Cogito ergo timeo?

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COGITO ERGO TIMEO? COGNITIVE PROCESSES IN THE ORIGIN, MAINTENANCE, AND TREATMENT OF ANXIETY DISORDERS

Cogito ergo timeo? Cognitive processes in the origin, maintenance, and treatment of anxiety disorders

Rede uitgesproken bij de aanvaarding van het ambt van hoogleraar Klinische Psychologie aan de Faculteit der Sociale Wetenschappen van de Radboud Universiteit Nijmegen op vrijdag 24 februari 2006

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Mijnheer de rector magnificus,
zeer gewaardeerde toehoorders,

Ik heb deze dag zo lang mogelijk voor mij uit geschoven – maar nu is het er eindelijk toch van gekomen. Waarom heb ik er zo lang mee gewacht? Twijfelde ik over mijn beroep, als professor? Echt niet, ik hou van mijn beroep en ik vind het geweldig om in Nijmegen hoogleraar klinische psychologie te zijn. Gaat het dan om de toga? Nee, dat ook niet, daar ben ik inmiddels wel aan gewend. Of houd ik er misschien niet van om toespraken te houden? Nou, dat zeker niet, want eigenlijk hoor ik mezelf erg graag praten.

Ik ben bang dat dit uitstel te maken heeft met datgene wat men van mij verwacht vandaag. Het werd mij al snel duidelijk dat een oratie in Nederland erg belangrijk is. Ik kreeg de indruk dat ik vandaag een visie moest laten horen (of op zijn minst een boodschap moest overbrengen) – en dat is hetgene waar ik toch wel problemen mee heb.

Misschien gaat oud-bondskanselier Schmidt iets te ver als hij zegt "Iemand die visies (standpunten) heeft, moet naar de dokter gaan". Staat u mij toe om, aan de hand van een voorbeeld, mijn gevoelens ten opzichte van visies, duidelijk te maken. Toen ik in Nijmegen solliciteerde op deze vacature, heb ik mij, voordat ik mijn tweede sollicitatiegesprek had, op enkele punten goed voorbereid. De sollicitatiecommissie wilde, onder andere, graag iets horen over mijn visie met betrekking tot de toekomst van Klinische Psychologie. Op alle andere punten had ik mij goed en terdege voorbereid, maar de visies, daarmee had ik weer tot het laatst gewacht. Op de avond voorafgaande aan het bewuste sollicitatiegesprek heb ik een goede vriend opgebeld, die minder moeite heeft met 'visies', en ik heb hem gevraagd mij een paar van zijn 'visies' met betrekking tot Klinische Psychologie te 'lenen'. Maar ja, ik was even vergeten dat hij ook therapeut is, waardoor ik meer vragen dan antwoorden kreeg en in de daaropvolgende socratische dialoog wist hij mij mijn ideeën voor de toekomst te ontlokken. Alleen al de term 'idee' klinkt mij sympathieker in de oren; de term 'plan' vind ik nóg aantrekkelijker. Verwacht U dus vandaag alstublieft van mij geen visies, en verwacht u ook niet te veel 'boodschappen'.

Eén van mijn boodschappen zou kunnen zijn dat ik visies binnen het onderzoek wantrouw; ze zijn niet nauwkeurig genoeg, verwachten te veel. Onderzoek fascineert mij vanuit geheel andere gronden: wat mij hierin aantrekt zijn de hele kleine stapjes, het puzzelen, de afwijzing, het opnieuw vinden van een onderdeeltje. Totdat er, heel langzaam, een beeld of eigenlijk alleen nog maar een stukje – een gedeelte – van een beeld ontstaat. Voor sommige mensen kan dit saai zijn, ik vind het geweldig, ook al komt 'het beeld' niet altijd in zijn geheel tot stand. Onderzoek betekent voor mij het vertellen van een verhaal; een verhaal dat zich heel langzaam ontwikkelt; een verhaal waarvan de geheimen ook heel langzaam, soms zelfs met tegenzin, prijsgegeven worden. Hierbij hoort ook het gevoel om bij een groep puzzelaars te horen, want het plaatje

wordt pas compleet door het werk van velen. In mijn eentje zal het nooit lukken om de puzzel af te maken. Maar met elkaar, verspreid over de hele wereld, hebben we een kleine kans. Ik zou het geweldig vinden, als ik een stukje van mijn enthousiasme voor 'het onderzoek van de kleine stapjes' op u zou kunnen overbrengen.

Tot zover de inleiding in het Nederlands – ik ga nu verder in het Engels en ik eindig in het Duits. Nijmegen is nu mijn thuishaven; ik ben het begin van deze rede verschuldigd aan Nijmegen en Nederland. De taal die bij mijn wetenschap hoort is Engels, daarom is het wetenschappelijke gedeelte van mijn oratie in het Engels. En het feit dat ik vandaag hier sta, dank ik vooral aan mijn Duitse achterban, mijn dank hiervoor is dus later in meestal het Duits.

CLINICAL PSYCHOLOGY

I am now professor in Clinical Psychology. Clinical Psychology is an extremely huge – and for me fascinating – area of psychology. It deals with exceptional mental states, disorders, and diseases in order to describe, explain, and treat these phenomena systematically. And this is no minor task because mental diseases are very common. Recent data shows that every third to every second person will be afflicted by a psychological disorder once in her or his life. The burden of mental illnesses on health and productivity throughout the world has long been profoundly underestimated. Data developed by the massive *Global Burden of Disease* study, conducted by the *World Health*

Organization, reveal that mental illness, including suicide, ranks **second** among the burden of diseases in established market economies, such as the United States or Europe. Furthermore, psychological disorders lead to what is called disability adjusted life years (DALYs). DALYs for a disease are the sum of the years of life lost due to premature death or years lost due to disability. One DALY represents the loss of one year of equivalent full health. As you can see, seven of the ten most important reasons for DALYs are due to mental disorders.

Nearly two-thirds of all people who are diagnosable with a mental disorder do not seek treatment. And of those who do seek treatment, only a very small minority gets an evidence-based psychological treatment, although that would be the best option for most disorders.

