

Beoordeling Programma-adviescommissie Onderzoek (PACO) voorstel voor wetenschappelijk (M)GGZ-onderzoek

De PACO beoordeelt dit voorstel en stuurt het vergezeld van een advies aan de RZO. De RZO adviseert de Staatssecretaris van Defensie over (de richting van) (M)GGZ-onderzoek en de subsidiering daarvan.

Registratieformulier

1a. Gegevens hoofdaanvrager

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1b. Titel van onderzoeksvorstel

Plasticiteit van aversieve herinneringen: Aard en klinische exploitatie

1c. Samenvatting *Maximaal 200 woorden*

Bevindingen van recent onderzoek naar de werking van EMDR lijken te stroken met de werkgeheugen-theorie: een herinnering aan een traumatische ervaring wordt minder aversief als men bij het ophalen van deze herinnering tegelijkertijd een taak uitvoert die het werkgeheugen fors belast. De effectiviteit neemt toe als de complexiteit van de taak is afgestemd op de cognitieve span van de persoon, waarbij onderbelasting, maar waarschijnlijk ook overbelasting, minder werkzaam is. De klinische implicatie hiervan is dat elke taak die het werkgeheugen optimaal belast, effectief kan worden ingezet bij behandeling en preventie van intrusieve herinneringen. De doelstelling van dit project is 1) kritisch testen welke psychologische mechanismen verantwoordelijk zijn voor de *afname* van stress-gerelateerde klachten na simultane werkgeheugenbelasting/ophalen van aversieve herinneringen en (2) nagaan of traumatische herbelevingen kunnen worden *voorkomen* wanneer het werkgeheugen kort na trauma wordt belast tijdens het ophalen van herinneringen aan het trauma.

1d. Maximaal 5 keywords

Clinical psychology, behavior research and therapy, experimental psychopathology

1e. In welke (universitaire) setting zal het onderzoek in hoofdzaak worden uitgevoerd

Lokaal. Het onderzoek zal worden uitgevoerd binnen het UU/Linschoteninstituut van de Faculteit Sociale Wetenschappen. Een onafhankelijke commissie heeft een vergelijkende evaluatie gedaan van psychologie onderzoek bij zes Nederlandse universiteiten over 1998-2004 [Quality Assurance Netherlands Universities; QANU (2006). *Research Review Psychology 1998-2004*. <http://www.qanu.nl>]. De kwaliteit van de Utrechtse psychologie groepen (die zijn geïntegreerd in het “Linschoten Instituut”) had de hoogste rang van het land; Utrecht was de enige Nederlandse groep waarvan alle subprogramma’s werden beoordeeld als “excellent” of “erg goed” op alle dimensies die werden geëvalueerd (p.90). Het

onderzoek valt onder de leerstoelgroep Experimentele Psychopathologie van Prof. Dr. Marcel A. van den Hout (mede-aanvrager). Binnen deze leerstoelgroep voeren twee promovendi en een onderzoeksassistent onderzoek uit naar vroegtijdige signalering van stress-gerelateerde problematiek na uitzending met subsidies van NWO (Open Competitie en Vernieuwingsimpuls). Het huidige preventie/interventieproject sluit hier goed bij aan.

Landelijk. Het project wordt ingebed in de Nederlands-Vlaamse onderzoeksschool Experimentele Psychopathologie (EPP; <http://www.dmkep.unimaas.nl/epp/>), die door de KNAW is geaccrediteerd. De onderzoeksschool heeft een solide nationale en internationale reputatie.

1f. Hernieuwde beoordeling

Is dit onderzoeksvoorstel reeds eerder ingediend bij de RZO?

Nee	ja	Wanneer	Titel
X			

Onderzoeksvoorstel

3a. Beschrijving van het onderzoeksvoorstel

Maximaal 4.000 woorden (exclusief referentielijst, inclusief voetnoten).

3a-1. Algehele doelstelling en kern doel-/vraagstellingen

The aim is to (1) critically test which psychological mechanisms are responsible for the *reduction* of stress-related problems after simultaneous working-memory taxing/retrieval of aversive memories and (2) examine whether intrusive memories can be *prevented* when working memory is taxed shortly after trauma during retrieval of trauma-related memories.

3a-2. Wetenschappelijke achtergrond en relevantie

Since late 2001, about 1.64 million U.S. troops and troops from more than 20 other nations have been deployed to Afghanistan or Iraq. Although most service members return home without problems and successfully readjust, some return with posttraumatic stress disorder (PTSD) or other combat stress-related mental health problems. A recent review¹ identified 22 independent studies of the prevalence of PTSD, major depression, and/or brain injury among troops deployed to Afghanistan and/or Iraq. None used diagnostic interviews, the most accurate way to identify cases, with the exception of our study of Dutch Army troops deployed to Iraq^{2;see1,p.37} Using a prospective design, we found that about 5 months after returning from Iraq, 3.5% had full-blown PTSD and 2% had subthreshold forms of PTSD, while other psychopathology was less common. All other studies used screening tools, and suggest that 5-15% may return with PTSD.¹

These conditions can have negative and costly consequences if left untreated. The presence of PTSD is associated with absence from work, various psychiatric problems (e.g., depression, substance abuse), unhealthy behaviors (e.g., smoking), physical health problems (including ‘medically unexplained’ symptoms),³ and family troubles.⁴ The presence of subthreshold or ‘mild’ mental disorders is associated with worse clinical outcomes years later.⁵ Adequate treatment would reduce these psychological and economic costs, but there are fundamental gaps in the understanding and treatment of PTSD.

