitive diathesis-stress model to explain depressive symptoms (Scher, Ingram, & Segal, 2005).

Applied to attachment theory, it might be that individuals develop different attachment schemas with different attachment contents representing different relational experiences with the same and with other attachment figures. A person develops a specific attachment schema due to specific relational experiences and if this schema is activated, it will influence the processing of information during new relational experiences. This attachment schema can become a cross-temporal stable feature of a person if it remains activated or if it is easily activated during distress. However, cognitive psychology predicts that if this person encounters stable schema-incongruent contexts, these new experiences will be stored in different attachment schemas. These new attachment schemas might guide new attachment-related behaviours. Nevertheless, the old attachment schema will not be unlearned but is expected to lay dormant until reactivated (Bouton, 2004; Bouton & Swartzentruber, 1991; Rodriguez, Craske, Mineka, & Hladeck; 1999). This assumption finds some support in the study by Treboux, Crowell, and Waters (2004) who found that the effect of insecure attachment depended on experienced relationship-related distress. Furthermore, the correlations between negative parenting style and punitive parenting on the one hand, and attachment on the other hand that were found in **Chapters 2** and **3** confirm that in adolescence indeed new relational experiences keep on having impact on attachment security.

In summary, the diathesis-stress characteristic of the attachment schema might well be one of the influences that can help explain the cross-temporal instability found in longitudinal attachment research. Indeed, it acknowledges Sroufe, Egeland, and Kreutzer's (1990) suggestion that over time attachment patterns may be replaced by new patterns, whereby the earlier patterns remain latent until reactivated. Interestingly, the diathesis-stress perspective can also be understood from the connectionist model Fraley (2007) proposes, as this model

suggests that knowledge is stored in units that require activation. Central to this model is that different patterns of activation lead to different representations, which resembles the diathesis-stress characteristic of the attachment schema. In line with this potentially interesting implication of the attachment schema conceptualization, Van Vlierberghe, Braet, and Bosmans (2008) did find evidence that the early maladaptive schemas linked with the attachment schema (**Chapter 6**) do behave according to the diathesis-stress model. Importantly, in our studies we have not yet primed attachment-contexts. This we will be discussed in the future research section.

The content of internal working models

It has been argued that many studies on the content of internal working models have provided only limited additional knowledge as they mainly measured very general contents in terms of global positive and negative feelings about the self and the others (Pietromonaco & Feldman Barrett, 2000). One of the implications of the attachment schema approach has been that it should be possible to capture attachment-related maladaptive cognitions in terms of early maladaptive schemas (Mason, Platts, & Tyson, 2005). Interestingly, the early maladaptive schemas have been defined as very specific with regard to their content. Their formulation is also more in line with Baldwin's (1992) plea in favour of conceptualizing the internal working models in terms of relational schemas, as they consist of representations of the self in interaction with important others.

Results indicate that these early maladaptive schemas are significantly correlated with the attachment anxiety and the attachment avoidance dimensions. **Chapter 4** has revealed that the majority of these links can be explained by the expectation that one's needs for security, safety, stability, nurturance, empathy,

sharing of feelings, acceptance and respect will not be met in a predictable manner (Disconnection/Rejection schema domain). These results seem to substantiate Waters and Waters' (2006) statement that the internal working model consists at least partly of a secure base script.

The processes underlying internal working models

Although attachment theory predicts information processing biases guided by the content of the internal working model, its metaphorical conceptualization failed to provide clear and testable hypothesis (e.g. Belsky & Cassidy, 1994; Hinde, 1988; Rutter, 1995; Waters and Waters, 2006). Therefore, research with regard to the underlying processes has been limited and this especially in the younger age-groups. An important advantage of the attachment schema approach is that it might integrate cognitive psychology and attachment theory. Attachment research can profit from this integration for at least two reasons. First of all, the attachment schema definition leads to very clear and testable predictions regarding schema-congruent information processing biases. Secondly, this integration introduces cognitive psychology's very vast, rich, and elaborated research literature, paradigms, and experience with schema-congruent information processing biases to attachment research.

Cognitive schema-related biases have been investigated very thoroughly within experimental psychopathology (e.g. McNally, 2000; MacLeod, 1993; Zvolensky, Lejuez, Stuart, & Curtin, 2001). From all the paradigms that have been developed to measure schema-congruent attention, memory and interpretation biases, our experimental designs to measure attentional biases have proven to be especially interesting. Studying attachment-related attentional biases made it possible to investigate the influence of attachment at the start of the cognitive processing cycle (Baert, De Raedt, & Koster, 2009; Crick &

Dodge, 1994). Furthermore, these biases were measured using computerized experimental tasks that allowed fully standardized and precise presentations of stimuli. More importantly, in our studies these tasks generated reaction times to the presentation of a meaningless target or the (in)correct localization of meaningless targets. Such effects are difficult to control by participants. Therefore, these tasks can also be referred to as implicit measures (De Houwer, 2005). This experimental approach appears to be interesting for at least two reasons.

Firstly, the presented studies demonstrated high correlations between the explicit measures of attachment (i.e., questionnaires) and the attentional biases. In other research domains, correlations between the implicit and explicit measures are generally weak to non-existent (Fazio & Olson, 2003; Payne, Burkley, & Stokes, 2008). Consequently, the reported high correlations underscore the relevance of our findings and can be considered as an important contribution to understand the processes underlying the attachment schema. Secondly, whereas the ecological validity of the Strange Situation Procedure (Ainsworth et al., 1978) is generally accepted, this approach cannot be applied to older children, adolescents, or adults. Two problems seem to be particularly important. The level of distress that needs to be induced to cause similar proximity seeking behaviours in older individuals would transgress ethical boundaries (Dwyer, 2005), and the attachment behaviours in older individuals are expected to be different compared to infants (Mayseless, 2003). As the discussion regarding the validity of both attachment questionnaires and attachment interviews is still going on (further elaborated in the limitations section of this general discussion), the high correlations found in our studies are very interesting. They seem to suggest that, in the future, further developed versions of these experimental measures might provide a powerful and valuable addition to contemporarily used attachment assessment instruments.

In summary, the attachment schema conceptualization introduces cognitive psychological knowledge and research paradigms to the study of internal working models. On the long run, the implementation of these paradigms might contribute to our understanding of attachment schemas and attachment processes. On the one hand, the present dissertation has demonstrated that the associated experimental paradigms might increase our understanding of attachment-related cognitive processes. On the other hand, the experimental tasks we evaluated to be useful in attachment research might be further developed, which might overcome some of the limitations encountered with traditional attachment measurement instruments.

III. Strengths and Limitations

Besides the need to replicate these findings to establish their power, several limitations requiring further research should be noted. For example, the small sample sizes in two studies might raise questions regarding statistical power. Although power analyses did substantiate the relevance of our findings, future research should try to replicate these findings in larger samples. Also, across our studies, the samples cover a wide age-range. Although this has the advantage that we were able to demonstrate attachment-related processes across all these ages, we cannot conclude that the same processes can be demonstrated in all age-groups. Therefore each finding should be replicated in the other age-groups. For example, it would be interesting to see whether the attentional narrowing effect can be found in older age-groups. Now, we will further elaborate on three other important limitations that the majority of our studies have in common: (a) the non-clinical nature of the samples studied; (b) the cross-sectional nature of the research designs; (c) limitations to the attachment measures we used.

The non-clinical nature of the samples studied

All the presented studies were designed to increase our understanding of the associations between attachment and psychopathology. As none of these studies have presented data that were gathered in clinical populations, it is possible that some processes differ depending on the clinical status of the sample (Zeijlmans van Emmichoven, van IJzendoorn, de Ruiter, & Brosschot, 2003). However, this dissertation aimed at investigating correlates of attachment security in a broad community, as insecure attachment is a risk factor but not a synonym for psychopathology (e.g., Cassidy, 2009). Instead, we have conceptualized attachment as a dimension with a wide range of inter-individual differences that do not neatly correspond to the distinction between clinical versus non-clinical. Furthermore, we intended to perform complex sets of linear analyses and therefore employed research in a non-clinical sample to avoid effects of restriction of range. Interestingly, a representative proportion of the sample studied in **Chapters 2** and **3** had clinical scores on the CBCL, the distribution of the SCL-90 score of the sample described in **Chapter 4** was exactly equal (with the same mean and standard deviation) to the distribution of the non-clinical norm group, and in **Chapter 6** significant correlations were found between attachment and psychopathology ranging from .28 to -.34, but these results were omitted from the manuscripts during the submission processes in response to reviewers' requests. Although these descriptive characteristics of our samples do indicate that most of our studies did cover a sufficiently wide range of symptoms of psychopathology, we did start collecting clinical data in three psychiatric hospitals in Flanders (Kinderpsychiatrisch Centrum Genk, OPZ Geel, Sancta Maria Sint-Truiden) and in collaboration with Dr. Christel Peeters. Due to the fact that not many families with children requiring psychological or psychiatric care tend to volunteer for this kind of research, data collection is still ongoing.

The cross-sectional nature of the research designs

The mediation analyses carried out seem to suggest a model in which parenting styles and behaviours cause attachment-related cognitions, which in turn cause distortions in information processing and influence the development of psychopathology. However, the cross-sectional nature of the presented research designs and the correlational nature of the analyses do not allow inferences regarding causal pathways. Future research needs to investigate the processes identified in the present studies using longitudinal designs. Longitudinal designs might not only reveal the direction of the effects found but these designs can also help increase our knowledge regarding the development of the attachment system beyond infancy. There is an urgent need to further investigate attachment-related developmental processes during middle childhood (Mayeseless, 2003), as this age-group has only recently received attention from attachment researchers. Interestingly, the current results demonstrate that the attachment system plays an important role during middle childhood, suggesting that the attachment system is undergoing change during childhood and early adolescence. Further research is needed to situate these findings in a broader developmental perspective.