Clinical Psychology tries to identify and classify disorders, to describe their frequency, their begin, their time course, and their prognosis, to identify predictors and protecting factors. We try to explain their causes and their maintenance. And finally, we try to develop and test treatments and prevention measures. I hope I could give you an idea of Clinical psychology with that very short description, about the many and manifold things Clinical Psychology hast to do. I could talk about that for many hours, but today I have 45 minutes, and thus I will concentrate on my own passion within Clinical Psychology.

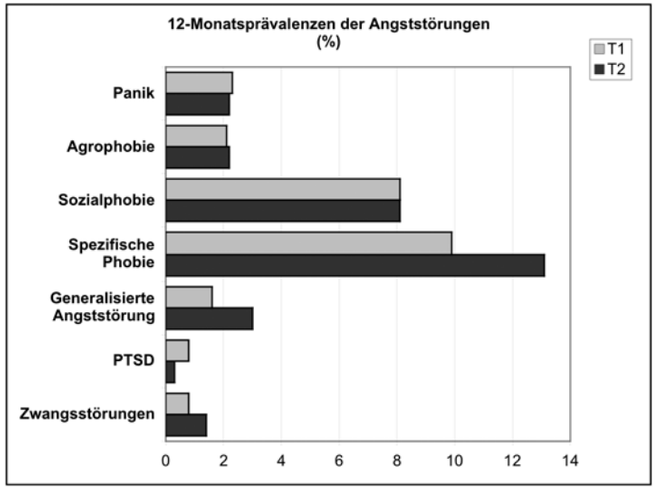
ANXIETY DISORDERS

I have always been most interested in anxiety disorders. These disorders are the most frequent mental disorders. The reason for this is probably that anyone feels anxious once in a while, thus fear and anxiety are very frequent emotions. Fear is a normal human emotional reaction – it is a built-in survival mechanism with which we are all equipped. Even as babies, we possess the survival instincts necessary to respond when we sense danger. The brain then triggers a response that causes the heart rate to increase, blood to be pumped to large muscle groups to prepare for physical action, blood pressure to increase, skin to sweat to keep the body cool, and so forth. Normal anxiety prepares us for coping with threat, but biologically, coping means fight or flight. That is what we are prepared for. But in many modern situations, running away or fighting is not useful. If you are afraid of giving a talk, it will not help. Nevertheless, your body reacts automatically. For some people, that reaction in itself is a problem. Others react with fear to non-threatening things, like spiders. If the anxiety is too extreme, if it interrupts life and becomes impairing and dysfunctional, we are talking of an anxiety disorder.

Anxiety disorders are a group of conditions that share extreme or pathological anxiety. Thus the mood or emotional tone is at its centre. The conditions can range from feelings of uneasiness to immobilizing bouts of terror. The anxiety disorders

include panic disorder, agoraphobia, generalized anxiety disorder, specific phobia, social phobia, obsessive-compulsive disorder, acute stress disorder, and post-traumatic stress disorder. These disorders start early, they tend to be chronic, they are often relapsing, and they involve recurrent episodes of illness and periods of disability.

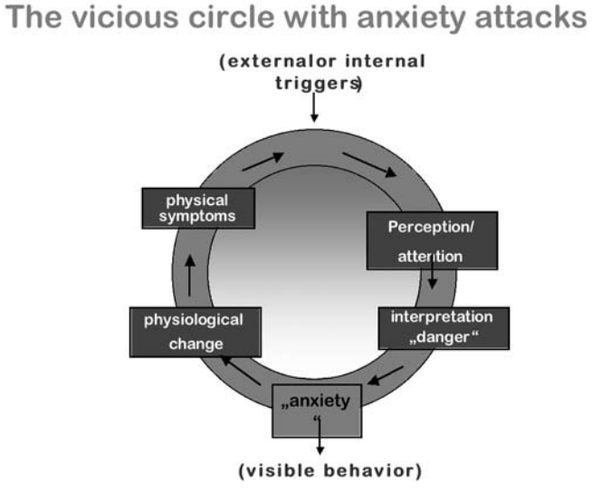
More women suffer from anxiety disorders than men. In a longitudinal epidemiological study I have conducted with my colleagues (Becker, Türke, Neumer, Soeder, Krause, & Margraf, 2000), about 20 % of women aged 19 to 25 suffered from an anxiety disorder. Especially common are specific phobias (e.g., being afraid of animals, heights, or blood), and Social Phobia, that is, being afraid in social situations.



THE ROLE OF COGNITIVE PROCESSES IN ANXIETY DISORDERS

What has interested me most, is: what is the function of fear, and how is it distorted in cases of too much fear, as in anxiety disorders? Current theories of anxiety disorders suggest that the development and maintenance of anxiety disorders is strongly affected by biased cognitive processes. Let me give you an example of a 'biased cognitive process': anxiety patients show attentional biases. If someone who is afraid of spiders enters a room, he or she will scan the walls for spiders or signs of spiders. When he sees a dark

spot, his attention will hold fast to that spot (the attention is quickly and involuntarily captured by threat), and he will find it difficult to look at something else (it is hard to disengage attention from threat). Another example is the common model of how panic attacks develop. Panic attacks are sudden and intense feelings of threat, that accompany all anxiety disorders. Here is a report of a patient: "It came upon me by surprise. I began to feel wave after wave of fear and my stomach gave out on me. I could hear my heart pounding so loudly, I thought it would come out of my chest. Pains were shooting down my legs. I became so afraid, I couldn't catch my breath. What was happening to me? Was I having a heart attack? Was I dying?".



What has happened to this person? Usually there is some trigger, internal or external, that produces a somatic change, for instance a heart skip. To produce a panic attack, this change first has to be recognized by the patient, he or she has to pay attention to that change. And panic patients are especially good at attending to their bodily symptoms, they show an attentional bias. Second, these changes are interpreted as dangerous, as signs of immediate threat, like in the above example as a sign of impending death. This triggers a fight-or-flight response with all its physiological changes. These are again

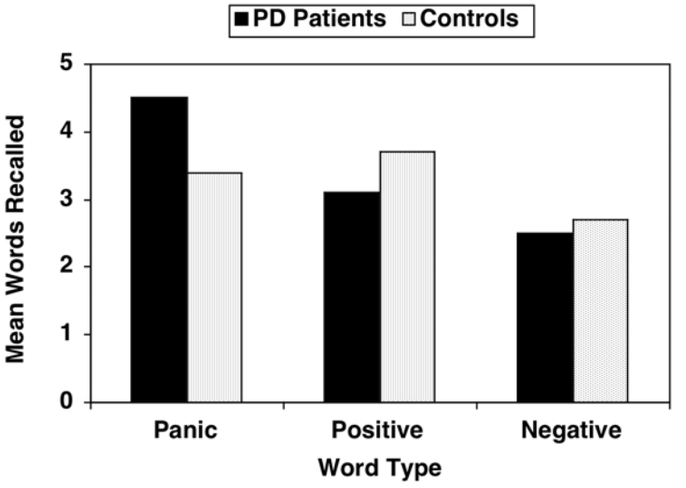
perceived and interpreted as a confirmation that things are really amiss: a vicious circle is started that is difficult to stop. Thus, cognitive processes, namely what is perceived, what we attend to, and how we interpret it, are of great importance in the maintenance of an anxiety disorder.

