Attachment-related information processing: exploring the effect of attachment organization on cognitive regulation in adults
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Chapter 5

Attachment and perceptual defense

To examine the assumption that insecure attachment is associated with perceptual defense, we administered the Adult Attachment Interview and the Defense Mechanism Test in a nonclinical (n = 46) and an anxiety disorder (n = 31) sample. Applying a generally threatening and a separation-related DMT stimulus, we hypothesized that dismissing attachment would be characterized by a tendency to defend against threatening stimuli, and preoccupied attachment would be revealed by a tendency toward hypervigilance for threatening information. This was expected to lead to a relatively late versus a relatively early recognition of the threat in the stimuli, especially in the separation-related picture as this is most relevant to attachment anxiety. Results indicated that in nonclinical individuals, attachment insecurity in general goes together with an attentional bias for separation threat. In anxiety disorder patients, preoccupied attachment is related to an attentional bias for separation threat compared to general threat, while dismissing attachment goes together with a deactivating strategy when confronted with separation threat.

Thanks are due to Drs. Joost Beek and his co-workers of the Johan Weyer Instituut for recruiting the patients who participated in Experiment 2. We are also grateful to Dr. Alex Rubino, who provided us with the separation slide used by him and his co-workers in their 1990 study.
Attachment theory (Bowlby, 1973, 1980, 1984) has evolved around John Bowlby's interest in the psychological effects of separation on young children (van Dijken, 1997). Bowlby conceived of an evolutionary based attachment behavioral system that is directed at maintaining a homeostasis between seeking attachment security and exploring the environment. Under conditions that imply danger, the young child is expected to seek out its caregiver for protection; under relatively safe conditions, it can explore the surroundings. Defined as a behavioral system in early infancy, in later years the child is thought to form an internal working model of attachment, defined as "... a set of conscious and/or unconscious rules for the organization of information relevant to attachment and for obtaining or limiting access to that information ..." (Main, Kaplan, & Cassidy, 1985, pp. 66-67). The internal working model can be conceptualized as a cognitive-affective mechanism that guides information processing. The representational model of attachment is built from experience; this implies that differences in attachment experiences are associated with differences in cognitive processing of attachment-relevant information. Thus, selective or biased attention, expectancies, interpretation and memory are central to attachment theory. The studies reported here concern the effect of the mental representation of attachment on information processing.

In infancy, attachment behavior becomes organized in a way that is appropriate to the attachment-related experiences with the caregiver (see Bretherton, 1985). Repeated interactions with caregivers are assumed to form the basis of the internal working model of attachment: a set of expectations concerning the attachment figure(s), especially concerning their availability and typical responses to security distress, and behavior of the self in relation to caregivers in attachment-relevant situations. Secure attachment goes together with a representational model of a sensitively responsive and available caregiver, combined with a model of self as being worthy of attention. Insecure attachment may result from unresponsive or from inconsistently responsive caregiving and may be associated with a model of self as only being worthy of attention under certain conditions. The attachment system is assumed to be a primary behavioral control system that is active and context sensitive (Main, 1990). In case of relatively unavailable caregivers, a secondary, conditional strategy is developed to protect against attachment anxiety that cannot be reduced through the primary behavioral strategy. Main (1995) suggests that "...the infant develops a defensive, conditional strategy for maintenance of proximity and/or self-organization in response to restrictions the parent has placed on proximity-seeking or on autonomous exploration" (p. 453). Put otherwise, the conditional strategy serves to sustain development in case of unfortunate attachment experiences by limiting access to attachment-related information. Conditional strategies thus require manipulation of cognitive processes to maintain a given attachment organization; these processes include selective attention, encoding, remembering and anticipating. In securely attached children, the expression of negative affect communicates distress to the caregiver, who then responds with action to improve the child's situation. In the case of an unresponsive caregiver, however, the conditional strategy will be to deactivate the expression of negative affect so as not to be rejected (Cassidy & Kobak, 1988). In the case of inconsistently responsive caregiving, the conditional strategy will be to hyperactivate the expression of negative emotion to attract attention.
Security distress is seen in situations that elicit attachment behavior. Early attachment researchers developed a measurement tool in the form of behavioral observations of infants and their caregivers in the laboratory: the Strange Situation Procedure (SSP; Ainsworth, Blehar, Waters, & Wall, 1978; Main & Solomon, 1990). In this attachment classification protocol for infants, separation from the caregiver and responses from the child at reunion with the caregiver serve to show the typical reaction of that child towards that caregiver. For children too old to participate in the SSP, methods were developed to tap into the child's attachment representation through responses to photographs, family drawings, story completion, or through analyses of parent-child discourse and behavior after a separation (for an overview, see Main, 1995). In adults, the state of mind with regard to attachment is measured with a representational instrument: the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985). The AAI was originally developed to predict the behavior of the respondents' children in the SSP, and to predict parents' responsiveness towards their infants. In later studies, the AAI was also administered to adults regardless of parenting status, directed at discovering individual differences in functioning in relation to the attachment state of mind (for an overview of AAI-studies up to 1994, see van IJzendoorn & Bakermans-Kranenburg, 1996). The AAI classifies adults into four attachment categories: autonomous, dismissing, preoccupied and unresolved with regard to attachment. The focus of the interview is the mental organization of attachment representations; the AAI assesses the respondent's state of mind with regard to attachment that presumably reflects the "unconscious" internal working model developed in childhood.

The AAI assesses the quality of the adult attachment representation in strictly psycholinguistic terms. In our earlier studies, concerned with the relation between attachment representations and information processing, we used linguistic tasks (Stroop task: Zeijlmans van Emmichoven, de Ruiter, & Brosschot, 2000; Stroop and memory task: Zeijlmans van Emmichoven, van IJzendoorn, & de Ruiter, 2000; lexical decision task: Zeijlmans van Emmichoven, van IJzendoorn, & Schuengel, 2000). Findings from these studies indicated that attachment insecurity, but not the type of insecurity, was a discriminating characteristic in selective information processing. It has, however, been suggested that pictures can access affective associations more directly than words can (de Houwer & Hermans, 1994). The aim of the present studies was to investigate whether insecure attachment strategies are associated with perceptual defense in a non-linguistic, namely pictorial information-processing task.