Limitations to the attachment measurement instruments

The use of attachment questionnaires in young samples can be considered to be problematic, as even in adult research the use of attachment questionnaires has led to considerable controversy. On the one hand, in adult research, these questionnaires have been considered to be a superior measure of a person's cognitions compared to the interviews' evaluation of the coherence

and believability of discussed attachment experiences (Mikulincer & Shaver, 2007). On the other hand, questionnaires to measure adult attachment have been heavily criticized for several reasons: Adult Attachment Interview (AAI) researchers argue that questionnaires cannot plumb the psychodynamic depths and the unconscious emotion regulation processes as does the AAI and that the AAI does a better job delineating information-processing strategies of dismissing and preoccupied adults (Jacobvitz, Curran, & Moller, 2002).

In spite of this controversy, adult attachment research has been increasingly able to demonstrate that the gap between attachment questionnaires and attachment interviews might in real terms be less wide as the theoretical discussion leads one to suspect. Research shows that when comparing both methodologies at a categorical level, findings range from no associations (e.g. Simpson, Rholes, Orina, & Grich, 2002; Waters, Crowell, Elliott, Corcoran, & Treboux, 2002) to moderate but significant associations (Creasy & Ladd, 2005). When approaching questionnaires and interviews from a dimensional perspective, higher correlations are found, which suggests that both measures are interrelated in a theoretically sensible way (Shaver, Belsky, & Brennan, 2000).

With regard to the view that questionnaires cannot be related to the unconscious attachment processes and therefore do not take into account that a part of the respondents will dismiss their attachment needs, Mikulincer and Shaver (2007, p.109) give three reasons of disagreement with this argument from an adult attachment perspective: “First, most adults have sufficient experience in close relationships to provide valuable information about their relational cognitions, feelings, and behaviours. Second, conscious and unconscious processes typically operate in the same direction to achieve a goal, and unconscious motives are often manifested in conscious appraisals (Chartrand & Bargh, 2002). Third, even with people who defensively deny attachment needs or claim they do not suffer from attachment insecurities, it is possible to derive from attachment questionnaires the kinds of conscious beliefs that defensive

people may hold about themselves (Crowell, Fraley, & Shaver, 1999)." Furthermore, attachment research has revealed that attachment questionnaires do correlate in the predicted direction with implicit measures (e.g. Dewitte & De Houwer, 2008; Dewitte et al., 2007; Zayas & Shoda, 2005). These results suggest that questionnaires indeed measure an important dimension of the attachment system.

With regard to our research goals, it is unfortunate that the development of instruments to measure attachment at younger ages and especially in middle childhood proved to be still in its infancy (Dwyer, 2005). In measuring attachment in childhood, we followed the reasoning resulting from the abovementioned conceptual and empirical considerations, in spite of the fact that they were formulated with regard to adults. We decided to measure attachment dimensionally, using questionnaires, arguing that children are capable of reporting attachment-related cognitions and that avoidant children will not idealize their attachment relationships as they are specifically motivated to stress their independence. The associations between the questionnaires and the implicit measures we found in **Chapters 5** and **6** do confirm that at least a part of the aforesaid arguments might be valid in younger age-groups as well.

To investigate relationship-specific attachment representations in adolescence in **Chapters 2** and **3**, we chose the widely used and accepted Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987; translated into Dutch by Noom, Deković, & Meeus, 1999). For our middle childhood sample in **Chapter 6** we chose to use the mother-items of its derivate, the People In My Life questionnaire (PIML, Cook, Greenberg, & Kusche, 1995). Although these questionnaires have been described as measuring attachment-related trust and alienation cognitions and communication behaviours (Armsden & Greenberg, 1987), they do not measure the attachment representations as distinguished by Ainsworth (Ainsworth et al., 1978). For this reason, we decided to use the Relationship Questionnaire (RQ, Bartholomew & Horowitz, 1991;

translated into Dutch and adapted to children by Roelofs, Meesters, Ter Huurne, Bamelis, & Muris, 2006) in **Chapters 5** and **6**. Although the RQ and the PIML have good reputations, little was known about the reliability and validity of the translated and adapted questionnaires at the moment our study started.

In response to these assessment-related limitations, we have more recently started to investigate the psychometric qualities of these attachment questionnaires (Bosmans, Braet, Soenens, & Verschuere, 2008). To assess the psychometric qualities of the PIML and the RQ, these questionnaires were administered to 500 children with ages ranging from 7 to 17 (M = 11.15; SD = 1.6; 325 boys and 304 girls). To evaluate the validity of the PIML and the RQ, mothers and children filled out a parenting questionnaire measuring Psychological Control (based on Barber, 1996), Autonomy Support (based on Grolnick, Ryan, & Deci, 1991), and Responsiveness (Schludermann & Schludermann, 1988), and mothers filled out the Child Behaviour CheckList (CBCL, Achenbach & Rescorla, 2001).

Factor analysis on the mother-items of the PIML, confirmed that a three factor solution is indeed recommendable: after Varimax rotation, only three factors had an eigenvalue higher than 1 (8.03, 1.45, 1.23), they explained 51% of the variance, and could be interpreted as a Trust, Communication, and an Alienation factor. Although not all the items followed the predicted distribution across the three factors, the high reliabilities for the theoretically supposed Trust (α = .89) and Communication (α = .78) scales and to a lesser extent the Alienation scale (α = .63 after deletion of the inadequately loading 'I feel scared in my home' item). Table 1 demonstrates how the Trust, Communication, and Alienation subscales correlate in the predicted direction with the four RQ scales. The three PIML scales correlated significantly in the predicted direction with the RQ Vignette scores, with clearly the highest correlation between Trust and the RQ Secure Vignette.

Table 1

Correlations between attachment questionnaires, parenting and psychopathology

	1.	2.	3.	4.	5.	6.	7.
Attachment							
1. PIML-Trust	1						
2. PIML-Com	.73***	1					
3. PIML-Alien	-.56***	-.47***	1				
4. RQ-S	.53***	.42***	-.35***	1			
5. RQ-DA	-.32***	-.26***	.32***	-.34***	1		
6. RQ-P	-.32***	-.26***	.31***	-.33***	.46***	1	
7. RQ-FA	-.27***	-.16***	.19***	-.25***	.35***	.44***	1
Parenting Styles							
8. R-child	.79***	.71***	-.50***	.51***	-.32***	-.33***	-.23***
9. R-mother	.30***	.23***	-.22***	.13**	-.16***	-.12**	-.05
10. PC-child	-.50***	-.33***	.46***	-.32***	.37***	.33***	.34***
11. PC-mother	-.01	-.01	.08†	-.02	.04	.04	.09*
12. AS-child	.58***	.44***	-.41***	.37***	-.24***	-.28***	-.29***
13. AS-mother	.15**	.09†	-.15**	.07	-.07	-.09*	-.02
Psychopathology							
14. CBCL-ext	-.35***	-.22***	.22***	-.14**	.16***	.19***	.15**
15. CBCL-int	-.14**	-.05	.14**	-.10*	.09*	.05	.10*

Note: ***Attachment****:* PIML-Trust = People In My Life Trust scale; PIML-Com = People In My Life Communication scale; PIML-Alien = People In My Life Alienation scale; RQ-S = Relationship Questionnaire – Secure Vignette; RQ-DA = Relationship Questionnaire – Dismissing Avoidant Vignette; RQ-P = Relationship Questionnaire – Preoccupied Vignette; RQ-FA = Relationship Questionnaire – Fearful Avoidant Vignette; ***Parenting Styles****:* R-child = Responsiveness according to the child; R-mother = Responsiveness according to the mother; PC-child = Psychological Control according to the child; PC-mother = Psychological Control according to the mother; AS-child = Autonomy Support according to the child; AS-mother = Autonomy Support according to the mother; ***Psychopathology****:* CBCL-ext = Child Behaviour CheckList subscale externalizing; CBCL-int = Child Behaviour CheckList subscale internalizing † $p < .1$; * $p < ..05$; ** $p < .01$; *** $p < .001$

Further, the PIML scales correlated significantly with the Responsiveness and Autonomy Support scales independent of the informant, with Psychological Control when assessed by the child, and with externalizing and internalizing symptoms as assessed by mother (except for the correlation between Communication and Internalizing). Comparable correlations were found for the RQ Vignette scores. These correlations provide at least some evidence that the questionnaires we used are reliable and can be used to investigate specific predictions derived from attachment theory. These results replicate the significant correlations found between RQ and IPPA, and psychopathology in older samples (e.g. Aspelmeier, Elliott, & Smith, 2007).

In spite of the limitations mentioned above, the presented studies can be considered as a valuable contribution to attachment research due to several strengths in their designs. The same hypotheses were tested using different research approaches but all leading to comparable conclusions. Some of the studies were based on large samples, which fuels the power of our findings. Although some studies were based on the information of a single informant, other studies were conducted with multiple informants and confirmed our findings. Data were analysed with different approaches to investigate the mediating processes under study. All these statistical approaches are considered as valuable and many are very powerful (Holmbeck, 1997; Preacher and Hayes, 2004). Finally, next to investigating attachment processes with questionnaires, the studies in the present dissertation were among the first to investigate attachment schema-related biases in attentional processing with an experimental paradigm. These experimental paradigms have proven to provide a strong measure of the attentional biases associated with insecure attachment. One of the explanations for the strong effects we found, might be the innovative approach to present individually relevant stimuli. In previous research (e.g. Dalgleish et al., 2003), experimental measurements of information processing biases tended to present rather general pictures (e.g. faces with different emotional expressions)

or general information (e.g. positive or negative words). The current studies presented pictures of own mother compared to unfamiliar women. This idiosyncratic approach might be one of the reasons why the presented strong effects were found.