Patients who suffer from these intense and sudden panic attacks, that is, panic disorder patients, were the participants of my first research. At that time I was working as a student assistant with Jürgen Margraf. He had a treatment study with those patients. He offered me to write my master's thesis about part of his study – there was so much data, and interesting data on therapy. But somehow this was not what I wanted. First of all, I wanted to come up with my own idea, and even more with my own data. I convinced Jürgen that I might add something to his study, and started reading. Quite early on, a book by Williams, Watts, MacLeod, and Mathews (1988) caught my attention. I had found my topic! However, at that moment I had no idea that I had found my topic for many years to come (at that point of time, my plan was to become a therapist).

MEMORY BIAS IN ANXIETY DISORDERS

The book by Williams et al. (1988) stated that cognitive processes are biased in different ways in anxiety and depression. The authors assumed that anxiety is characterized by an attentional bias, whereas depression by a memory bias. This assumption was justified on the grounds that anxiety patients have to attend to threatening stimuli in order to avoid feared situations and objects. Furthermore, they were considered not to elaborate on these stimuli because this would be too unpleasant. This in turn would lead to impaired memory for these stimuli, that is, to a disorder-incongruent memory bias. In addition, anxiety patients might deliberately avoid searching their memory for threatening stimuli.

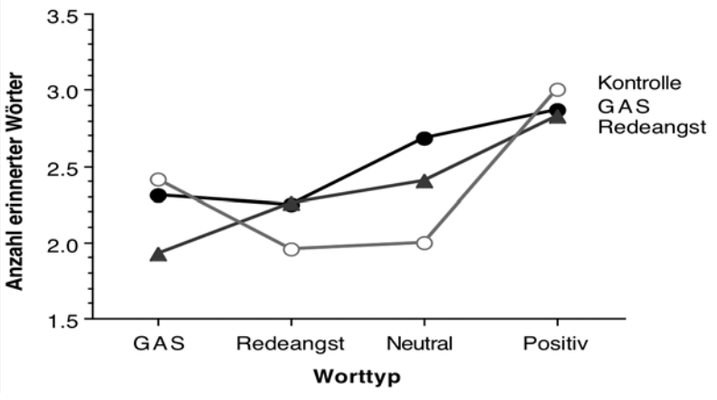
I was reading that with fascination. It made sense, but I had my doubts. By then, I had met several patients with panic disorder (PD). They seemed to think about their panic all the time, and that is elaboration, not avoidance. Thus I planned my first experiment. I wanted to answer the question whether PD-patients not only pay more attention to stimuli relevant to their disorder, but whether they also remember them better later. To achieve this, I had the participants (PD-patients and non-anxious controls) learn words incidentally by generating imaginary scenes that combined the words with themselves. The list of words contained negatively and positively toned words (e.g., murder and vacation) as well as words relevant to Panic Disorder (e.g., fainting). Following a distractor task, participants were given a free recall test. This means they were asked to remember the words they had imagined earlier. Free recall has been extensively and successfully used in research on mood and memory. I found that the panic patients showed better memory for panic-related words than the non-anxious controls. Thus, panic patients showed a memory bias for threatening stimuli.



Mean number of words recalled by panic patients and controls

What a success, in my first research approach I had been able to disprove a new theory, and it was even published later on (Becker, Margraf, & Rinck, 1994).

Nevertheless, I still wanted to become a therapist, but not right away. I had always loved to travel, and before I got myself my first job, I wanted to see more of the world. The easiest (and cheapest) way seemed a scholarship for research. I convinced my boyfriend and collaborator, and now husband, Mike to come with me, and we ended up in Stanford. I was working with W.T. Roth, and I do not think I could have been in a better place. Tom had a great lab and gave a lot of support, and Gordon Bower gave additional assistance with planning new experiments. I was doing almost exclusively research, and only my own, and only what I was interested in! I was in heaven. Not surprisingly, I followed up on my ideas about anxiety and memory, and I conducted a second experiment. This time with patients suffering from Generalized Anxiety Disorders (GAD), a second group with Social Phobia, and a third group of non-anxious controls. In this study, however, I found no memory bias whatsoever (Becker, Roth, Andrich & Margraf, 1999). Neither GAD-patients nor social phobics remembered words relevant to their fears better than control participants.



Mean number of words recalled by group and word type

I think this was the moment I was hooked to research. How could I explain that I had found a memory bias in Panic Disorder, but not in the other two anxiety disorders, given that the experiment was methodologically sound? Thorstein Bunde Veblen (1857-1929) has stated that a good researcher has more questions at the end of his research endeavor than at the start. ('Ernst zu nehmende Forschung erkennt man daran, dass plötzlich zwei Probleme existieren, wo es vorher nur eines gegeben hat.') Well, I still was a bit naive and I wanted answers. Thus, being back in Germany, I replicated the results with panic patients. I could show again that these anxiety patients had a memory bias for panic-related words. In a further study, I compared depression and social phobia, and replicated my results again: no memory bias in patients with social phobia (Rinck & Becker, 2005). This is a typical research story: you begin with a straightforward, simple question, in this case: is it true that there is no memory bias in anxiety disorders? You get results, you do replications, and quite often the story gets more complicated. My next hypothesis was: maybe patients with phobias who ruminate less about their disorder show no memory bias. That might explain why patients with social phobia do not show better memory for words related to their fears. On the other hand, patients with panic disorder or with GAD ruminate about and elaborate their fears excessively, thus they should show better memory for that kind of material. But only panic patients do show a bias – patients with GAD, as I and other researchers had shown, did not. Thus, we are stuck with a strange pattern that seems to be reliable, but we cannot explain it at this moment. We will need new approaches to solve this puzzle.