Bowlby (1980, Chapter 4) applied information processing approaches in his theory of attachment-related defense. He made a distinction between selective and defensive exclusion of information, pointing out that selective exclusion is a normal healthy process that protects us from information overload, while defensive exclusion refers to information that, when accepted for processing in the past, has led the person to suffer more or less severely. Bowlby (1980) related defensive exclusion to interpersonal experiences in childhood, such as situations in which the child's attachment behavior was aroused and - because of unresponsive caregiver reactions - terminated again. Specifically, Bowlby (1980) hypothesized that avoidance behavior in young children serves the function of preventing the processing of information that would trigger attachment behavior. Consequently, deactivation of attachment becomes anticipatory. Next to defensively excluding information that might elicit attachment behavior, avoidant individuals may also develop a view of attachment
relationships as being of minimal importance, thus preventing affective distress (Cassidy & Kobak, 1988). Similarly, resistant behavior in children serves the function of hyperactivating attachment behavior and may be associated with an information processing bias favoring attachment-related cues and a view of attachment relationships as being of maximal importance.

In the AAI, a dismissing state of mind shows by limiting or dismissing the influence of attachment experiences on development and current functioning. If negative experiences are recounted, the affective response is minimized. The results point at a cognitive bias among avoidant adults directed at minimizing the acknowledgment of distress or difficulties in attachment representation (Main et al., 1985) and in social adjustment (Kobak & Sceery, 1988). In adults classified as preoccupied with respect to attachment, AAI-findings point at hypervigilance for negative attachment-related experiences. Put together, it can be said that in the case of an insecure attachment representation the internal working model regulates attachment-related information processing and serves as a defensive strategy to control affective distress, either in a deactivating or in a hyperactivating way (Dozier & Kobak, 1992).

Traditionally, psychological defense has been defined in terms of unconscious processes. In psychoanalytic literature, defense refers to the process of regulating painful emotions by protecting the ego from painful or unacceptable conflicts. Defense mechanisms have been defined as mental processes that reduce the opportunity for distressing emotions like anxiety to come into consciousness, thus functioning as an intrapsychic protective mechanism against painful impulses, ideas or affects (A. Freud, 1948). In modern cognitive psychology, a vast amount of research has been reported, directed at preconscious information processing which bears resemblance to the concept of defense. Defense is then assumed to be an unconscious operating system of control processes that regulates which perceptions are represented in consciousness, and determines what form this awareness takes (for a review, see Paulhus, Fridhandler, & Hayes, 1997). Defensive strategies are assumed to arise when problem-solving strategies are ineffective or inappropriate. The choice of a person's response to an anxiety-provoking stimulus depends on the stimulus context and on the individual's characteristic processing style. Modern cognitive psychology has thus evolved from a psychoanalytical to an information-processing approach to defense.

Perceptual defense concerns an individual's recognition threshold for threatening stimuli. A large body of research shows that unpleasantly toned stimuli are more difficult to perceive accurately than neutral or positively toned stimuli (see Mathews & MacLeod, 1994). Again, what is evaluated as unpleasant depends on the interaction between the context and the individual's characteristic style. In terms of information processing, some preliminary analysis of the meaning of the stimulus must be performed before complete processing takes place; in this preconscious phase of information processing defensive processes are assumed to take place. Oliff (1991) defines defense as a mental strategy that serves the purpose of warding off negative emotional states by distorting aspects of reality.

A research tool in the information processing approach to perceptual defense is the Defense Mechanism Test (DMT), a measure that was developed to examine percept genesis (Kragh, 1955): the perception of external reality as an outcome of internal processes that are prone to subjective influences. The DMT is a tachistoscopic measure; respondents are shown a TAT-like picture of a teenage child with a threatening adult in the background. Initially
below the perceptual threshold, the exposure time of the picture is gradually increased until
the person can identify the stimulus constellation. The threat in the picture is expected to
evoke various defensive reactions interfering with correct detection of the threatening
stimulus. The defense mechanisms used to this end are evaluated by analyzing the
respondent's reactions to the stimulus exposures, looking for signs of perceptual distortions
that are assumed to be defensive against the threat in the stimulus. The coding system of the
DMT (Kragh, 1985) is strongly rooted in the psychoanalytic theory of defense mechanisms.
Kline (1987) criticized the construct validity of the DMT, saying the DMT cannot validly
claim to measure defense mechanisms and may instead be measuring personally relevant
perceptual distortions in relation to individuals' conflicts and problems. In the studies
reported in this paper, we have chosen to use the most straightforward measures of the DMT
that are thought to be rather pure measures of defense (Olff, 1991): the recognition of the
figures in the stimulus, and the recognition of the threat in the stimulus. Late perception,
including late threat perception, has been shown to explain significantly more variance in the
DMT findings than the psychodynamic defense mechanisms as operationalized by Kragh
(Zuber & Ekehammer, 1997).

Next to the generally threatening DMT-stimuli developed by Kragh (1985), a
separation-related DMT-stimulus was developed by Rubino, Grasso and Pezzaroossa (1990).
This separation stimulus was shown to elicit denial-of-threat responses in participants with
low self-reported sensitivity to separation (Rubino et al., 1990), and with manic patients
(Rubino, D'Avossa, & Ciani, 1992). In a recent study, it was shown that agoraphobic
patients were characterized by denial of the separation theme (Rubino, Zanna, Marino, &
Pezzarossa, 1997). Specifically, patients suffering of panic disorder and agoraphobia were
characterized by a tendency to first perceive the threat and then stop mentioning it, and by
explicit denial of the separation in the last four stimulus exposures. The introduction of the
separation theme in the DMT-tradition makes for a link between studies of attachment-related
information processing and studies of perceptual defense.