IV. Ongoing and Future research

Although the findings in this dissertation seem to suggest that the internal working model can be conceptualized as an attachment schema and although this conceptualization might have interesting implications for attachment theory, much more research regarding the properties of internal working models is needed. In the following paragraphs we will discuss the need for further research on the characteristics of the attentional breadth task, the need for research on other attachment schema-related information-processing biases, the need for further research on the associations between attachment, early maladaptive schemas and psychopathology in younger age-groups, and the need for research on the assumed diathesis-stress characteristic of attachment schemas.

Firstly, the strength of the effects found with the attentional breadth task (ABT, **Chapter 6**) suggests that this task might be a very promising tool to use in further attachment research. Nevertheless, further research is required (a) to investigate the psychometric properties of the task, (b) to exclude alternative explanations, (c) to enable a more profound interpretation of the results, and (d) to investigate associations between information processing biases and proximity seeking behaviours. For this purpose, we are currently performing several follow-up studies. (a) New research with the ABT task is being conducted to investigate its reliability and to investigate whether this task can be used to measure information-processing biases guided by other cognitive contents such

as self-focused attention in depression. (b) As it is possible that less secure children's difficulties to locate far targets are caused by their slower recognition of mothers, a second experimental design is developed to associate ABT-effects to reaction times on a picture recognition task. (c) A third line of research investigates whether the attachment breadth effect is automatic or not. We have developed an alternative version of the ABT in which children do not have to recognize the central picture, but in which children have to distinguish the colors of squares that are drawn around the pictures. If the ABT-effect remains without the active processing of the central picture, this would be a strong indication that the ABT measures an automatic effect. (d) Finally, we have developed an attachment-related version of the Approach Avoidance Task (AAT, Rinck & Becker, 2007), also with pictures of mothers and of unfamiliar women as presented stimuli. This task measures approach and avoidance action tendencies. A first study with 30 participants demonstrated a strong general approach-effect towards mother and an approach preference for mother over unfamiliar women, but contrary to our expectations this effect was not associated with secure attachment (Bosmans, Braet, De Raedt, & Rinck, 2008). Follow up research is now investigating whether this AAT-effect can be associated to the ABT-effect, and how these differences in the link with attachment can be explained.

Secondly, to further substantiate the attachment schema conceptualization of the internal working model, evidence for other information-processing biases should be found. Two alternative biases have been repeatedly documented in cognitive psychology (Clark et al., 1999): (a) an interpretation bias and (b) a memory bias. For this purpose, we are already developing alternative tasks. (a) We developed a vignette task to measure interpretation biases. Using this measure we have been able to distinguish two interpretation bias scores, a subjective and an objective interpretation bias score. We are currently investigating whether these findings can be linked to attachment. Furthermore, (b) to measure memory biases, we adapted two experimental tasks

that have typically been used to investigate memory biases guided by depressive cognitive schemas: the autobiographical memory task (AMT, Williams & Broadbent, 1986), , and the self-referent encoding task (SRET, Jaenicke, Hammen, & Zupan, 1987). The AMT has been developed to demonstrate that depressed patients have a decreased ability to recall specific memories. Within the AMT methodology, memory specificity is conceptualized as the extent to which participants can recall an occurrence that happened once and lasted shorter than a day. The SRET investigates the recall of positive and negative emotion words. A first study investigated the associations between SRET and attachment security (measured with RQ) in 39 referred obese youngsters (age M = 13.72; SD = 1.88). However, no direct effects of attachment were found. Interestingly, repeated measure analyses (with valence of the recalled self-encoded words as within subjects variable) did reveal a trend towards significance for the interaction between word valence and depression after controlling for the effect of attachment ($F(1, 28) = 3.83$; $p = .06$; Bosmans, Braet, & Goossens, 2005). This seemed to suggest that the results obtained with this version of the SRET are rather linked with depression. For future research, we have now developed an attachment-related version of the SRET in which the positive and negative words have to be encoded in relation to mother. We will now start investigating the links between the AMT, this adapted SRET and attachment.

Thirdly, future research should investigate the development of attachment schemas. The findings that were reported in **Chapter 4** should therefore be replicated in younger age groups. This line of research can increase our understanding of attachment schema development. Also, this would allow us to investigate whether in middle childhood the affect-regulating influence of attachment on psychopathology is comparable to what has been found in adults. Investigating the associations between attachment dimensions, early maladaptive schemas, emotion regulation processes and psychopathology in middle

childhood requires an age-appropriate measure of attachment anxiety and attachment avoidance. We have found only one questionnaire measuring comparable dimensions in children: The Preoccupied and Avoidance Coping Questionnaire (PACQ, Finnegan, Hodges, & Perry, 1996). However, both our (Bosmans, Braet, Soenens, & Verschuere, 2008) and other's (e.g. Kerns, Tomich, Aspelmeier, & Contreras, 2000) research has revealed that the Preoccupied scale does not measure the intended maladaptive attachment anxiety dimension. Therefore, we have been adapting the ECR-R (Fraley, Waller, & Brennan, 2000), reformulating the items using a child-friendly vocabulary and focusing on the relationship with mother or father (Brenning, Soenens, Braet, & Bosmans, 2008). As psychometric evaluation has revealed that the attachment anxiety and attachment avoidance scales are highly reliable and valid, we have now started to use the adapted ECR-R in new research on the development of maladaptive cognitive schemas and on cross-generational transference of attachment security in middle school-aged children.

Finally, one of the most intriguing implications of the attachment schema perspective is its diathesis-stress characteristic. This characteristic might be one factor influencing cross-temporal instability in attachment security (Fraley, 2007; Sroufe et al., 1990), but it might also provide an insight in processes of attachment-related change. A better understanding of these processes might be very important in the development of adequate therapeutic approaches to treat children and adults with less favorable attachment histories.

In summary, we can conclude that the studies in this dissertation can give rise to several new lines of research that follow from the association between internal working models and attachment schemas. By using experimental and other methodologies that have been developed during the last decennia within cognitive psychology research, the reported pilot studies suggest that attachment theory might benefit from further merging these two powerful research traditions.

V. Clinical relevance

When expounding the clinical relevance of our findings, we will make a distinction between the clinical implications of our last three studies (**Chapters 4, 5** and **6**) and our first two studies (**Chapters 2** and **3**). Therefore, we will discuss these implications in two separate parts. Part I will deal with the implications for the therapeutic approach of attachment problems. Part II will deal with the implications for the therapeutic approach of externalizing and internalizing behaviour problems

Part I: Implications for the treatment of attachment problems

Although this dissertation has not investigated or developed strategies to treat attachment problems, its results may increase our insight in the therapeutic mechanisms of existing treatment approaches. Also, the further integration of attachment theory and cognitive psychology may introduce some techniques of cognitive behavioural therapy (CBT) in the treatment of attachment problems. We will present a clinical case from which we will start our exposition. After providing a very concise overview of some better known treatment approaches, we will discuss some techniques that focus on cognitive distortions and that might be helpful to treat attachment problems.

> *Lena is a 12 year old girl living in a residential home in the child protection system. Until the age of four she lived abroad with her mother. Then her presumed father forced her mother to hand her over to*

him and to let her come to Belgium. Three months after her relocation, Lena ended up in a child hospital with the presumption that father physically abused the girl. As it was not possible to get in contact with the biological mother, Lena had to go to a foster family. The integration in this (and a following) foster family failed due to behaviour problems. By the age of six, the court decided to give the custody to the residential centre where she has been residing until today.

During her sojourn at the home her behaviour gradually normalized as time passed by. The home asked for our expertise not long after her twelfth birthday. The home reported a sudden increase of behaviour problems at school and at the home. In spite of the sudden and unexpected behavioural changes, many stressful experiences could be identified. A new inquiry regarding the incidents with the presumed father was about to start and she was obliged to participate to the juristic investigations. The only caretaker she had known from the beginning of her stay at the home had just resigned. An older girl who had been at the home for years was about to become too old to stay. Lena had just started her first year at secondary school. Finally, by becoming 12 years old, she got an identity card, which for her symbolized a tangible step towards adulthood which seemed to imply having to leave the home.

This case provides an interesting starting point to discuss the clinical implications of our studies. The story of Lena is a good illustration of the diathesis-stress characteristic of attachment schemas. Although the following is not more than a hypothesis, it could be that Lena indeed had a less secure attachment schema at the start of her stay at the home. However, thanks to the stable, structured and caretaking environment at the home, she appeared to have developed less maladaptive attachment schemas leading her to behave in a more

adaptive manner. Nevertheless, the recent exposure to the high number of stressors related to the probable contents of the initial less secure attachment schema, seems to have reactivated the original schema, leading her to relapse to old behavior.

Not only does the attachment schema conceptualization help to understand attachment-related relapses, it also seems to suggest that successful attachment therapy might in part depend on the construction of new, more secure attachment schemas or on the reactivation or strengthening of older more secure attachment schemas. We deliberately try to avoid any bold statements regarding these implications as they would first need to be empirically substantiated. However, it has been repeatedly suggested that existing therapeutic approaches that are regarded as successful owe their therapeutic success partly to their impact on the attachment-related experiences of clients in the relationship with the therapist (independent of their age) which lead to the construction or activation of secure attachment schemas. These more secure schemas can in turn stimulate personal growth.