Right now I am starting a collaboration with Anne Speckens and Indira Tendolkar at the Department of Psychiatry together with the FC Donders Centre for Cognitive Neuroimaging here in Nijmegen. We are going to have a close look at memory (this time in depression). We hope that with new measurements, in this case with fMRI, we will be able to learn more about the underlying processes, providing us with new answers (or I expect with new questions, that I will happily pursue for many years to come).

ATTENTIONAL BIAS IN PHOBIAS

But let me get back to anxiety and attention: an important function of anxiety is the detection of threat, enabling the individual to react quickly. Thus, several theories predict, that threat stimuli such as spiders or snakes should be detected particularly quickly. Moreover, the enhanced detection of threat cues should be even more obvious in anxiety patients than in healthy individuals. Indeed, many phobics claim to be particularly good at detecting the feared stimuli in their environment. Interestingly, there is almost no research to corroborate that subjective experience of the patients, although there is no lack of attempts.

- *Are Spider fearful persons 'better' at detecting spiders?*

We applied the signal detection theory (SDT) to this question (Becker & Rinck, 2004). According to SDT, the task of detecting a stimulus always involves two independent processes. First, performance depends on the participant's ability to discriminate the target stimulus from the absence of it or from other stimuli. This ability is usually termed *sensitivity*, and it is of main interest in research on attentional biases in anxiety. Second, participants' performance also depends on what is called their *response criterion*, that is, their general tendency to respond with "Yes" or "No" when asked whether a hardly discernible stimulus was presented. We decided to study the detection of threatening stimuli in specific phobia, namely in fear of spiders. In animal phobias, the presence of enhanced detection abilities seems most likely, due to the existence of frequent and clearly defined threat objects. In the experiment, participants were asked to detect the presence of spiders in pictures presented very briefly. As control conditions, participants were also asked to detect stimuli of similar content, but different emotional valence, namely positively valenced pictures of butterflies and emotionally neutral pictures of beetles. For each type of picture, we compared the spider fearfuls' sensitivity and response criterion to those of the control participants.

We found that spider fearfuls' ability to detect threatening stimuli, that is, pictures of spiders, was not any higher than the ability of non-fearing control participants.

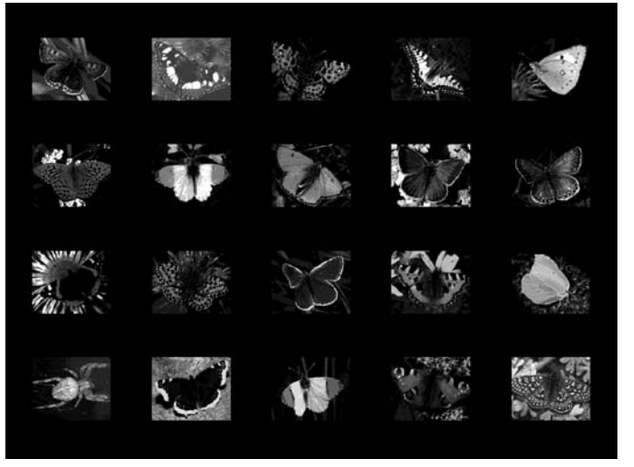
Thus, no increase in sensitivity and no selective attentional bias for threat could be shown. In contrast, the spider fearful participants showed a bias in their response criterion: they tended to say "Yes" more often when they were asked whether a spider had been presented. Interestingly, the spider fearfuls' bias also extended to similar animals, namely beetles. Accordingly, ratings of the stimulus materials showed that spider fearfuls rated beetles as more negative than the non-fearful controls did. Thus, the spider fearfuls showed a generalized bias, tending to believe that they had seen highly negative spiders and slightly negative beetles. Instead of being particularly apt at detecting the feared animals, they might tend to mistake rather innocent stimuli for threatening ones. For instance, the spider that a spider phobic patient 'detects' so quickly might actually be a stain on the wall or a piece of dirt on the floor. Moreover, if the phobic patient quickly flees from the threatening situation, he or she might not even notice the error. Thus, he creates a world that to him or her is more 'dangerous'.

- *Only distraction or also enhancement by threat?*

These results agree with the model of Mathews and Mackintosh (1998), which states that anxiety patients only show an attentional bias for threat if the threatening stimulus competes for attention with other stimuli. They argue that "When only one stimulus or attribute is presented, regardless of whether it is neutral or emotional, it will always accrue sufficient activation to attract attention. Therefore, anxiety-related differences can only occur when there is more than one competing representation".

This statement may explain *when* an attentional bias in anxiety disorders is likely to occur. It does not explain, however, *how* this bias will manifest itself. In principle, there are at least two different ways: anxiety patients may show the enhanced detection of threat stimuli I referred to earlier. Moreover, they should show increased distraction by these threat stimuli when they try to concentrate on other stimuli. For several years, we had employed a research paradigm that allows both types of biases, enhancement and distraction, to occur. In this 'visual search task', participants have to find a single target stimulus (e.g., a spider picture) hidden among many other distractor stimuli (e.g., butterfly pictures). Let me give you an example: first, participants are shown the spider picture to look for. Then a matrix of pictures is shown in which the spider must be found.

In one of our experiments, again with spider fearfuls and non-anxious controls, a single target picture of a spider, beetle, or butterfly was displayed. It disappeared automatically after 2 sec, to be replaced by a matrix of 20 pictures. Participants were instructed to find the target picture in the matrix, and to press a key on a computer keyboard as soon as they found it. We recorded these reaction times, and we found that spider phobics were not faster to find the spider in this example. Thus, there was no evidence of anxiety-related enhanced detection of threat. In contrast, they were



slower to find a single butterfly among a group of spiders. Thus, there was specific distraction by threatening stimuli, but not faster detection of them.