We conducted two studies to investigate whether insecure attachment is associated
with perceptual defense in nonclinical adults and in anxiety disorder patients. Insecurely
attached adults are known to be sensitive to rejection and separation experiences with their
major attachment figures. In the AAI, this shows through denial of unfortunate attachment
experiences by dismissally attached individuals; in preoccupied individuals this shows in
overinvolvement with negative experiences. In clinical conditions, agoraphobia is typically
associated with separation anxiety and often goes together with an insecure attachment
representation (de Ruitter & van IJzendoorn, 1992; Fonagy et al., 1996; Manassis, Bradley,
Goldberg, Hood, & Swinson, 1994).

The relation between anxiety disorder, attachment representation and perceptual
defense will be explored in Study 2. In Study 1, we start out exploring the relation between
attachment insecurity in a nonclinical group and perceptual defense as measured with the
DMT. We predict differences between autonomous and insecurely attached participants in
threat perception because of regulatory differences in their respective attachment schemata.
Attachment insecurity is associated with hypersensitivity for attachment-relevant danger,
although the expression of attachment stress may differ on a behavioral level between
dismissing and preoccupied individuals. It is conceivable that dismissing attachment will be
characterized by a tendency to defend against threatening stimuli (deactivating strategy: late
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threat detection) and preoccupied attachment will to be revealed by a tendency toward hypervigilance for threatening information (hyperactivating strategy: early threat detection). In insecurely attached participants, the separation-related picture is expected to elicit more threat-denial than the original DMT-stimulus, because it is most relevant to attachment insecurity. To differentiate between state and trait anxiety per se and attachment-related anxiety, scores on the DMT are controlled for individual levels of state and trait anxiety.

Study 1

Method

Participants and Procedure
The sample consisted of 46 undergraduate psychology students (20 men, 26 women; mean age 24 years, range 17-50 years) who volunteered to participate and received course credit in return. Participants were tested individually at our lab. First they completed the State-Trait Anxiety Inventory, then the Defense Mechanism Test was administered. After a 15-minute break, the Adult Attachment Interview was conducted. The whole session took approximately 2 to 2.5 hours.

Measures

Adult Attachment Interview. The AAI is a semi-structured interview with 21 questions plus standardized probes. After a general description of their family and living arrangements when growing up, respondents are asked to describe their childhood relationship up to age 12 with their parents (or other main caregivers) and to give global descriptions of their relationship with each parent. Next, they are asked to provide specific memories for each description. Furthermore, they are asked to describe what happened in attachment-relevant situations like illness and distress, and to recount specific memories of their own and their parents' behavior in these situations. Respondents are asked about experiences with rejection, separation, punishment, abuse and loss, and are asked how they think their experiences have influenced their development. If relevant, respondents are asked about their relationship with their own children, and about the influence of their own growing-up experiences on their behavior as a parent. The AAI is coded according to a manual (Main & Goldwyn, 1994). Next to giving scores for inferred caregiving experiences in childhood, scores are given for the current state of mind with respect to attachment. Coherence and consistency in the course of the interview strongly contribute to the final classification. Respondents classified as autonomous with respect to attachment are characterized by a balanced view of their past, whether their experiences were positive or negative. They tell their story in a clear and coherent way, acknowledge the influence of their past experiences on their development and their present behavior, and clearly value attachment. They impress as relatively independent and objective with regard to attachment. Respondents classified as dismissing of attachment seem to limit the influence of their attachment experiences by claiming to be too independent to have been affected by them, or by insisting on a lack of memory for specific descriptions of their highly favorable general characterizations of their parents. They seem to organize their thoughts in a way that permits attachment to remain deactivated by unqualified idealization of their caregivers. Respondents
classified as *preoccupied* with attachment show confusion with regard to their experiences through passivity or anger and conflict, as expressed in the linguistic form of their discourse. They seem very involved and mentally entangled in their past and/or present attachment relationships and seem unable to move beyond them. Next to these three attachment classifications, respondents can be classified as *unresolved* with respect to loss or trauma when they show lapses in the coherence of their thought or speech while discussing the loss of or abuse by attachment figures. In addition to a primary unresolved classification, these respondents receive a secondary classification as autonomous, dismissing or preoccupied with respect to attachment (Main & Goldwyn, 1994).

AAI classifications show a reasonable test-retest reliability over 2-month and 12-month periods, and are independent of IQ, autobiographical memory, verbal ability, social desirability, interviewer and coder (Bakermans-Kranenburg & van IJzendoorn, 1993; Sagi et al., 1994; Benoit & Parker, 1994). The AAI also reliably predicts infant attachment, especially for mother-child dyads (see van IJzendoorn, 1995).

The AAI's of the participants in this study were coded according to the manual (Main & Goldwyn, 1994) by I.A. Zeijlmans van Emmichoven, who was trained by M. Main and E. Hesse in Leiden, the Netherlands, in 1995, and has an intercoder reliability over 83% with M. Main. Eleven of the AAI's (24%) were also coded by Dr. C. Schuengel, who was trained in Regensburg, Germany, in 1993 and in Leiden, the Netherlands, in 1995. Percentage of agreement on these 11 cases was 91% (kappa = .86) both for the 3-category and the 4-category classification. A difference in classification of one interview was discussed to agreement.

**Defense Mechanism Test.** The DMT consists of two series of 22 tachistoscopic exposures of a picture. In this study, we used the standard DMT-apparatus (DMT®; Psytec, Sweden) with exposure times progressing from .005 to 2 seconds. During testing, the light level in the room was set low.

**Stimuli:** Two pictures were shown, both representing a situation in which a peripheral adult threatens a centrally placed child. The original DMT-stimulus (Kragh, 1985) shows a child seated at a table and a peripheral person looking angrily upon the child (both of the same sex as the participant). The separation stimulus (Rubino et al., 1990) shows a baby lying on the floor and a woman with a handbag stepping out of a door.