For infant-mother dyads, attachment treatment protocols have been developed and evaluated as effective (e.g., Berlin, 2005; Lieberman, Weston, & Pawl, 1991; Van den Boom, 1995). These protocols aim at improving the caregiving skills of the newborn's parents. This will impact the infants' attachment experiences which then might lead to more secure attachment schemas. For older children, some treatment protocols or strategies exist as well. However, their treatment effect has been understudied. Some strategies, like holding therapy in which physical proximity is forced upon the child (Welch, 1988), are widely used in spite of the strong recommendations against using them (Boris, Zeanah, and the AACAP Work Group on Quality Issues, 2003; Lilienfeld, 2007). Interestingly, a recently developed protocol in which blind children are much more gradually and slowly (following the children's pace)

exposed to physical proximity, does appear to have positive effects (Sterkenburg, Janssen, & Schuengel, 2008). Other treatment protocols, such as *Mentalizing Therapy* in which clients are taught to explore their own and other's minds (Bateman & Fonagy, 2008) are thought to be successful due to the security offered during the therapeutic relationship and to the mental space created by the newly learned abilities which lead to improved social interactions (Fonagy & Bateman, 2006).

Although not designed with the explicit purpose to treat attachment problems, other therapeutic approaches, such as schema-focused therapy (Young et al., 2003) and narrative therapy (White & Epston, 1990), consist of potentially helpful therapeutic techniques to develop or reactivate more secure attachment schemas. Schema-focused therapy consists of interesting techniques aimed at meeting the patient's core emotional needs that were frustrated by the parents. For example, the *Limited Reparenting* technique indicates that the therapist tries to create a warm and accepting environment during and outside the session, allowing the patient to seek proximity whenever needed, while maintaining appropriate professional boundaries (Kellogg & Young, 2006). From the attachment schema perspective this technique seems to create new relational experiences allowing the patient to develop a more secure attachment schema.

Instead of creating new attachment schemas, narrative techniques can be used to help patients reactivate old secure attachment schemas (White & Epston, 1990). Starting again from the needs, hopes, or wishes formulated by the patient, narrative therapy assumes that these needs have developed due to earlier but very brief and limited experiences in which these needs were more or less met. Narrative therapy will try to identify the learning experiences by helping the patient to recall these almost forgotten, ignored, or devaluated positive memories and by helping the patient to acknowledge their importance. Following the

attachment schema perspective one might argue that this technique can help to reactivate more adaptive old attachment schemas.

Finally, other CBT techniques might prove to be useful to create new circumstances in which more secure attachment schemas can be developed. For example, psycho-education (e.g., White, 2000) might be helpful to create the conditions under which both (a) caregivers and (b) clients can initiate new and more secure interactions. (a) Providing caregivers with information regarding the affect-regulating properties of the attachment system might help them deal with the child or adolescent's negative behaviours without feeling rejected. Psycho-education can help caregivers understand the affect-regulating dynamics of the attachment system. More attachment anxiety explains permanent concerns and efforts to make an attachment figure more available. More attachment avoidance explains the occurrence of behaviours aimed at inhibiting quests for support, and active attempts to handle distress alone. This understanding might lead caregivers to express more compassion and be less rejecting towards the child or adolescent, while they set limits to child or adolescent's unacceptable behaviours. (b) Under the condition that it is possible to provide children and adolescents with a secure enough daily context, psycho-education can help them to better understand how their fears of being rejected lead to anxious and avoidant attachment behaviours. This insight is a necessary step before learning to adopt new strategies to cope with negative emotions. Newly trained emotion coping skills (e.g., Kovacs, Sherrill, & George, 2006) can lead to more secure interactions with the caregivers which can increase the likelihood for more secure attachment schemas to develop.

In summary, the attachment schema perspective is able to help explain the therapeutic benefits of existing strategies to treat attachment problems. Furthermore, this perspective can introduce some well elaborated and successful treatment strategies developed in CBT and narrative therapy that seem to be a

promising addition to the existing therapeutic approaches. Although these strategies promise to be powerful tools to (re)create more secure attachment schemas, it is nevertheless always necessary to assess whether this approach is favourable. As has been argued in **Chapter 1**, an insecure attachment schema might be an adaptive schema in a maladaptive context (Treboux, Crowell, & Waters, 2004).

Follow up of the clinical case:

> *Based on the abovementioned analysis of Lena's behaviour problems and because Lena refused therapeutic assistance, it was decided that the educators of the home needed to remain stable and secure for the child. This was done on the one hand by continuing to apply the rules of the home but at the same time accepting her and her struggle with her emotional turmoil experienced due to the exposure to the stressors mentioned. The educators started to help her associate the behaviour problems with her emotional state. Furthermore, to help the educators to continue providing their care, they were introduced to the basics of the attachment-related affect-regulation strategies. Due to this introduction they were able to interpret Lena's rejecting behaviours as part of her emotional state instead of as a rejection of the care they offered. In this stable and secure environment, one year later Lena's behaviour problems seem to have improved.*

Part II: Implications for the treatment of externalizing and internalizing behaviour problems

Research has repeatedly demonstrated that less adaptive parenting behaviours and parenting styles increase the probability that children will develop affective and behaviour problems (e.g., Barber, Stolz, & Olson, 2005; Reitz, Deković, & Meijer, 2006; Van Leeuwen, Mervielde, Braet, & Bosmans, 2004). For this reason, many evidence-based treatment and prevention programs for children with internalizing as well as with externalizing behaviour problems include parent management training components. For example, the *Friends Program* was developed to treat both children and adolescents as their parents with internalizing problems (Barrett, Lowrey-Webster, & Turner, 2000; De Winter, 2007; Mommerency, Boonen, Bosmans, Braet, & Schoentjes, 2009); the *Triple P Program* was developed to treat children and adolescents with externalizing problems (Sanders, Markie-Dadds, Tully, & Bor, 2000), and the *STOP Program* was developed to prevent externalizing problems in young children (De Mey, 2007; Merlevede, Meerschaert, Bosmans, De Mey, & Braet, 2004). These programs all aim at teaching parents better skills to raise their children. Although these programs have been proven to be successful to a certain degree, much room for improvement remains (e.g., Braet, Meerschaert, Merlevede, et al., 2009).

Moreover, research indicates that early onset and duration of psychopathology have negative long-term implications (e.g., Perlis, Miyahara, Marangell, et al., 2004; Moffit, Caspi, Harrington, & Milne, 2002), which confirms the need for successful treatment and prevention programs. Even more importantly, with regard to externalizing behaviour problems, older patients were found to be less susceptible to treatment and to have smaller chances of

long-term change (Kazdin, 1995). The findings in **Chapter 2** suggest that these limited treatment effects of parent management trainings on externalizing behaviour problems at later ages might at least partly be explained by the reduced impact of parenting styles. Although the statistical techniques used in **Chapter 3** did not allow investigating whether the same age-related parenting effects can be found for internalizing problems, the findings did confirm that attachment plays a crucial role to explain the association between parenting and psychopathology. Therefore, our findings suggest that when developing therapeutic approaches to treat or to prevent the development of psychopathology, it is important to additionally assess attachment problems and to develop therapeutic techniques to address these if present.

As described in the previous part, promising therapeutic strategies have been developed or can be applied to address attachment problems. Based on this advancement, new treatment protocols are being developed to treat internalizing or externalizing psychopathology in children and adolescents focusing on the quality of the attachment relationship. For example, *Attachment-Based Family Therapy* (ABFT, e.g., Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002) is a protocol to treat depression by improving insecurely attached adolescents' disrupted abilities to implicitly and explicitly interpret actions of themselves and others and on rebuilding the attachment bond with the parent or main caregivers. From our attachment schema perspective, this seems a promising therapeutic approach. The adolescent is expected to develop new and more secure attachment schemas due to the fact that they acquire the same abilities as focused on during *Mentalizing Therapy*, increasing the likelihood that they will benefit more from the experience of the more secure interactions with caregivers. This seems a promising treatment protocol for several other reasons as well. The approach successfully combines and integrates, in a concise therapeutic framework, valuable techniques that were developed in several therapeutic traditions including cognitive behaviour therapy and family therapy. The

protocol acknowledges that the treatment of children and adolescents' emotional problems requires helping them to develop more secure attachment schemas. This new schemas can only be obtained by working with the entire family and by working on the quality of the parent-child relationship.

FINAL CONCLUSION

This dissertation started from the premise that the internal working model concept forms the cornerstone of attachment theory as it helps to explain the relationship between parent-child interactions and later functioning in general, current information processing, and the development of psychopathology in specific. Although the first two studies of the dissertation confirmed this premise, many distinguished attachment researchers have criticized the internal working model concept for its metaphorical formulation. Therefore the dissertation aimed to add to the existing growing interest to approach the internal working model from a cognitive schema perspective. In line with the three last studies' findings that the internal working model does behave according to the predictions derived from cognitive schema theories, it was argued that the internal working model can be defined as a cognitive attachment schema. This attachment schema conceptualization is interesting for at least two reasons. It leads to new research questions and adds new research tools to attachment research. Finally, it has been argued that it might increase our understanding of attachment-related clinical phenomena and treatment effects.