Curiously, as soon as we changed the instructions and the experiment a little, all of a sudden the results changed. In a second experiment, no target picture was shown before presentation of the matrix. Instead, participants were instructed to indicate whether

the matrix was made up of 20 animal pictures of the same kind (e.g., 20 spiders) or whether it included one animal that was different from the rest (the 'odd one out' animal). If there was an odd-one-out animal (the target picture), they were to press as quickly as possible the "yes" key on the computer keyboard. If they could not find an odd-one-out picture, they were asked to press the "no" key. In this task, both enhanced detection and increased distraction by threat occurred. Spider-fearful participants found a spider among other animals more quickly than the controls, and they were slower to find another animal among spiders. Thus, it seems safe to conclude that in addition to increased distraction by threat, speeded threat detection does indeed occur during visual search, and that its occurrence depends on how information is processed during the visual search task.

We followed up on this finding with one further version of the experiment. Although both the odd-one-out search task and the target search task involve a single target object among many distractor objects, the tasks differ with regard to an important aspect: the amount of visual detail *available* before visual search and *necessary* during it. For each trial of the target search task, the participants know exactly which target picture they have to search for and what the picture looks like. In contrast, in the odd-one-out search task no previous knowledge about the visual details of the target object is available because the target is not shown in advance. Therefore, we modified the target search task of the first experiment by not presenting the to-be-found target picture. Instead, only the target category was named: on each trial, participants were instructed to search for a butterfly, beetle, dragonfly, or spider, respectively. Therefore, this *category search task* does not provide any visual detail of the target picture before presentation of the matrix, it just gives the category, that is, what kind of animal to look for. As before, participants did not know whether a target picture would be contained in the matrix of pictures. The category search task in this experiment yielded results that were perfectly comparable to those of the odd-one-out search task in the first experiment. In particular, reaction times indicated that both disorder-specific speeding of threat detection and disorder-specific distraction by threat occurred. The distraction effect was also observed as in the other two experiments, suggesting that slowed disengagement from threat occurs independently of the specific features of the visual search task.

These experiments tell us a lot about the processes of attention, and what might be changed in anxious people. The finding of speeded threat detection in spider fearfuls suggests that clinically anxious people do indeed show attentional biases in both the shift and the disengage component of visual attention, as suspected by Fox et al. (2001). They shift their attention towards threat, and they are slower to disengage their attention from threat. Disorder-specific speeding of threat detection does exist, although its occurrence depends on specific features of the experimental task. In comparison, disorder-specific distraction by threat seems to be a more wide-spread and reliable phenomenon, which was observed with many different paradigms.

The experiments revealed critical features of the search task which favor the occurrence of speeded threat detection. One such feature may be the unpredictability of the specific target item. It seems that only 'unpredictable' threat stimuli (in the sense that it is not known in advance which individual target stimulus will be presented) are detected more quickly by spider phobics. If, on the other hand, they are instructed to search for a particular, known threat stimulus, they are not any faster than non-anxious controls. Another critical feature seems to be the level of visual detail that is available for the visual search task and that is needed for a successful search. Speeded threat detection in spider fearfuls only occurred when visual detail was neither available nor necessary. This finding suggests that the detection effect is more likely in, or even limited to, situations in which participants may employ a more superficial, holistic visual search for the 'Gestalt' of the target, rather than an analytic and focused search, in which details of different pictures have to be compared to each other.

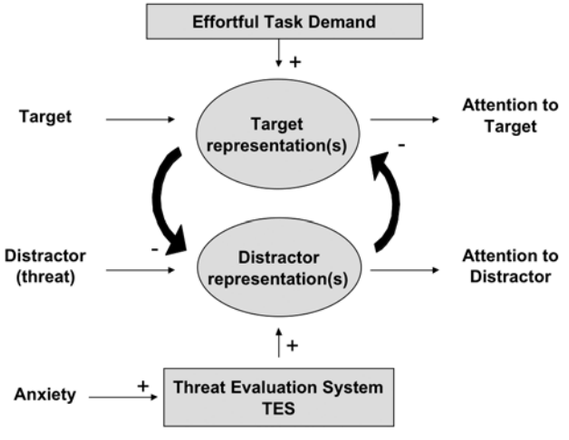
Finally, the present results also speak to the role of reflexive versus voluntary processes in the allocation of attention. Regarding disorder-specific distraction by threat, it seems quite unlikely that the spider fearfuls voluntarily chose to look at spider distractors longer than necessary. After all, this would be unpleasant and against instructions. Indeed, the distinction between reflexive versus voluntary attention has also been corroborated by neurophysiological data: recent evidence suggests that different brain areas are involved in goal-directed search for stimuli versus reflexive detection of salient or unexpected stimuli (Corbetta & Shulman, 2003). Regarding the speeded threat detection observed here, voluntary allocation of attention seems an unlikely explanation as well. This explanation would imply that SFs decided to spend less time looking at the neutral or pleasant distractors *before* they could know that the matrix contained a spider target. Therefore, one has to consider how reflexive attentional processes may be biased towards threat, and particularly so in anxiety disorders. In fact, in one way or another most cognitive theories of anxiety postulate that threat stimuli receive a processing advantage, for instance by being primed such that they are processed more efficiently by the perceptual system (e.g., by the 'threat evaluation system' postulated by Mathews & Mackintosh, 1998).

What may be the function of an attentional bias that is directing reflexive attention towards threat, thereby creating increased distraction by threat, and sometimes also speeded detection of threat? In fact, it may be just the bias that humans and other animals need to survive in a dangerous world. If you suspect a lion nearby, you better find him quickly and concentrate on him. In anxiety patients, this adaptive bias is heightened to a sub-optimal level, however. As a result, they tend to interpret innocent stimuli as threatening, their reflexive attention is captured by threat stimuli, they are

overly distracted by them, and they find it hard to disengage attention from them. In addition, their physiological reactions to threat stimuli may be overly strong (Öhman & Mineka, 2001). In short, they mostly suffer from the disadvantages of an amplified attentional bias, without gaining much of an advantage.

• *Automatic and controlled attentional processes*

Let me go into a bit more detail here, looking at the different stages of attention. In order to understand the processes involved in attentional biases, it is necessary to differentiate fast, more automatic processes from slower, cognitively controlled processes. The distinction is important both theoretically and empirically. For instance, Mathews and Mackintosh (1998) postulated – in accordance with neurobiological models of anxiety such as the one proposed by LeDoux (1996) or Öhman (1993) – the existence of a 'Threat Evaluation System (TES)' which evaluates the emotional significance of stimuli even before they are processed consciously. The stronger a persons' anxiety is (either currently or permanently in the case of anxiety patients), the more



likely it is that the TES becomes activated and increases its output. These automatic processes are complemented and partially controlled, however, by higher cognitive control processes (e.g., coping behavior) and by situational demands (e.g., the importance and emotional significance of competing stimuli). The balance of these automatic versus strategic processes will then determine the emotional reaction to threat stimuli and the observable behavior, with one restriction: the very first phase of the response will be governed mainly by automatic processes, because they are faster than strategic processes.