**Procedure:** The participant's eyesight was tested and a demonstration picture was used to explain the procedure to the respondent. Instructions and procedure were similar to those described in the manual (Kragh, 1985). After each stimulus exposure, participants were asked to draw what they thought they had seen and to verbally describe this while drawing. The experimenter recorded the verbal report. When "a person" was seen, participants were instructed to indicate sex, estimated age, and mood of that person. When the respondents commented on the similarity between the exposures, they were asked to draw and describe it anyway. No indication was given that the stimulus exposures only differed in exposure time and not in content.

**Scoring:** The sketches and verbal reports were coded by I.A. Zeijlmans van Emmichoven according to a manual (Kragh, 1985; Dutch translation of the manual by de Vries, de Ruiter, Brosschot, & Olff, 1992). For each stimulus picture, six variables were coded. *First phase* (P1) is the number of the exposure at which the respondent for the first
time reports seeing something meaningful at the place of the central and/or the threatening figure. *First Hero-recognition* (H1) is the number of the exposure at which the respondent first recognizes the centrally placed figure as representing a person. *First Peripheral person-recognition* (Pp1) is the number of the exposure at which the respondent first recognizes the threatening figure as representing a person. *Threshold phase* (T1) is the number of the exposure at which the respondent reports a threat from the peripherally placed person for the first time. In the separation stimulus, the threat is correctly recognized when the respondent indicates the woman is leaving the room. In the original DMT-stimulus, the threat is correctly recognized when the respondent indicates the peripheral person as angry, cross, or austere. A low T1 score indicates early threat-recognition. *Summed threat score* (T-sum) is the summed score of the numbers of each exposure at which the respondent mentions the threat. A high T-sum score indicates there are many exposures at which the threat is mentioned. *Weighted threat score* (T-weighted) is the summed score of the reversed number of every exposure at which the threat is mentioned. A high T-weighted score indicates an early threat-detection with threat reported at many exposures.

To ensure inter-rater reliability, 11 protocols (24%) were double-coded Dr. M. Olff. There were no differences in coding of the variables relevant for this study.

**Questionnaire.** The State-Trait Anxiety Inventory (STAI; Dutch version: van der Ploeg, Defares, Spielberger, 1979) contains 20 statements about trait anxiety and 20 statements about state anxiety. Respondents indicate on a four-point scale how strongly the statements apply to them. Internal consistency (alpha) in this study was .92 for trait anxiety and .90 for state anxiety. The psychometric qualities of the STAI have been found satisfactory, and the manual provides normscores.

**Results**

**Adult Attachment Interview**

Sixteen participants (34.8%) were classified as autonomous, 16 (34.8%) as dismissing and 14 (30.4%) as preoccupied. The AAI distributions are shown in Table 1. The AAI distribution from the sample was compared to a standard probability distribution based on nonclinical samples of adolescents and young adults (van IJzendoorn & Bakermans-Kranenburg, 1996) using Multinom (Kroonenberg, 1998). This program computes a chi-square goodness-of-fit statistic and standardized residuals for each cell. The three-way AAI distribution in our sample differed significantly from the AAI distribution generally found in nonclinical adolescent and young adult samples. There were significantly less autonomous and more preoccupied participants ($\chi^2 (2) = 9.41, p < .05$). The four-way AAI distribution also differed significantly from the normscores: there were more dismissing and preoccupied participants and less autonomous and unresolved ones ($\chi^2 (3) = 15.27, p < .05$). There were no differences between the AAI categories for age, sex, or relationship status.

Analyses of the DMT scores were run both with three-way and with four-way AAI classifications; there was no difference in the results. The results reported here are based on 3-way AAI classifications with unresolved participants classified according to their secondary attachment classification.
Attachment and perceptual defense

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<thead>
<tr>
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<tr>
<th></th>
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<th>Study 2</th>
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<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
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<tr>
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<td>6</td>
<td>19.4</td>
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<td>34.8</td>
<td>10</td>
<td>32.3</td>
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<td>14</td>
<td>30.4</td>
<td>15</td>
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<td>8</td>
<td>25.8</td>
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<td>Unresolved</td>
<td>3</td>
<td>6.5</td>
<td>9</td>
<td>29.0</td>
</tr>
</tbody>
</table>

Table 1. Distributions of 3-way and 4-way AAI classifications in both studies

**STAI**
The mean score for state anxiety was 39.7 (SD = 6.4). This is higher than the normative scores for university students (8th decile). The mean score for trait anxiety was 37.8 (SD = 8.2). This is also slightly higher than the normative scores for university students (6th decile). The correlation between the STAI scores was significant (r = .52, p < .01, 2-tailed). There was no significant relation between the trait and state anxiety scores and the AAI classifications. Rank-order correlations (Spearman's $r_s$) revealed no relations between the STAI state scores and any of the DMT scores. There were significant correlations between the STAI trait anxiety scores and the threat detection scores for the original DMT stimulus (p < .05, 2-tailed).

**Defense Mechanism Test**
In one case, responses to the original DMT-stimulus were lost due to equipment failure. Mann-Whitney-Wilcoxon tests revealed that the insecurely attached participants had significantly lower P1 scores on the separation stimulus (p < .05) and on the original DMT-stimulus (p < .05) than the autonomous participants. Multiple comparisons (Siegel & Castellan, 1988) revealed that the preoccupied participants had lower P1 scores than the autonomous group, which means they were earlier than the autonomous group to recognize something meaningful in both stimuli. Mean scores of the three AAI groups on the DMT are presented in Table 2.

Within-group analyses (Wilcoxon signed rank tests) revealed that both the dismissing and the preoccupied group had a higher T-sum score (p < .01) and a higher T-weighted score (p < .01) on the separation stimulus than for the original DMT-stimulus. This means both dismissing and preoccupied participants recognized the threat more often and reported it more consistently in the separation stimulus than in the original DMT-stimulus.