Chapter 8

Nederlandse samenvatting

Een cognitief perspectief op hechting: Het interne werkmodel en verbanden met cognitieve schema theorie[10]

Dit is de korte Nederlandstalige samenvatting van dit doctoraatsonderzoek dat trachtte meer inzicht te verschaffen in een kernbegrip uit de hechtingstheorie: het interne werkmodel. In twee studies werd eerst nagegaan of hechting inderdaad een rol speelt in de verklaring waarom ouder-kind relaties een invloed hebben op de ontwikkeling van psychopathologie. Vervolgens werd de vraag gesteld naar de inhoud en het functioneren van het interne werkmodel. Om deze eigenschappen van interne werkmodellen te onderzoeken, werd het interne werkmodel theoretisch gekoppeld aan het cognitieve schema concept uit de cognitieve psychologie. De laatste drie studies toonden inderdaad aan dat het interne werkmodel bestaat uit inhouden die in eerder onderzoek geïdentificeerd werden als cognitieve schema's en dat het interne werkmodel de aandachtsverwerking van hechtingsgerelateerde informatie beïnvloedt. De onderzoeksresultaten en de mogelijke implicaties van deze bevindingen voor de hechtingstheorie en voor de behandeling van hechtingsgerelateerde problemen worden kort besproken.

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[10] Bosmans, G., & Braet, C. (under revision). Een cognitief perspectief op hechting: Het interne werkmodel en verbanden met de cognitieve schema theorie. *Tijdschrift Klinische Psychologie.*

Introductie

Bowlby (1969) voorspelde dat de kwaliteit van de ouder-kind relatie het risico op het later relationeel en emotioneel functioneren van mensen beïnvloedt. Hij verklaarde dit verband door te stellen dat kinderen de ervaringen die ze hebben met hun verzorgingsfiguren opslaan in interne werkmodellen. Deze interne werkmodellen zijn een mentale structuur waarin kinderen een beeld bijhouden over zichzelf als de moeite waard om verzorgd te worden en over de verzorgingsfiguren als in staat om zorg te bieden. Als kinderen blootgesteld worden aan spanningen, zal het interne werkmodel geactiveerd worden. Dit zal aanleiding geven tot een sterke nood om dicht bij de verzorgingsfiguren te zijn en zal een invloed hebben op hun evaluatie en perceptie van de sociale situatie. Afhankelijk van de kwaliteit van de verzorger-kind interacties zullen kinderen veilig of onveilig gehecht raken aan hun verzorgingsfiguren (die dan een hechtingsfiguren wordt en waarbij er vanuit gegaan wordt dat kinderen tegelijkertijd verschillende hechtingsfiguren kunnen hebben). Als kinderen tijdens hun ontwikkeling het gedrag van de hechtingsfiguren als minder responsief en sensitief ervaren, ontwikkelen ze een minder veilig intern werkmodel waarin de hechtingsfiguren worden gerepresenteerd als minder beschikbaar in tijden van nood (Kerns, Tomich, & Kim, 2006). Dit onveilige interne werkmodel vormt op zijn beurt een risicofactor voor de ontwikkeling van psychopathologie (bv Hill, 2002).

Een veilig intern werkmodel doet iemand onder spanning nabijheid van een hechtingsfiguur opzoeken, wat tot rust leidt. Een onveilig intern werkmodel activeert zogenaamde secundaire hechtingsgerelateerde affect-regulatie strategieën (Mikulincer, Shaver, & Pereg, 2003). Er kunnen immers, afhankelijk van de evaluatie of het zoeken van de nabijheid van een als onbeschikbaar geachte hechtingsfiguur een zinvolle optie zou zijn, twee verschillende secundaire affect-regulerende hechtingsstrategieën geactiveerd worden. Individuen die kiezen om toch nabijheid te zoeken, worden omschreven als

angstig gehecht en gaan emotioneel hyperactiverende affect-regulatie strategieën hanteren. In plaats van tot rust te komen in nabijheid van de hechtingsfiguur, zullen deze individuen steeds op hun hoede blijven voor mogelijke separatie of afwijzing. Omgekeerd zullen zogenaamde vermijdend gehechte individuen kiezen om geen nabijheid te zoeken wat zal leiden tot deactiverende affect-regulerende strategieën. Ze zullen hun nood aan een hechtingsfiguur ontkennen, en intimiteit en nabijheid vermijden. Deze secundaire hechtingsgerelateerde affect-regulatie strategieën vergroten de kans op het ontwikkelen van psychopathologie omdat angstig gehechte individuen door hun emoties overspoeld worden en vermijdend gehechte individuen door de emotionele deactivatie hun onderliggende emotionele problemen niet kunnen oplossen (Mikulincer & Shaver, 2007). Ondanks deze duidelijke visie op de impact van ouder-kind relaties op later functioneren, is het evenwel onduidelijk hoe deze ouder-kind relaties gerepresenteerd worden en wat het interne werkmodel precies is. Voor het huidige doctoraatsonderzoek werden drie onderzoekslijnen uitgewerkt met als doel om (a) de rol, (b) de inhoud, en (c) de mechanismen van interne werkmodellen te onderzoeken.

Doel I: De mediërende rol van hechting in het verband tussen opvoeding en psychopathologie

De eerste onderzoekslijn trachtte evidentie te vinden voor Bowlby's (1969) centrale hypothese dat de invloed van ouderlijk opvoedingsgedrag op de ontwikkeling van psychopathologie verklaard wordt door het interne werkmodel dat kinderen opbouwen over de ouder. Om deze hypothese te onderzoeken werden 511 adolescenten bevraagd. Deze hypothese werd op twee manieren onderzocht. In een eerste studie (**Hoofdstuk 2**) werd aangetoond dat het verband tussen een negatief controlerende opvoedingsstijl en externaliserende

gedragsproblemen verklaard kan worden door de geassocieerde hechtingsgerelateerde cognities. In een tweede studie (**Hoofdstuk 3**) werd aangetoond dat het verband tussen het straffend opvoedingsgedrag van ouders (multi-informant gemeten aan de hand van de oordelen van ouders en kinderen samen) en internaliserende problemen eveneens verklaard wordt door de geassocieerde hechtingscognities. Hoewel het cross-sectionele karakter van dit onderzoek het niet mogelijk maakt om causale conclusies te trekken, bevestigen deze studies de mediërende rol van hechting. Bovendien werd de relevantie van deze resultaten bevestigd doordat hetzelfde effect gevonden werd ongeacht de inhoud van de symptomen van psychopathologie, ongeacht of er opvoedingsstijlen of opvoedingsgedragingen gemeten werden, ongeacht een uni-informant of een multi-informant beoordeling van opvoeding, ongeacht het geslacht van de adolescenten, en tenslotte ongeacht het geslacht van de hechtingsfiguur.

Doel II: De inhoud van het interne werkmodel

Ondanks de centrale rol van het interne werkmodel binnen de hechtingstheorie is er doorheen de jaren veel kritiek gerezen over de manier waarop dit concept gedefinieerd is. Dit heeft aanleiding gegeven tot de uitwerking van onze twee volgende onderzoekslijnen. Bowlby heeft het interne werkmodel concept gebaseerd op het filosofische idee dat mensen mentale structuren over de omgeving opbouwen om van daaruit nieuwe interacties met de omgeving beter te begrijpen en beter te organiseren (Craik, 1943). Doordat Bowlby liever een conceptuele metafoor dan een duidelijk gedefinieerd mechanisme wilde formuleren (Thompson & Raikes, 2003) ontwikkelde het interne werkmodel tot een zeer breed, alles verklarend, en moeilijk testbaar construct (Hinde, 1988). Omdat onderzoekers er niet in slaagden om op basis

van deze formulering toetsbare hypotheses af te leiden (Rutter, 1995; Waters & Waters, 2006), heeft het lang geduurd vooraleer het onderzoek naar interne werkmodellen op gang is gekomen (Main, Kaplan, & Cassidy, 1985; Thompson, 2008a) en blijven er veel lacunes in ons begrip van interne werkmodellen (Pietromonaco & Feldman Barrett, 2000; Thompson & Raikes, 2003; Thompson, 2008a; Thompson, 2008b).

Hoewel de laatste jaren het hechtingsonderzoek meer gericht is geweest op de bovenbesproken affectregulerende eigenschappen van het hechtingssysteem, blijft de nood voor een beter begrip van het interne werkmodel groot. Onderzoekers blijven gemotiveerd om het interne werkmodel verder te onderzoeken en conceptueel beter te definiëren omdat dit belangrijke implicaties kan hebben voor ons inzicht in het functioneren van het hechtingssysteem (Thompson & Raikes, 2003). De huidige conceptualisatie laat namelijk ten eerste niet toe om te begrijpen hoe verschillende interne werkmodellen binnen één individu onderling georganiseerd zijn. Ten tweede kan de huidige conceptualisatie onvoldoende verklaren waarom er onvoldoende overtuigende evidentie gevonden wordt voor de voorspelde cross-temporele stabiliteit van hechting. Tenslotte blijven er veel vragen bestaan over de inhoud van interne werkmodellen en over de onderliggende mechanismen. In de volgende vier paragrafen zullen we kort ingaan op deze vier conceptuele problemen geassocieerd met het interne werkmodel. Daarnaast kan een beter begrip van het interne werkmodel relevant zijn voor de therapeutische benadering van hechtingsgerelateerde problemen. Het kan helpen om ons inzicht in de werkingsmechanismen van de bestaande behandelstrategieën te vergroten en om nieuwe behandeltechnieken te introduceren.