Anxiety patients generally show a reflexive attentional bias towards threat, whereas their strategic control processes vary in speed and direction: they may keep their focus of attention on the threat stimuli, they may disengage attention from them sooner or later, or they may even choose to avoid them. Despite the theoretical importance of this 'vigilant-avoidant' pattern of attentional bias, surprisingly few studies have directly addressed its time course.

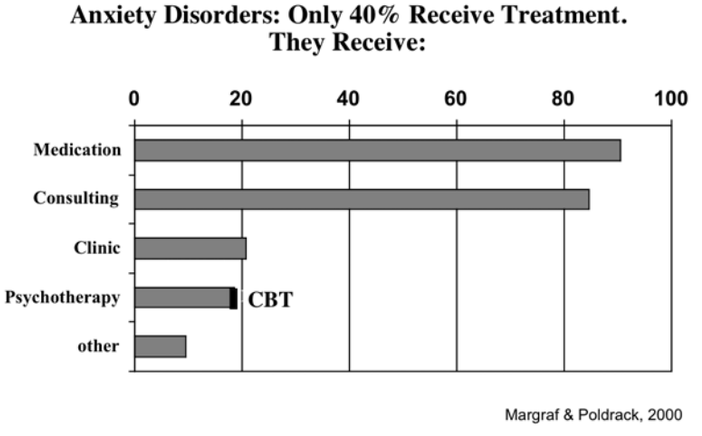
To learn more about the time course of attention, it is helpful to record the participants' eye movements while they study stimuli. Therefore, in the next study we continuously recorded eye movements while spider fearful participants and non-anxious controls had one minute to study four pictures presented simultaneously (a spider, a butterfly, a dog, and a cat). Compared to non-anxious controls, the spider fearfuls spent *more* time looking at a spider picture during the first 500 ms of the presentation. This attentional bias towards the spider was quickly followed by avoidance of it: during the next second, gaze durations on spiders did not differ between SFs and NACs, and for the rest of the 1 minute presentation time, the SFs spent *less* time looking at the spider than NACs. Thus, we observed a reversal of the attentional bias, with vigilance for threat followed by avoidance of it. The present results fully support the vigilance-avoidance sequence postulated by several cognitive and biological theories of anxiety (e.g., LeDoux, 1996; Öhman, 1993;): the spider fearfuls showed a quick attentional bias towards threat, and most likely, this bias was reflexive and automatic. Moreover, within one second, the bias was followed by the opposite behavior, and the fearfuls exhibited visual avoidance of threat. Given the late onset of this avoidance behavior, one has to assume that it was under voluntary control. Both phenomena will contribute to the maintenance of anxiety: the attentional bias increases the likelihood of perceiving threat, which will then increase anxiety and distract from other stimuli and tasks. The following avoidance behavior will reduce anxiety, but the reduction is short-lived, and avoidance prevents sufficiently long exposure to threatening stimuli. In a real life situation, spider phobics may not stop looking at a real living spider, but I am quite sure that they would show a flight response and leave the room. This is the vicious circle of fear and avoidance that successful psychotherapy intends to break.

SOME CONCLUSIONS CONCERNING ATTENTIONAL BIASES AND ANXIETY DISORDERS

As you can see there is not **one single** attentional bias. If we study attention, we have to differentiate between various stages of processing, various mechanisms, and various boundary conditions. We could show in several experiments that patients with an anxiety disorder are faster to detect a threatening stimulus than individuals without an anxiety disorder. But this seems to be only true if several stimuli compete for attention. In normal life outside the laboratory, there are almost always stimuli competing for attention. Thus, reports of patients that they are seeing their feared object faster than others might be true. However, our experiment showed that more than attention is biased. Patients also interpret ambiguous stimuli more readily as threatening. This way, they are creating a world full of 'dangers'. We could further show that detecting a stimulus more quickly depends on how much we know about it in advance. The patients in our experiments only showed enhanced detection of threat if more automatic processes got a chance. Furthermore, a robust finding in anxiety patients seems to be that they find it difficult to turn their attention away from distracting threatening stimuli, even if they try to avoid paying attention to feared objects. I think that this series of experiments gives an overview of my approach to research, as far as cognitive biases are concerned. I could have shown you many more examples, since I have given you but a glimpse of my own work, and even less than a glimpse of all the work that has been done in this field. But everywhere, other colleagues have similar questions and problems. I hope that I was able to give you an idea of the enormous puzzle we are dealing with. And I hope I could also convey to you the joy I feel when I have found another piece of the puzzle, and when I have linked it with the pieces found by others.

COGITO ERGO TIMEO?

When I talk about my research – especially in front of clinical psychologists – I am usually asked "What is that research good for?". Thus, I am asked for its applications. From the beginning of my work, I had an answer prepared: if we know how patients think, how their cognitive processes affect and maintain their anxiety, we might be able to improve their treatment. I usually made a nice story out of it. But actually this is a vision, and I am not certain if my research will ever really improve treatment. In fact, we have excellent treatments for anxiety already. Eighty percent of patients with specific phobia can be healed and the problems will not come back, 75 % of the patients with panic disorder. Thus, there is room for improvement, but all in all we are doing very well already. I would have no problems telling you again how my research might improve cognitive and behavior therapy. But actually this is not what my research is about at this moment. Right now, we are still wondering: which cognitive processes are reliably changed in anxiety disorders? What are 'normal' changes, and what are pathological changes? What is the function of fear, and how is it changed in anxiety disorders? I still see years of work ahead of me. And during these years, we will have little relation to treatment. The research that we are conducting right now helps us understand the human way of processing information and its influences on anxiety. How does the way we think influence our mood, how does our mood affect the way we think, and even more difficult, how do mood and cognitions interact in emotional disorders? This is no small matter, and it is fundamental research. Fortunately, recent findings reveal that it is also relevant research: it has been shown that cognitive biases are not mere correlates or consequences of anxiety disorders. Instead, they do indeed play a causal role in the development and maintenance of anxiety disorders. To follow up on this research, I plan to study anxiety in children, and to study the children for a longer time, looking at the development of fears and cognitive biases. Moreover, my colleagues and I have begun to investigate questions such as: do cognitive biases change due to successful treatment? Can we probably predict treatment success? Can the biases be trained – and if trained, do they make people more or less anxious? All these are very interesting questions that will take some years to answer – and to generate more questions on the way.