To analyze the relation between the DMT scores and the trait anxiety scores, results on the STAI trait scale were grouped around the median. Mann-Whitney-Wilcoxon tests of the DMT scores revealed significant differences between participants with lower and with higher trait anxiety scores. Participants with higher trait anxiety scores, compared to those scoring below the trait anxiety median, had higher T1 scores (p < .01) but also higher T-sum scores (p < .01) and higher T-weighted scores (p < .01) on the original DMT-stimulus. They
were later than the low trait-anxious group to recognize the general threat but recognized it more often and more consistently.

<table>
<thead>
<tr>
<th>Separation stimulus</th>
<th>Dismissing ( (n = 16) )</th>
<th>Autonomous ( (n = 16) )</th>
<th>Preoccupied ( (n = 14) )</th>
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</thead>
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<tr>
<td>P1</td>
<td>6.9 (3.6)</td>
<td>8.1 (3.5)</td>
<td>5.9 (4.0)</td>
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<tr>
<td>H1</td>
<td>9.8 (4.7)</td>
<td>10.7 (3.7)</td>
<td>9.9 (3.5)</td>
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<tr>
<td>Pp1</td>
<td>9.8 (4.3)</td>
<td>10.7 (3.6)</td>
<td>10.2 (3.3)</td>
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<tr>
<td>T1</td>
<td>11.0 (8.2)</td>
<td>14.4 (7.7)</td>
<td>12.4 (6.4)</td>
</tr>
<tr>
<td>T-sum</td>
<td>3.8 (3.8)</td>
<td>3.0 (2.6)</td>
<td>4.5 (3.3)</td>
</tr>
<tr>
<td>T-weighted</td>
<td>20.0 (24.2)</td>
<td>11.8 (12.4)</td>
<td>23.9 (21.6)</td>
</tr>
<tr>
<td>Original DMT-stimulus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>8.3 (3.2)</td>
<td>8.8 (2.3)</td>
<td>6.9 (2.9)</td>
</tr>
<tr>
<td>H1</td>
<td>9.0 (3.2)</td>
<td>9.9 (2.9)</td>
<td>8.4 (2.7)</td>
</tr>
<tr>
<td>Pp1</td>
<td>11.5 (4.0)</td>
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<td>10.8 (3.5)</td>
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<tr>
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<td>6.2 (9.2)</td>
<td>9.7 (10.1)</td>
<td>8.5 (10.2)</td>
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<tr>
<td>T-sum</td>
<td>1.1 (1.8)</td>
<td>1.7 (2.2)</td>
<td>1.3 (1.7)</td>
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<tr>
<td>T-weighted</td>
<td>3.5 (7.0)</td>
<td>4.9 (7.9)</td>
<td>2.9 (4.0)</td>
</tr>
</tbody>
</table>

Table 2. Mean scores (SD's in brackets) on the separation stimulus and the original DMT-stimulus for dismissing, autonomous and preoccupied nonclinical participants.

Note. P1 = first phase; H1 = first Hero-recognition; Pp1 = first peripheral person-recognition; T1 = threshold phase; T-sum = summed threat-recognition score; T-weighted = weighted threat-recognition score.

Discussion
Our hypothesis that dismissing attachment would be characterized by late threat-detection and preoccupied attachment by early threat-detection was not supported: there were no significant differences between the two insecure groups in threat-detection. However, the preoccupied participants were faster than the autonomous ones to recognize something meaningful in both pictures, which is consistent with the hypothesized hypervigilance of preoccupied individuals.

Contrary to our expectation, the separation stimulus yielded better threat recognition in insecurely attached than in autonomous respondents. Both dismissing and preoccupied individuals more often recognized the threat in the separation stimulus and kept on reporting it at longer exposures. This may point at an attentional bias for, instead of a defensive reaction against separation stimuli in both dismissing and preoccupied individuals. Separation threat seems to catch their attention more than general threat.

Findings on the relation between higher trait anxiety and performance on the original DMT stimulus can be described as an initial inhibited attention to general threat, combined with enhanced awareness at a conscious level. This is contradictory with the generally observed tendency of high trait-anxious individuals to selectively attend to threatening stimuli at a pre-attentive stage (see Williams, Watts, MacLeod, & Mathews, 1997). However, the studies reviewed by Williams et al. concern experimental tasks focused on encoding or
retrieving linguistic stimuli. The DMT concerns perceptual defense processes and in this kind of paradigm it is impossible to control for response biases. It is possible that low trait-anxious participants are just less willing than high trait-anxious ones to report the threat, even though they also may encode it.

Finding enhanced recognition of separation threat in insecurely attached participants supports the idea that separation threat is relevant in insecure attachment. Because anxiety disorders are known to be associated with an attentional bias for relevant stimuli, we applied the same DMT-paradigm in an anxiety disorder sample.

Study 2

Introduction
Attachment insecurity has been pointed out as a risk factor for the development and maintenance of psychopathology. Bowlby (1973), for instance, interpreted agoraphobia as a separation disorder, resulting from childhood experiences with loss, abandonment or separation threat (as from unavailable and/or unresponsive caregivers). Rather than viewing agoraphobia as a fear of the presence a stimulus, Bowlby thought of agoraphobia as a fear of the absence of an attachment figure and/or a secure base to retreat to (Bowlby, 1973). Indeed, agoraphobics are known to report significant childhood separation anxiety (de Ruiter & van IJzendoorn, 1992). A meta-analysis (Gerlsma, Emmelkamp, & Arrindell, 1990) showed that adult phobic disorders are related to an affectionless and controlling parental rearing style as measured with self-report questionnaires. The DSM-IV (APA, 1994) also mentions that childhood separation anxiety disorder may precede the development of panic disorder with agoraphobia in adults. However, the relation between attachment insecurity and psychopathology is not a linear one. Although at a lower frequency, autonomous attachment representations are also found in clinical samples (see van IJzendoorn & Bakermans-Kranenburg, 1996). One might think of an autonomous state of mind with regard to attachment as a factor contributing to the capacity for self-exploration and self-reflection (Eagle, 1995) and to the capacity to benefit from social support (Kobak & Sceery, 1988). This way, autonomous attachment may serve as a protective factor against psychopathology and, in case of psychopathology, as a factor conducive to treatment use (see Dozier & Tyrrell, 1998).