Vanuit de kennis die ontwikkeld werd op nieuwe domeinen (zoals de cognitieve psychologie) en vanuit de ontevredenheid over de definiëring van het interne werkmodel, werd er de laatste twintig jaar toenemend geargumenteerd dat het interne werkmodel zou kunnen opgevat worden als een cognitief schema

(Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Bretherton, 1990; Nelson, 1986; Schank, 1982, 1999, Waters & Waters, 2006). Dit is een concept ontwikkeld binnen de cognitieve psychologie dat doorheen de jaren erg goed conceptueel afgebakend is en haar nut heeft bewezen in de studie van onder meer depressie (bv. Clark, Beck, & Alford, 1999). Een cognitief schema is gedefinieerd als een mentale structuur die stimuli uit de omgeving doorlicht, codeert, en evalueert (Beck, 1964). Op basis van een cognitief schema interpreteren mensen nieuwe ervaringen op een betekenisvolle wijze. Schema's richten de aandacht op eerder opgeslagen informatie om van daaruit nieuwe ervaringen te interpreteren. Onderzoek heeft aangetoond dat een cognitief schema de verwerking van schemagerelateerde informatie op drie belangrijke niveaus vertekent. Een cognitief schema heeft namelijk een invloed op (a) de aandacht die mensen hebben voor, (b) de herinnering van, en (c) de interpretatie van schemagerelateerde informatie. Omdat cognitieve schema's conceptueel veel gelijkenissen vertonen met wat Bowlby beschrijft over interne werkmodellen en omdat de definiëring van een cognitief schema veel toetsbaarder geformuleerd is, heeft deze dissertatie geprobeerd om verbanden te leggen tussen deze twee concepten. Dit werd onderzocht in twee onderzoekslijnen, ontwikkeld als test van twee basiscriteria waaraan interne werkmodellen moeten voldoen om beschouwd te worden als een cognitief schema. Enerzijds moet de inhoud van het interne werkmodel overeen komen met inhouden die erkend zijn als cognitief schema (wat getoetst werd in **Hoofdstuk 4**). Anderzijds moet het interne werkmodel, net als een cognitief schema, de informatieverwerking van hechtingsgerelateerde informatie beïnvloeden (zie Doel III).

De studie in **Hoofdstuk 4** werd uitgevoerd om het eerste criterium te toetsen: de inhoudelijke relatie tussen het interne werkmodel en cognitieve schema's. Uit dit onderzoek blijkt dat de inhoud van interne werkmodellen inderdaad overeenkomt met de inhoud van erkende cognitieve schema's (Young,

Klosko, & Weishaar, 2003). Er werd aangetoond dat het basisschema dat de relatie tussen hechting en psychopathologie verklaart, bestaat uit verwachtingen dat de nood voor veiligheid, geborgenheid, stabiliteit, zorg, empathie, het delen van gevoelens, aanvaard en gerespecteerd worden niet tegemoet gekomen zullen worden. Dit komt overeen met de voorspelling van de hechtingstheorie dat het interne werkmodel minstens ten dele bestaat uit gedachten over de beschikbaarheid van de hechtingsfiguur in tijden van nood (Waters & Waters, 2006). Bovendien heeft dit onderzoek ook aangetoond dat angstige hechting bijkomend samenhangt met verwachtingen dat men aan de wensen van anderen tegemoet moet komen om aanvaard te worden en dat vermijdende hechting bijkomend samenhangt met de verwachting dat men succesvol kan functioneren onafhankelijk van de steun van anderen.

Doel III: Het interne werkmodel en de aandachtsverwerking van de hechtingsfiguur

Nadat in het onderzoek van **Hoofdstuk 4** aangetoond is dat interne werkmodellen zich inhoudelijk gedragen als cognitieve schema's, werd in deze derde onderzoekslijn onderzocht of interne werkmodellen ook de aandachtsverwerking van hechtingsgerelateerde informatie beïnvloedt. Er werd meer bepaald gekeken of de aandachtsverwerking van de hechtingsfiguur vertekend wordt door hechtingsgerelateerde cognities. Het voordeel van het meten van vertekeningen in de aandachtsverwerking is dat we op deze manier een zicht krijgen op de invloed van hechting in het begin van de informatieverwerkingscyclus, omdat de informatieverwerking steeds begint met het richten van de aandacht op stimuli (Baert, De Raedt, & Koster, 2009; Crick & Dodge, 1994). Dit is bovendien een interessante onderzoeksfocus omdat aandachtsvertekeningen doorgaans bestudeerd worden met computertaken die

het mogelijk maken om op een erg gestandardiseerde en nauwkeurige wijze stimuli te presenteren en waarvan de uitkomst moeilijk te sturen is door de proefpersoon. Voor onze onderzoeksvraag werden twee soorten stimuli gebruikt. Enerzijds werden foto's getoond van de moeder van de proefpersoon en anderzijds werden foto's getoond van vrouwen die de proefpersoon nog nooit gezien had (allen ook moeders). Dit onderzoek werd uitgevoerd bij lagere schoolkinderen omdat zij zeker nog de moeder als primaire hechtingsfiguur beschouwen (Kerns, Abraham, Schlegelmilch, & Morgan, 2007), maar tegelijkertijd wel al cognitief voldoende ontwikkeld zijn om de computertaken op voldoende adequate wijze uit te voeren (Tschopp et al., 1999).

Omdat Derryberry and Tucker (1994) hebben aangetoond dat emoties zowel het richten van de aandacht (aandachtsoriëntatie) als de breedte van het aandachtsveld (aandachtsbreedte) beïnvloeden, werden de aandachtsvertekening onderzocht met twee verschillende experimentele taken. Om de *aandachtsoriëntatie* naar moeder te meten, werd de Exogene Cueing Taak (ECT, Posner, 1980) aangepast. In onze versie van de ECT wordt er op een computerscherm links of rechts van het blikveld van een proefpersoon een foto getoond van ofwel de eigen moeder ofwel een onbekende vrouw. Vervolgens wordt er op dezelfde plaats (een valide trial) of aan de andere kant van het blikveld (een invalide trial) een doel-stimulus (een zwart vierkantje) getoond. De kinderen moesten zo snel mogelijk op een knop drukken als de doel-stimulus verscheen. Door de reactietijden op de valide en invalide trials met elkaar te vergelijken kon gemeten worden naar welke soort foto (moeder vs onbekend) het langst gekeken werd, naar welke foto het eerst de aandacht gericht werd, en van welke foto de aandacht het snelste losgemaakt kon worden. Om de *aandachtsbreedte* te meten, werd een Aandachtsbreedte Taak (ABT, gebaseerd op het werk van Ball, Beard, Roemker, Miller, & Griggs, 1988) ontwikkeld. In de ABT werden centraal in het blikveld foto's (moeder vs onbekend) gepresenteerd. Tegelijkertijd werd een doel-stimulus getoond op een random

locatie rond de centraal gepresenteerde foto ofwel dichtbij (10° van de visuele hoek), ofwel veraf (25°). Door het aantal correct geïdentificeerde dichtbije doel-stimuli te vergelijken met het aantal correct geïdentificeerde veraf gelegen doel-stimuli, kon de breedte van het aandachtsveld rond de centrale stimulus gemeten worden.

De resultaten van **Hoofdstuk 5** en **Hoofdstuk 6** tonen aan dat onveilige hechtingsgerelateerde cognities een invloed hebben op de aandachtsverwerking van de hechtingsfiguur. Enerzijds vonden we dat minder veilig gehechte kinderen het meeste aandacht hebben voor foto's van moeder en dat ze hun aandacht sneller richten op foto's van moeder. Anderzijds vonden we dat minder veilig gehechte kinderen een sterker vernauwd aandachtsveld hebben rond foto's van moeder in vergelijking met foto's van onbekende vrouwen. In de dissertatie hebben we geargumenteerd dat ondanks mogelijke alternatieve interpretaties, deze resultaten waarschijnlijk een weerspiegeling zijn van een cognitief equivalent van het verminderd vermogen tot exploreren dat geobserveerd wordt bij onveilig gehechte jonge kinderen. De verwachting dat moeder niet beschikbaar zal zijn, zorgt er in dat geval voor dat kinderen hun aandacht blijven richten op moeder waardoor ze niet in staat zijn om bijkomende informatie op te nemen. Bovendien heeft het onderzoek in **Hoofdstuk 6** ons in staat gesteld om aan te tonen dat het opvoedingsgedrag van moeder (meer bepaald de mate waarin ze autonomie ondersteunend opvoedt) een invloed heeft op de aandachtsbreedte. Zoals voorspeld vanuit de hechtingstheorie, wordt dit verband volledig verklaard door de geassocieerde hechtingsgerelateerde cognities. Dit laatste is dan ook een sterke bevestiging van de basisassumpties van de hechtingstheorie en geeft een interessant zicht op het functioneren van het interne werkmodel alsook een interessante indicatie hoe dit interne werkmodel het functioneren van een individu kan bepalen.

Conclusie uit het uitgevoerde onderzoek

Bovenstaand onderzoek heeft de basisassumptie uit de hechtingstheorie (Bowlby, 1969) bevestigd dat het verband tussen de opvoedingservaringen van kinderen en psychopathologie verklaard wordt door de hechtingsgerelateerde cognities. Bovendien bevestigde het onderzoek dat het interne werkmodel inderdaad kan geassocieerd worden met het cognitieve schema concept. Enerzijds bestaat het interne werkmodel uit de inhouden die in de cognitieve psychologie beschouwd worden als cognitieve schema inhouden. Anderzijds blijkt het interne werkmodel zich procesmatig te gedragen als een cognitief schema, aangezien het gelijkaardige processen in de aandachtsverwerking van hechtingsgerelateerde stimuli stuurt. Het onderzoek heeft bovendien aangetoond dat onveilig gehechte mensen meer gedachten over de onbeschikbaarheid van hun hechtingsfiguur hebben en dat als ze minder veilig gehechte gedachten hebben, ze hun aandacht sterker richten naar hun hechtingsfiguur.