At the end of this long way, my research might indeed improve treatment. However, I am also a psychotherapist, I have treated patients, and I have written books about treatment. Therefore, I know that cognitive processes are but one more small puzzle piece among many causal agents. Disorders do not develop due to a single cause, they develop due to many factors and their interplay. And as a Clinical psychologist, I expect that cognitive processes will not be our most powerful tool for the improvement of interventions. At this very moment, the secret of how to improve the treatment that patients actually receive lies someplace else. This place can be found in the following figure.

This figure shows several sad facts: first, only 40 % of the individuals who suffer from an anxiety disorder receive any treatment at all. Second, of those who do receive treatment, less than 20 % receive psychotherapy. And third, only a small percentage of this latter group receives the best treatment, namely Cognitive Behavior Therapy. In sum, it means that only about 1 % of the individuals with an anxiety disorder receive the best treatment we have. Thus, to improve the situation of patients, it will not be effective to raise the success rate of controlled, evidence-based treatments from, say 75 % to 85 %. Instead, we could be much more helpful by making the 75 % version available to more patients. And as you can see from the figure, it would be a tremendous improvement already if only half of the patients received adequate, evidence-based treatments. Therefore, as a clinical psychologist, as a professor of Clinical Psychology, and as a trainer of future therapists, one of my goals is to ensure that the best treatments will actually be applied in the practice. What I sometimes encounter as 'behavior therapy' or 'exposure therapy' curls my toes! These things will have to change, and it would be worth another 45 minutes of talking about ways to achieve this. But don't worry, today I will restrict myself to my favorite topic: my love for understanding the human way of thinking and its interaction with anxiety. This may be research consisting of very small steps, it may be slow, it may even be frustrating sometimes. But for me it is wonderful, it is an adventure of knowledge. I hope to share this adventure with my colleagues and my students. And I hope that today, I was able to also share it with you.

DANK

Eine oratie – bzw. Antrittsvorlesung – ist nicht vorbei, wenn noch kein Dank ausgesprochen wurde. Und so muss es auch sein, denn dass ich heute hier stehe, habe ich vielen Menschen zu verdanken, die mir im Lauf meines Lebens geholfen haben und mich geprägt haben. Das gilt sowohl für meinen wissenschaftlichen wie für meinen privaten Werdegang. Allerdings werde ich im folgenden nur wenige Namen nennen. Zum einen wären es zu viele Namen, und damit schrecklich langweilig für die Zuhörer. Zum zweiten habe ich große Angst jemanden zu vergessen, der oder die es doch verdient hätte, bedacht zu werden. Wer mich ein wenig kennt, weiß, dass ich Probleme mit Namen habe. Selbst nach Monaten spreche ich Mitarbeiter und Studenten falsch an, oder es treten peinliche Pausen auf, wenn mir wieder mal ein Name entfallen ist. Selbst meine Familie leidet zuweilen darunter, spreche ich doch häufiger meinen Hund mit dem Namen meines Sohnes an – und leider auch umgekehrt. Ich bitte an dieser Stelle um Verzeihung allen, die unter meiner Schwäche gelitten haben und leider auch zukünftig leiden werden. In dieser Beziehung bin ich tatsächlich der zerstreute Professor. Aber keine Sorge, ich kenne Euch, ich weiß durchaus, wer mein Hund und wer mein Sohn ist.

Op de eerste plaats wil ik de officiële instanties bedanken die mijn aanstelling als professor bij klinische psychologie in Nijmegen mogelijk gemaakt hebben: het College van Bestuur van de Radboud Universiteit en de decaan van sociale wetenschappen, evenals de sollicitatiecommissie.

Auf den allerersten wissenschaftlichen Geschmack bin ich durch Uli Glowalla und seine Arbeitsgruppe – vor allem aber durch meine Mitstudenten bei Uli – gekommen. Prof. Glowalla ist kognitiver Psychologe und meine ersten Untersuchungen galten der Sprache. Es hat großen Spaß gemacht, vor allem weil wir ein tolles Team waren. Oft haben wir bis spät in der Nacht gearbeitet, damit unsere Experimente dann wirklich liefen (viel Enthusiasmus, schlechte Planung). Ich habe sehr viel über das Experimentieren gelernt, und ich denke, meine Liebe für das Experiment hat eindeutig hier ihren Anfang genommen. Unterstützt wurden wir übrigens von Mike Rinck (der immer kontrollierte, dass wir nicht am Computer aßen und tranken, lästig!), und der auch spät abends noch für mich Zeit hatte....

Aber Sprache war nicht mein Thema. Ich wechselte zu Jürgen Margraf und zur Klinischen Psychologie. Ihm kann ich gar nicht genug danken. Nicht nur durfte ich schon als Studentin nach Herzenslust forschen und meinen Interessen folgen, nein, er vermittelte mich auch nach Stanford, gab mir meinen ersten (und zweiten) Job an der Uni, überzeugte mich, dass Wissenschaft das Richtige für mich ist, und hat mich auch hier nach Nijmegen empfohlen. Er hat meine wissenschaftliche Weltsicht geprägt, mich unterstützt und an mich geglaubt. Ich hätte mir keinen besseren Chef und Wegbereiter wünschen können. Ich bin stolz mit ihm zu arbeiten und froh um seine Freundschaft.

Auch Tom Roth in Stanford hat mich geprägt. Der Aufenthalt bei ihm war für mich die Zeit, in der ich am intensivsten forschen durfte, ohne allzu viel Ablenkung (wenn man mal von der grandiosen Schönheit Kaliforniens absieht). Tom hatte immer Zeit, wir haben viel diskutiert, und ich bekam ein ausgezeichnetes Vorbild, wie ein internationales, interdisziplinäres Team aussehen kann und sollte. Sein Lab ist Vorbild für mein Lab.