It has often been found that anxious individuals selectively process threatening stimuli (Williams et al., 1997). In this study, we will look again at differences in threat recognition between attachment groups and at differences within attachment groups between threat reports on the separation stimulus and on the generally threatening stimulus. Furthermore, we hypothesize that agoraphobics will show more defense against separation threat than non-agoraphobic anxiety patients will. This is expected to result in later or absent threat recognition. Whether differences between anxiety disorders will also turn up on the original DMT-stimulus remains an open question (cf. Rubino et al., 1997). Furthermore, a combination of attachment insecurity with agoraphobia is expected to be associated with more defense against separation threat, showing in later or no threat recognition.
Method

Participants and Procedure
Thirty-one individuals voluntarily participated in the second study. The sample consisted of 9 men and 22 women, mean age 38 (range 20-55). They were all anxiety disorder outpatients referred for treatment to a local psychiatric hospital. The interviewing and testing in most cases took place in the period between the intake procedure and the start of protocolized cognitive-behavioral psychotherapy.

Participants were tested individually at our lab. Participation consisted of three 1.5-hour sessions, at which the Anxiety Disorders Interview Schedule-Revised, the Adult Attachment Interview, the Defense Mechanism Test, another task not reported on here, and the State-Trait Anxiety Inventory were administered. Respondents received Hfl. 50 for their participation.

Twenty-four of the participants used medication at the time of testing: 19 were taking an antidepressant, 1 was using a benzodiazepine and 4 were using both an antidepressant and a benzodiazepine.

Measures

Anxiety Disorders Interview Schedule-Revised. The ADIS-R (Dutch version by de Ruiter, Bouman, & Hoogduin, 1993) is a semi-structured interview schedule that provides a differential diagnosis for the DSM-III-R categories anxiety disorders, mood disorders, somatoform disorders and substance abuse. The ADIS-R also globally screens for psychotic episodes. Respondents are questioned about medication use and medical history.

The diagnostic interviews in this study were conducted by a clinical psychology intern who was trained in the use of the ADIS-R and in adjustments of the interview to DSM-IV criteria (APA, 1994). All participants met DSM-IV criteria for an anxiety disorder as primary diagnosis (panic disorder with agoraphobia, n = 19; panic disorder without agoraphobia, n = 3; social phobia, n = 2; obsessive-compulsive disorder, n = 5; generalized anxiety disorder, n = 1; anxiety disorder NOS, n = 1). All diagnoses were afterwards compared with the psychiatric assessments from the outpatient clinic. There were no disagreements on the primary diagnosis being an anxiety disorder and there were no disagreements on the agoraphobia diagnoses.

Adult Attachment Interview. The AAI's of the respondents in this study were coded according to the manual (Main & Goldwyn, 1994) by I.A. Zeijlmans van Emmichoven. Ten of the AAI's (32%) were also coded by Dr. M.H. van IJzendoorn, who was trained in Charlottesville, U.S.A., in 1988 and in Leiden, the Netherlands, in 1991 and 1995. Percentage of agreement on these 10 cases was 70% (kappa = .52) both for the 3-category and the 4-category classification. Differences in the classification of 3 interviews were discussed to agreement. Another 10 AAI's were also coded by Dr. C. Schuengel. Percentage of agreement on these cases was 100% for the 3-category classification and 90% (kappa = .80) for the 4-category classification. The difference in the classification of one unresolved case was discussed to agreement.

Defense Mechanism Test. Method and procedure of the DMT in this study was exactly the same as in Study 1. To ensure inter-rater reliability, 9 protocols (29%) were
double-coded by Dr. M. Olff. There were no differences in coding of the variables relevant for this study.

**Questionnaire.** Like in Study 1, the STAI was administered. In this study, internal consistency (alpha) was .82 for trait anxiety and .93 for state anxiety.

**Results**

**Adult Attachment Interview**

Ten participants (32.3%) were classified as autonomous, 6 (19.4%) as dismissing and 15 (48.4%) as preoccupied. The distribution of the AAI classifications is shown in Table 1. There was no significant difference in the AAI distributions between the samples of both studies reported in this paper. The AAI distribution was compared to a standard probability distribution based on clinical samples (van IJzendoorn & Bakermans-Kranenburg, 1996) using Multinom (Kroonenberg, 1998). The three-way AAI distribution in this sample differed significantly from the AAI distribution usually found in clinical adult samples: there were significantly more autonomous participants ($\chi^2 (2) = 14.08, p < .01$). The four-way AAI distribution also differed significantly from the normscores: there were more autonomous participants ($\chi^2 (3) = 31.65, p < .01$). There were no differences between the AAI categories for age, sex, relationship status, or medication use. There was no significant relation between attachment status and being diagnosed as agoraphobic (see Table 3).

<table>
<thead>
<tr>
<th>Agoraphobics</th>
<th>Dismissing</th>
<th>Autonomous</th>
<th>Preoccupied</th>
<th>Unresolved</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 (4)</td>
<td>6 (5)</td>
<td>8 (5)</td>
<td>0 (5)</td>
<td></td>
</tr>
<tr>
<td>Non-agoraphobics</td>
<td>1 (1)</td>
<td>4 (4)</td>
<td>7 (3)</td>
<td>0 (4)</td>
</tr>
</tbody>
</table>

Table 3. Distribution of attachment classification by agoraphobia diagnosis in Study 2 (4-way AAI distribution in brackets).

Analyses of the DMT scores were run both with three-way and with four-way AAI classifications; there was no difference in the results. The results reported here are based on 3-way AAI classifications with unresolved participants classified according to their secondary attachment classification.