Het was een keuze in dit doctoraat het interne werkmodel binnen de cognitieve psychologie te situeren. De associatie met cognitieve schema's kan zorgen voor een beter begrip van de problemen waarmee de huidige conceptualisatie van het interne werkmodel geconfronteerd wordt. We zullen dit nu kort toelichten. Ten eerste hebben we geargumenteerd dat onze data aantonen dat het interne werkmodel ook kan beschreven worden als een hechtingsschema. Deze conceptualisatie is compatibel met het meest recente theoretische model over de interrelatie tussen de interne werkmodellen van verschillende hechtingsfiguren. Fraley (2007) heeft geargumenteerd dat men interne werkmodellen best kan benaderen vanuit een neuraal netwerk model. Volgens neurale netwerk modellen zijn schematische representaties de uitingsvormen van de activering van een netwerk van met elkaar verbonden units (vergelijkbaar met neuronen). De inhoud van de schematische representaties in het algemeen en van

het hechtingsschema in het bijzonder zal afhangen van de constellatie van units die geactiveerd zijn door de stimulatie vanuit de buitenwereld.

Ten tweede verklaart het cognitieve schema-concept de beperkte stabiliteit van hechting. Inherent aan een cognitief schema is de verwachting dat het enkel gedrag beïnvloedt als het geactiveerd is. Dit werd binnen de cognitieve schema theorie beschreven als de kwetsbaarheid-stress eigenschap van cognitieve schema's (Beck, 1983). Een hechtingsschema kan een stabiele invloed krijgen in het leven van mensen omdat schema's ervoor kunnen zorgen dat mensen steeds in een gelijkaardige omgeving leven: ze interpreteren alle gedrag vanuit het schema en ze zoeken omstandigheden op die conform zijn met de inhoud van een schema. Als mensen echter verschillende hechtingsgerelateerde ervaringen hebben, vergroot de kans dat ze verschillende hechtingsschema's ontwikkelen die inhoudelijk variëren in veiligheid. Hierdoor is het mogelijk dat mensen een oorspronkelijk hechtingsschema vervangen door een nieuw hechtingsschema. Onderzoek toont echter aan dat een schema niet afgeleerd wordt, maar eerder latent aanwezig blijft (Bouton, 2004; Bouton & Swartzentruber, 1991; Rodriguez, Craske, Mineka, & Hladeck; 1999). Daarom blijft het gedurende het ganse leven mogelijk dat bepaalde contextfactoren zoals stress of stimuli die refereren naar de leercontext het oorspronkelijke hechtingsschema opnieuw activeren waardoor het opnieuw een gelijkaardige invloed op het gedrag zal hebben (Scher, Ingram, & Segal, 2005).

Ten derde toont dit onderzoek aan dat de cognitieve schema theorie in staat is om de cognitieve inhoud die onderliggend is aan de affectregulerende dynamiek van het hechtingssysteem op een inzichtelijke manier in kaart te brengen. Tenslotte introduceert de link met de cognitieve psychologie in het bestaande hechtingsonderzoek de mogelijkheid om met behulp van een aantal goed uitgewerkte experimenteel psychopathologische taken de onderliggende processen van het hechtingssysteem in kaart te brengen. Dit werd geïllustreerd door het onderzoek in dit doctoraat. Bovendien lijken deze experimentele maten

beloftevol om in de toekomst verder uit te werken als impliciete maten om hechting in kaart te brengen (De Houwer, 2005).

Ook voor de klinische praktijk lijkt de conceptualisering van het interne werkmodel als hechtingsschema interessante implicaties te hebben. Ten eerste argumenteert de inherente kwetsbaarheid-stress eigenschap van het hechtingsschema tegen een al te fatalistische houding ten opzichte van hechtingsgerelateerde problemen. In tegenstelling tot wat oorspronkelijk gedacht werd, is het hechtingsschema dan niet per definitie een stabiele persoonlijkheidstrek, maar is er juist nog ruimte tot verandering. Ten tweede helpt de hechtingsschema benadering een deel van de werkingsmechanismen van bestaande hechtingstherapieën te verklaren verklaren. De relatie die men in een klinische context opbouwt met een aanvaardende therapeut en de mentale ruimte die gecreëerd wordt in therapie om nieuwe interacties met een meer open blik aan te vangen, doet de kans toenemen om ook nieuwe, meer adaptieve hechtingsschema's te ontwikkelen. Tenslotte introduceert de link met de cognitieve schema theorie potentieel interessante nieuwe therapeutische technieken in de behandeling van hechtingsgerelateerde problemen. Enerzijds zijn er technieken, zoals narratieve technieken (White & Epston, 1990), die een bijdrage kunnen leveren in het reactiveren van bestaande, meer adaptieve hechtingsschema's. Anderzijds zijn er cognitieve technieken zoals Limited Reparenting technieken (Kellogg & Young, 2006), psycho-educatie (White, 2000), of coping vaardigheden aanleren (Kovacs, Sherrill, & George, 2006) die kunnen helpen nieuwe, meer adaptieve hechtingsschema's te ontwikkelen of om de invloed van maladaptieve schema's te reguleren.

Deze technieken kunnen vervolgens aangewend worden om als behandelstrategie voor de aanpak van de hechtingsgerelateerde component van de internaliserende en externaliserende problemen waarmee kinderen aangemeld worden in de hulpverlening. Ons onderzoek toont ook aan dat het effect van opvoeding op psychopathologie gemediëerd wordt door de hechtingsschema's

van kinderen. Dit onderzoek verklaart dan ook deels waarom het aanleren van opvoedingsvaardigheden weliswaar effectief kan zijn, maar slechts in geringe mate en enkel vroeg in de ontwikkeling (bv Kazdin, 1995). Nieuwe behandelprogramma's worden momenteel ontwikkeld waarbij nog beter de hechtingscomponent van problemen in rekening gebracht worden. Één veelbelovend programma is bijvoorbeeld Attachment-Based Family Therapy (ABFT, e.g. Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002). Dit programma is ontwikkeld om met behulp van cognitief gedragstherapeutische en systeemtherapeutische technieken de kwaliteit van hechtingsrelaties te verbeteren om op die manier jongeren met depressie te behandelen.

Hoewel onze bevindingen en de implicaties van ons onderzoek potentieel interessant kunnen zijn voor het begrip van het hechtingssysteem en voor de ontwikkeling van strategieën om hechtingsgerelateerde problemen te behandelen, is enige voorzichtigheid bij het interpreteren van deze gegevens geboden. (a) In sommige studies werden enkel kleine steekproeven gebruikt, waardoor replicatie in grotere groepen nodig is. (b) De verschillende onderzoekslijnen werden getest in verschillende leeftijdsgroepen. Daarom is het nodig om na te gaan of onze resultaten een weerspiegeling zijn van fenomenen die over de ganse ontwikkeling heen een stabiel karakter vertonen. (c) Omdat al de onderzoeksvragen getoetst zijn bij niet-klinische populaties, is het belangrijk om in toekomstig onderzoek na te gaan of dezelfde processen gevonden worden in klinische populaties. (d) hoewel onze mediatie-analyses lijken te suggereren dat de verbanden tussen de verschillende variabelen causaal van aard zijn, laat het cross-sectionele karakter van onze studies en het correlationeel karakter van onze statistische analyses ons niet toe om causale uitspraken te doen. (e) Tenslotte werd hechting onderzocht met behulp van vragenlijsten. Hoewel eigen psychometrisch onderzoek de betrouwbaarheid en validiteit van onze meetinstrumenten heeft bevestigd (Bosmans, Braet, Soenens, & Verschuere,

2008) is het nodig om dit onderzoek te herhalen met alternatieve diagnostische strategieën om hechting te meten.

Ondanks deze beperkingen, is de bijdrage in dit onderzoek waardevol omdat dezelfde hypotheses werden getest met verschillende onderzoeksmethodes (experimenteel onderzoek, vragenlijstonderzoek), met soms grote steekproeven, met gebruik van informatie van verschillende informanten, en met behulp van een variëteit aan krachtige statistische technieken. Bovendien zijn onze studies uit de derde onderzoekslijn de eerste studies die erin geslaagd zijn op een rigoureuze wijze een deel van het functioneren van het interne werkmodel in kaart te brengen. Op deze manier bieden deze studies voor het eerst een essentiële ondersteuning voor een theorie die reeds jaren haar belang heeft bewezen (Belsky & Cassidy, 1994). Tenslotte kan het besproken onderzoek de basis vormen voor nieuw onderzoek. Niet alleen is het nodig om aan te tonen dat er ook vertekeningen bestaan in de verwerking van informatie op vlak van de herinnering en interpretatie van hechtingsgerelateerde informatie. Ook moet onderzocht worden of het hechtingsschema inderdaad begrepen kan worden vanuit een kwetsbaarheid-stress model. Indien dit het geval is, wordt het belangrijk om experimentele procedures te ontwikkelen om veilige hechtingsschema's te reactiveren of op te bouwen. Tenslotte moet getoetst worden of de implicaties van het hechtingsschema concept inderdaad een meerwaarde kan betekenen voor de behandeling van hechtingsgerelateerde problemen.