Dies waren für mich die Menschen, die mich beruflich am meisten beeinflusst oder mir am meisten geholfen haben. Aber natürlich gibt es noch ein große Anzahl von Kollegen, die mir in Diskussionen oder beim täglichen Arbeiten geholfen und mich unterstützt haben. Summarisch möchte ich den Dresdner Kollegen danken. Ich war sehr gern dort und habe viel von Euch gelernt. Dresden war für mich eine äußerst prägende und fruchtbare Zeit. Ich hatte die Gelegenheit, mit sehr vielen netten Leuten zusammenzuarbeiten. Nicht nur bekam ich viel Hilfe, ich denke auch gern an unsere häufigen Tee(viertel-)stunden und an private Freundschaften. Es ist mir nicht leicht gefallen, Dresden zu verlassen, gerade wegen der Menschen dort.

Auch den Studenten und Doktoranden, die mit mir in Dresden und nun in Nijmegen gearbeitet haben, gilt meine Dank: ohne Euch stände ich nicht hier. Ich liebe meine 'Research labs', die Arbeit mit der Gruppe, Diskussionen, das Nachdenken über Experimente. Immer habe ich auch von Studenten sehr viel gelernt, viele ihrer guten Ideen sind wieder in der Forschung umgesetzt worden.

Ich bin auch Therapeutin. Heute habe ich sehr wenig über Therapie gesprochen, dabei finde ich sie immens wichtig. Ich habe immer gerne als Therapeutin gearbeitet und bilde mit großer Freude Therapeuten aus. Der Kontakt mit Patienten ist überaus wichtig für einen Professor der Klinischen Psychologie, denn es geht ja in diesem Fach um die psychischen Probleme. Ich schreibe Bücher über Behandlungen und leite gemeinsam mit Jürgen Hoyer ein Therapie-Forschungsprojekt. Diese Seite ergänzt meine eher grundlegende experimentelle Forschung und gehört zu meiner Person als Klinischer Psychologe. Hier möchte ich nun meinen Ausbildern danken, der Christoph-Dornier-Stiftung der Institutsambulanz in Dresden – und natürlich und vor allem auch den Patienten.

Ik wil ook mijn dank uitspreken aan mijn collega's van de Radboud Universiteit, die mij hier zo vriendelijk ontvangen hebben. Vooral bedank ik mijn sectie. Zij hebben voor mij, hier in Nijmegen, een heel goede start mogelijk gemaakt. Ik heb van hen alle mogelijke steun ontvangen en ik heb mij heel snel thuis gevoeld. Ik werk erg graag met jullie samen en ook de 'theekwartiertjes', die ik zo miste vanuit Dresden, zijn hier nu gestart. Ik verheug me op de verdere samenwerking met jullie.

Heute sind auch viele Freunde hier, oft in einer Doppelfunktion als Kollegen und Freunde. Nun möchte ich Euch aber als Freunden danken. "Freundschaft ist das schönste Geschenk, das die Götter den Menschen verliehen" sagte Cicero – ich denke er hat recht – und mehr brauche ich dazu nicht zu sagen!

Dass ich hier überhaupt stehe habe ich natürlich in erster Linie meinen Eltern zu verdanken. Nicht nur weil sie mich gezeugt haben, nein vor allem auch weil sie mich ermutigt haben, mich unterstützt und mich geliebt. Büchern wird in meiner Familie – im wahrsten Sinne des Wortes – viel Platz eingeräumt (bei meinem Bruder haben sie mittlerweile die Böden des Appartements erobert – und wir mussten gerade die Regale bis zur Decke hochziehen). Die Liebe zum Buch, zum Wissen hat mich mein ganzes Leben begleitet und wurde mir vor allem von meiner Mutter mitgegeben. Mama, Du bist die Beste! Ich wünschte, meine Vater könnte heute hier sein, er wäre so stolz gewesen. Den Ruf nach Nijmegen habe ich einen Tag nach seinem Tod erhalten, ich bedauere immer noch, dass es nicht ein weniges früher war. Papa hätte sich so gefreut! Dann ist da die nächste Generation, übrigens auch schon Leseratten. Sophie und Felix, ihr seid mein Sonnenschein, meine Ablenkung, Herausforderung, Anregung und Entspannung. Vielen Dank, dass ihr mich arbeiten lasst, aber auch dass ihr meine Arbeiten häufiger mal verhindert, ich bin so froh dass es Euch gibt.

Und last but not least! Komme ich zu Mike. Vielleicht ist Euch aufgefallen, dass ich erst berufliche und dann private Verbindungen genannt habe. Bei Mike ist diese Unterscheidung nicht möglich. Mike ist mein bester Kollege und mein bester Freund, mein Mann, der Vater meiner Kinder, mein Co-Autor und Mitantragsteller, mein stärkster Kritiker, mein größter Helfer, mein Geliebter, mein Partner. Danke!

Ik heb gezegd

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INAUGURELE REDE
DR. ENI SABINE BECKER

Everyone has felt a little (or a lot) anxious at one time or another. But what happens in anxiety disorders? In a disorder something somehow has gone awry; anxiety reaches overwhelming levels. And this is what Eni Becker is interested in. What is the function of fear, and how is it distorted in cases of too much fear, as in anxiety disorders? Current research suggests that the development and maintenance of anxiety disorders is strongly affected by biased cognitive processes. Therefore, Eni Becker has studied characteristic biases of cognitive processes such as attention, interpretation, and memory in several anxiety disorders, including specific phobias, social phobia, generalized anxiety disorder, and panic disorder. In her inaugural lecture or 'oratie', she explains these biases and uses examples from her own research to illustrate the way biases are studied experimentally.

Eni Becker (1965) studied Psychology and received her Ph.D. at the Philipps-University Marburg, Germany. After her studies, she was 'Visiting scholar' at the Department of Psychiatry and Behavioral Sciences, Stanford University. For about ten years, she worked as an Assistant Professor and Juniorprofessor at the Institute of Clinical Psychology at the University of Dresden. Besides her research and teaching at the university, she has worked as a therapist for the Christoph-Dornier-Foundation and the Outpatient Clinic for Psychological Disorders in Dresden. Since 2003, she is Chair of Clinical Psychology at Radboud University Nijmegen

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