**STAI**

The mean score for state anxiety was 37.8 ($SD = 8.1$). This is lower than the normative scores for psychiatric outpatients (2nd decile). The mean score for trait anxiety was 49.5 ($SD = 10.4$). This is not significantly different from the normative scores for trait anxiety in clinical samples (males: 6th decile; females: 5th decile). The correlation between the STAI scores was significant ($r = .48, p < .01$, 2-tailed). There was no significant relation between the STAI scores and the AAI classifications, or with being diagnosed as agoraphobic or not.
Also, there were no significant relations between the STAI scores and any of the DMT scores. For these reasons the STAI was left out of further analyses.

**Defense Mechanism Test**

Mann-Whitney-Wilcoxon tests showed that the insecurely attached participants had significantly higher P1 scores on the separation stimulus ($p < .05$) than the autonomous participants. Multiple comparisons (Siegel & Castellan, 1988) revealed that the preoccupied participants had a higher P1 score than the autonomous group, meaning they were later than the autonomous group to recognize something meaningful in the separation picture. Furthermore, the insecurely attached group had a lower T-sum score on the separation stimulus than the autonomous group ($p < .05$). Multiple comparisons (Siegel & Castellan, 1988) revealed that the dismissing participants had a lower T-sum score than the autonomous group, which indicates they less often recognized the separation threat. Mean scores of the three AAI groups on the DMT are presented in Table 4.

Within the preoccupied group, T-sum score and the T-weighted score were significantly higher on the separation stimulus than on the original DMT-stimulus ($p < .01$). This means that these participants recognized the threat more often and more consistently in the separation stimulus than in the original DMT-stimulus. Autonomous individuals were earlier to recognize something meaningful in the separation stimulus than in the original DMT-stimulus ($p < .01$).

<table>
<thead>
<tr>
<th></th>
<th>Dismissing ($n = 6$)</th>
<th>Autonomous ($n = 10$)</th>
<th>Preoccupied ($n = 15$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separation stimulus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>7.0 (2.3)</td>
<td>5.1 (3.2)</td>
<td>6.8 (3.0)</td>
</tr>
<tr>
<td>H1</td>
<td>10.5 (2.1)</td>
<td>9.9 (4.6)</td>
<td>11.7 (2.6)</td>
</tr>
<tr>
<td>Pp1</td>
<td>10.7 (3.1)</td>
<td>10.0 (3.9)</td>
<td>11.5 (2.2)</td>
</tr>
<tr>
<td>T1</td>
<td>12.0 (10.1)</td>
<td>15.8 (3.3)</td>
<td>11.7 (6.8)</td>
</tr>
<tr>
<td>T-sum</td>
<td>2.5 (3.3)</td>
<td>4.8 (1.8)</td>
<td>3.7 (3.4)</td>
</tr>
<tr>
<td>T-weighted</td>
<td>10.3 (17.5)</td>
<td>22.3 (14.4)</td>
<td>20.1 (20.5)</td>
</tr>
<tr>
<td>Original DMT- stimulus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>9.0 (1.8)</td>
<td>8.8 (2.2)</td>
<td>9.2 (1.9)</td>
</tr>
<tr>
<td>H1</td>
<td>10.0 (2.8)</td>
<td>9.8 (2.6)</td>
<td>10.3 (2.4)</td>
</tr>
<tr>
<td>Pp1</td>
<td>12.3 (2.9)</td>
<td>12.1 (4.0)</td>
<td>12.4 (3.1)</td>
</tr>
<tr>
<td>T1</td>
<td>6.7 (10.3)</td>
<td>8.2 (8.9)</td>
<td>6.1 (9.0)</td>
</tr>
<tr>
<td>T-sum</td>
<td>0.7 (1.2)</td>
<td>2.2 (3.0)</td>
<td>0.8 (1.4)</td>
</tr>
<tr>
<td>T-weighted</td>
<td>1.5 (2.5)</td>
<td>9.4 (14.5)</td>
<td>2.5 (3.9)</td>
</tr>
</tbody>
</table>

Table 4. Mean scores (SD’s in brackets) on the separation stimulus and the original DMT-stimulus for dismissing, autonomous and preoccupied anxiety disorder patients

*Note. P1 = first phase; H1 = first Hero-recognition; Pp1 = first peripheral person-recognition; T1 = threshold phase; T-sum = summed threat-recognition score; T-weighted = weighted threat-recognition score.*

Agoraphobics had a lower T-sum score ($p < .05$) on the separation stimulus than the patients with other anxiety disorders. This means that the non-agoraphobic anxiety patients were more consistent in reporting the separation threat than the agoraphobics. Within the
agoraphobic group, there was a lower P1-score ($p < .01$) on the separation stimulus than on the original DMT-stimulus. Furthermore, the agoraphobics had higher T-sum scores ($p < .01$) and higher T-weighted scores ($p < .01$) on the separation stimulus than on the original DMT-stimulus.

Agoraphobic insecurely attached participants had significantly lower T-sum scores ($p < .01$) on the separation stimulus than agoraphobic autonomous participants and non-agoraphobic anxiety patients. This means that the combination of agoraphobia and insecure attachment made for less accurate threat recognition on the separation stimulus.

Discussion

Again, we found no significant differences between the two insecurely attached groups, but we did find differences between insecure and autonomous participants. Preoccupied respondents were later than autonomous ones to recognize something meaningful in the separation stimulus. The dismissing group reported the separation threat less often than the autonomous group, which is consistent with the deactivation hypothesis. Preoccupied participants were better at and more consistent in recognizing separation threat than general threat. The fact that this does not account for dismissing respondents again supports the hypothesis that they deny separation threat.

As expected, agoraphobics mentioned the separation threat less often than non-agoraphobic anxiety patients did. However, agoraphobics recognized the threat in the separation stimulus more often and more consistently than in the generally threatening stimulus. This points at an attentional bias in agoraphobics for separation threat compared to general threat.

We found no significant relation between the three-way attachment classification and being diagnosed as agoraphobic. We expected insecurely attached agoraphobics to show more defense on the separation stimulus than autonomous ones, and indeed insecure agoraphobics made less mention of the separation threat than autonomous agoraphobics and other anxiety disorder patients.