Appendix

Appendix A

Fraley and Spieker (2003) applied Meehl's (1973, 1992) MAXCOV taxometric technique for distinguishing latent types (i.e. classes, natural kinds) from latent continua (i.e. dimensions) to Strange Situation Procedure data of 1139 fifteen-month old children. According to Meehl's (1992) approach, a true category, or *taxon*, exists if all group members share a common, discrete source of influence on their manifest characteristics. This source can be biological (e.g. a common gene), sociocultural (e.g. a specific ideology), or representational (e.g. a common goal or a common belief). Fraley and Spieker (2003) proposed secure attachment as an example: if secure attachment represents a natural taxon, there is something qualitatively different about the way the attachment system operates for securely and insecurely attached children. In other words, if secure attachment represents unique latent characteristics, these characteristics will, probabilistically, elicit behaviours indicative of secure attachment (e.g. contact seeking when distressed, being easily soothed by an attachment figure) among children that belong to this taxon, but will fail, probabilistically, to elicit these behaviours among children who do not belong to this taxon.

This statistical approach has the important implication that there will be negligible covariation among behaviours that are indicative of a latent class within a sample of individuals who belong to that latent class. Thus, if secure attachment is a discrete category, Fraley and Spieker (2003) predicted within a sample of children classified as secure a non-significant covariation between how much proximity they seek when reunited with the caregiver and how much contact they subsequently maintain with the caregiver. In other words, proximity

seeking and contact maintaining should be relatively independent within a sample of children identified as securely attached. On the other hand, in a sample of children classified as secure and children classified as avoidant one should find considerable covariance between how much contact children maintain with their caregiver and how readily they seek proximity after reunion.

Meehl's (1973) general covariance mixture theorem states that the covariance between two indicators of a taxonic variable results from the weighted within-group covariances and the weighted indicator mean differences:

$$COV_{xy} = p\,COV_t + q\,COV_c + pq\,(M_{xt} - M_{xc})\,(M_{yt} - M_{yc}),$$

where COV_{xy} denotes the observed covariance between indicators *x* and *y* in the mixed sample, *p* is the base rate of the taxon group (*t*), *q* is the base rate of the nontaxon group (*c*), and $pq\,(M_{xt} - M_{xc})\,(M_{yt} - M_{yc})$ is the weighted product of the mean differences between the two groups for each indicator. When the within-group indicator covariances are small (i.e. COV_t and COV_c) are small (i.e. near zero) the general covariance mixture theorem can be expressed more simply as

$$COV_{xy} = pq\,(M_{xt} - M_{xc})\,(M_{yt} - M_{yc}),$$

Thus, for a taxonic construct, the indicator covariances are a function of the mean difference between groups and the product of the base-rates of the two groups (i.e. *pq*). This second equation implies that in a situation with only securely attached children (*p* equals one, and *q* equals zero) the taxon hypothesis suggests a non-significant covariance between proximity seeking and contact maintenance. However, if the number of securely and insecurely attached children is equal ($p = q = .5$), the taxon hypothesis suggests this covariance

should be maximized. In the MAXCOV analysis, this covariance is calculated for different samples ranging from samples in which only nontaxon members are used in the analysis, over samples in which an equal amount of taxon and nontaxon members are used, to samples in which only taxon members are used. The category hypothesis predicts decreasing covariances in the first and the last samples and higher covariances for the samples with more mixed samples. The analyses of Fraley and Spieker (2003) revealed that the traditional attachment patterns do not follow a categorical organization.

Appendix B

Main et al. (1985, p. 76) provided some definitions of internal working models, which will be fully described to provide a complete picture of the original conceptualization of internal working models:

1. Internal working models are mental representations that include affective as well as cognitive components (Bretherton, 1985). They are integral components of behavioural systems and play an active role in guidance of behaviour (Bowlby, 1980).
2. Internal working models are most likely formed out of generalized event representations (Bretherton, 1985).
3. Once formed, internal working models have an existence outside of consciousness as well as a propensity for stability (Bowlby, 1980).
4. The events out of which internal working models of the self in attachment relationships are formed are attachment-relevant events. These models are formed out of the "outcomes" of a relatively environmentally stable (formerly "instincive") intention to seek proximity to caregivers (Bowlby, 1969/1982).
5. Infants whose attempts to gain proximity to the caregiver are consistently accepted will develop different internal working models of relationships than do infants whose attempts to gain proximity are consistently blocked or are accepted only unpredictably. Where access is consistently restricted or admitted only unpredictably, we may expect active reorganization, restriction, and redirection in attention, behaviour, and emotional expression.
6. Some type of internal working model of specific relationships may be formed in the first months of life. By the time the infant is 1 year of age, individual differences in Strange Situation behaviour with a

particular parent may be conceived as reflecting individual differences in the infant's internal working model of a particular infant-parent relationship.

7. Models of relationships do not depend solely on events experienced in the partner's presence. Because event representations are defined to include "attempts and outcomes", they will necessarily include the outcome of, for example, the infant's efforts to gain the caregiver in the caregiver's absence. Thus, the internal working model of a relationship may change over the course of the partner's absence.
8. Internal working models of relationships provide rules and rule systems for the direction of behaviour and the felt appraisal of experience.
9. Internal working models of relationships also will provide rules for the direction and organization of attention and memory, rules that permit or limit the individual's access to certain forms of knowledge regarding the self, the attachment figure, and the relationship between the self and the attachment figure. These rules will be reflected in the organization of thought and language as it relates directly and indirectly to attachment. Many will be unconscious.
10. In childhood, it is possible that internal working models or relationships can be altered only in response to changes in concrete experience
11. Following the onset of the stage of formal operations, it is possible that the internal working models of particular relationships established earlier can be altered. This is because these operations may permit the individual to think about thought itself, that is, to step outside a given relationship system and to see it operating (Piaget, 1967).

12. While internal working models show a strong propensity for stability, they are not conceived as templates. They are best conceived as structured processes serving to obtain or to limit access to information.

Appendix C

Schema descriptions, domain descriptions (in italics) and exemplary YSQ-SF items[11] *(Young et al., 2003).*

SCHEMAS/DOMAINS	**DESCRIPTION**	**EXEMPLARY YSQ-SF ITEM**
Disconnection/Rejection	*Expectation that one's needs for security, safety, stability, nurturance, empathy, sharing of feelings, acceptance and respect will not be met in a predictable manner.*	
Abandonment/Instability	The perceived instability or unreliability of those available for support and connection.	'I need other people so much that I am afraid of losing them'
Mistrust/Abuse	The expectation that others will hurt, abuse, humiliate, cheat, lie, manipulate or take advantage.	'I feel I have to watch out with other people, otherwise they will deliberately hurt me'
Emotional Deprivation	The expectation that one's desire for a normal degree of emotional support will not be adequately met by others.	'In my life there have been few people who really listened to me, understood me or who considered my real needs and feelings'
Defectiveness/Shame	The feeling that one is defective, bad, unwanted, inferior or invalid in important respects or that one would be unlovable to significant others if exposed.	'None of the boys or girls that I like could still love me if they knew my flaws'
Social Isolation/Alienation	The feeling that one is isolated form the rest of the world, different form other people, and/or not part of any group or community.	'I do not belong; I'm a loner'

[11] To give an idea of the content of the YSQ, the represented items are retrieved from the backtranslation of the Dutch adolescent YSQ used in the present study.

Impaired Autonomy/Performance	*Expectations about oneself and the environment that interfere with one's perceived ability to separate, survive, function independently or perform successfully.*	
Dependence/Incompetence	The belief that one is unable to handle one's everyday responsibilities in a competent manner without considerable help from others.	'I am not very confident in my ability to resolve common everyday problems'
Vulnerability to Harm/Illness	Exaggerated fear that imminent catastrophe will strike at any time and that one will be unable to prevent it.	'I am scared of me and/or my family losing all our money and becoming poor'
Enmeshment/Undeveloped Self	Excessive emotional involvement and closeness with one or more significant others (often parents) at the expense of full individuation or normal social development.	'I have not been capable of separating from my parent(s) like most other kids my age seem to have managed'
Failure	The belief that one has failed, will inevitably fail or is fundamentally inadequate relative to one's peers.	'Most people can do more than I can in the areas of school and other achievements'
Impaired Limits	*Deficiency in internal limits, responsibility to others or long-term goal orientation; leads to difficulty respecting the rights of others, cooperating with others, making commitments or setting and meeting personal goals.*	
Entitlement/Grandiosity	The belief that one is superior to other people, entitled to special rights and privileges or not bound by the rules of reciprocity that guide normal social interaction.	'I feel that what I have to offer is of greater value than the things other people have to offer'
Insufficiënt Self-Control/Self-Discipline	Pervasive difficulty of refusal to exercise sufficient self-control and frustration tolerance to achieve one's personal goals or to restrain the expression of one's emotions and impulses.	'If I am unable to achieve a goal, I get easily frustrated and give up'
Other-Directedness	*An excessive focus on the desires, feelings and responses of others at the expense of one's own needs in order to gain love and approval, maintain one's sense of connection or avoid retaliation.*	

Subjugation	Excessive surrendering of control to others because one feels coerced submitting in order to avoid anger, retaliation or abandonment.	'I find it very difficult to stand up for my rights and insist that my feelings are taken into consideration'
Self-Sacrifice	Excessive focus on voluntarily meeting the needs of others the expense of one's own gratification.	'I am so busy doing for the people I care about that there is little time left for me'
Overvigilance/Inhibition	*Excessive emphasis on suppressing one's spontaneous feelings, impulses and choices or on meeting rigid, internalized rules and expectations about performance and ethical behaviour, often at the expense of happiness, self-expression, relaxation, close relationships or health.*	
Emotional Inhibition	The excessive inhibition of spontaneous action, feeling or communication, usually to avoid disapproval by others, feelings of shame or losing control of one's impulses.	'I am embarrassed about showing my feelings to other people'
Unrelenting Standards/Hypercriticalness	The belief that one must strive to meet very high internalized standards of behavior and performance, usually to avoid criticism.	'I try to do my level best; I do not settle for 'good enough''

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