General Discussion

In the studies reported in this paper, we investigated perceptual defense as a function of attachment security in nonclinical adults and in anxiety disorder patients. Mental representations of attachment are assumed to differ in their regulating function in case of relevant danger. On a behavioral level, dismissing and preoccupied attachment are associated with opposed strategies: minimization versus maximization of the expression of attachment distress (Main, 1990). The Defense Mechanism Test has been proved to be a good predictor of performance in stressful situations (Olff, 1991). We expected to find differences in threat perception reports on the Defense Mechanism Test between securely and insecurely attached individuals, and possibly also between dismissing and preoccupied participants.

The DMT paradigm requires respondents to describe initially ambiguous stimuli. Without psychophysiological control measures, it is not possible to determine whether the performance on this task results from differences in perception per se or from differences in
behavioral strategy. The respondent is free to interpret the threatening scene in the DMT picture and may misattribute the stimulus situation to regulate the anxiety that is likely to ensue. This misattribution follows the guidelines of the person's cognitive schema (see Bretherton & Munholland, 1999). In this line of reasoning, we expected dismissing attachment to be characterized by a deactivating strategy and preoccupied attachment by a hyperactivating strategy, leading to relatively late versus relatively early threat recognition as compared to the autonomous participants.

Contrary to our hypotheses, we found no differences in threat detection between dismissing and preoccupied participants. The anxiety-disordered dismissing group, however, less often recognized the threat in the separation picture than the anxiety-disordered autonomous participants, which contributes to the idea of dismissing individuals employing a deactivating strategy when their attachment schema is triggered: they minimize their expression of negative emotions when confronted with separation threat.

We had specific hypotheses about separation threat-detection, founded on the idea that in attachment theory separation is a basic theme. In both our nonclinical and our anxiety disorder sample, preoccupied participants showed more accurate recognition of separation threat compared to general threat. This is consistent with the idea that preoccupied individuals use a hyperactivating strategy when their attachment schema is triggered: they maximize their attention to negative emotions in case of attachment-related threat. Contrary to our hypothesis, nonclinical dismissing participants were also better at recognizing separation threat than general threat. However, anxiety-disordered dismissing participants did not recognize separation threat better than general threat.

The agoraphobic participants were better at recognizing separation threat than at recognizing general threat. Cognitive-psychological investigations of information processing in affective disorders have shown that anxiety patients are characterized by an attentional bias for threatening stimuli (Williams et al., 1997). Our findings contribute to the well-known clinical observation that separation themes are highly significant for agoraphobics.

Regardless of attachment classification, agoraphobic participants mentioned the separation threat less often than the non-agoraphobic anxiety patients did. We found no significant relation between three-way attachment classification and type of anxiety disorder, but overall the insecurely attached agoraphobics were less good at recognizing separation threat than the autonomous agoraphobics and the non-agoraphobic anxiety patients (regardless of their attachment classification). We found an unexpectedly high percentage (83%) of dismissing attachment in agoraphobics. Compared to de Ruiter and van IJzendoorn's (1992) finding that agoraphobics report significant childhood separation anxiety, this is surprising: one would expect more preoccupied attachment classifications in agoraphobics. Manassis et al. (1994) and Fonagy et al. (1996) report specifics about the attachment distribution in adult anxiety disorder samples. Most striking from their findings is the high number of unresolved and secondary preoccupied classifications in anxiety disorder patients. Alas, they do not report specific relations between attachment classification and type of anxiety disorder. Like in their samples, the secondary classification of our unresolved anxiety disorder patients was mainly preoccupied. However, the percentage unresolved classifications in our anxiety sample was low.

Overall, the attachment-classification distribution in our samples differed significantly from the distributions usually found. This may be a result of our way of sampling. Our
nonclinical participants volunteered to participate in a study advertised as concerning "the influence of childhood experiences on perception". The title of the study may especially appeal to preoccupied individuals. The anxiety disorder sample was also contracted on voluntary participation. Due to the burden of already having an anxiety disorder, it is imaginable that insecurely attached and unresolved individuals cannot handle the stress of participating in a research experiment next to undergoing treatment for their disorder.

Some other aspects of our experimental set-up must also be reconsidered. The anxiety-provoking nature of the DMT stimuli may produce a response bias rather than a perceptual bias because some respondents may be less willing to report perceiving threatening stimuli until they are very sure they actually exist. There is no certain way one can differentiate between initial priming and subsequent elaboration in the DMT paradigm. There is accumulating evidence that, in high trait-anxious individuals and in patients suffering from anxiety disorders, threat-related stimuli are registered by pre-attentional mechanisms, even though the stimuli do not necessarily reach conscious awareness (Eysenck, 1997; Mathews & MacLeod, 1994). From the DMT, no conclusions in this light can be drawn. Another problem in our set-up is that the state-anxiety measure was administered before the DMT was conducted, which makes it impossible to determine whether state-anxiety levels increased during the task and thus might explain some of the findings about the effect of trait anxiety levels (cf. Williams et al., 1997). It might be more informative to register physiological arousal levels during the whole DMT-procedure.

In the AAI, the differences between insecurely attached respondents are discovered by linguistically analyzing their coherence and consistency of discourse. In our study we found no evidence that the expected differences between dismissing and preoccupied individuals can also be revealed when analyzing their strategy for coping with threat in a perception task. In view of our results, we propose that in nonclinical individuals, attachment insecurity in general goes together with an attentional bias for separation threat. In anxiety disorder patients, preoccupied attachment is related to an attentional bias for separation threat compared to general threat, while dismissing attachment goes together with a deactivating strategy when confronted with separation threat. Future studies with larger samples will have to point out whether a dismissing state of mind with regard to attachment in patients with agoraphobia results in a deactivating strategy when they are confronted with attachment-related threat stimuli.

1In view of the ordinal measurement level, DMT-scores were analyzed with nonparametric tests. Nonparametric analysis of the DMT-scores is recommended also because of the skewed distributions (Olff, 1991). To avoid Type 1 errors, the Bonferroni correction was employed when relevant.