The “hallmark” of PTSD is that initial excessive remembering of the traumatic event (intrusive memories, nightmares, and flashbacks) does not wane over time. Such unwanted memories are also relevant to depression and other anxiety disorders.⁶ How does one recover from vivid and disturbing memories? Cognitive models⁷ suggest that sensory trauma-related information needs to be encoded conceptually. That is, when the meaning of the event is integrated into the existing store of autobiographical memories, vividness of memories will be reduced. Consistent with these models, effective treatments for PTSD use exposure techniques to confront patients with their upsetting memories for prolonged periods of time (e.g., 45-60 min in 9 weekly sessions) to allow the conscious

attempt to search for meaning.⁸ Descriptions of trauma scenes are tape-recorded, and clients are instructed to listen to their therapy tapes daily (for at least 45 min). Although no other treatment modality has such strong evidence for its efficacy, there are drawbacks: patients (and therapists) may be reluctant to confront traumatic memories for extended periods of time. In fact, about 50% of patients may drop-out.⁹

An emerging therapy called eye movement desensitization and reprocessing (EMDR) aims to *directly* reduce the vividness of traumatic memories. EMDR evolved not from theory, but from an observation: Shapiro noticed that upsetting thoughts were resolved when her eyes followed the waving of leaves during a walk in the park. She developed EMDR, and argued that lateral eye movements facilitate cognitive processing of traumatic memories, and are an essential therapeutic component.⁸ In the basic EMDR-protocol,⁸ a client is asked to identify and focus on a traumatic image. Next, a set of 20 eye movements is elicited by having the client follow a repetitive side-to-side motion of the therapist's index finger, while the unpleasant memory is held in mind. The client then reports current sensations, cognitions, and emotions. Sets are repeated until the client reports minimal distress associated with the memory. The therapist guides the client to replace a negative cognition with a positive one. Research has shown that lateral eye movements indeed reduce ratings of the vividness and emotionality of unpleasant memories,¹⁰ and that EMDR is an effective treatment for PTSD.¹¹ Thus, treatment guidelines by e.g., Trimbos-instituut¹² and the US Department of Veterans' Affairs/Department of Defense^{see13} consider exposure and EMDR to be treatment-of-choice for PTSD, while EMDR may be better tolerated by clients and may lead to much progress in only a few sessions.

However, EMDR has been the subject of a heated debate.^{e.g.,13-16} This has mainly focused on theoretical weaknesses. It is unclear *how* eye movements might produce benefits, and studies have shown that other forms of bilateral stimulation (e.g., finger tapping) yield similar results, leading many scholars to proclaim EMDR as merely a CBT variant.¹³ Interestingly, recent findings from several independent research-lines provide a fresh perspective on the mechanisms involved in reducing the vividness of upsetting memories. They offer theoretical explanations for the efficacy of EMDR that are remarkably converging, and are clinically highly relevant. The findings and explanations relate to the malleability of traumatic memories during retrieval, and relate to three lines of research described below.

1. An elegant series of experiments was conducted by Gunter and Bodner (2008)¹⁷ with healthy participants who retrieved negative autobiographical memories, using our protocol,¹⁰ under various conditions. Three accounts of how eye movements might produce positive effects were critically tested. An 'investigatory-reflex account' was not supported, because only eye movements during, and not after, retrieval reduced vividness/aversiveness. An 'interhemispheric-communication account' was not supported, because horizontal and vertical eye movements were equally effective compared to a 'just retrieval' condition. The findings only support a '*working memory account*'.

This account assumes that beneficial effects occur because during retrieval, the two tasks (keeping the memory in mind and making eye-movements) compete for limited working memory resources. This will blur the recollection during retrieval, which is thought to produce a decay of the original memory trace.^{see17} Thus, first of all, this account predicts that not only do eye movements have beneficial effects, but so do other tasks that tax working memory. Second, it predicts that the stronger the taxing of working memory, the stronger the reductions in vividness/adversity. A third prediction relates to the locus of working memory. Note that working memory consists of three subsystems: a Central Executive (CE), which functions as attentional system, and two "slave systems": a Visuospatial Sketchpad (VSSP), responsible for setting up and manipulating visuospatial images, and a Phonological Loop (PL), in control of processing speech-based information.¹⁸ Both eye movements and memory retrieval involve the VSSP. If EMDR capitalizes on competition for working memory resources at the VSSP level, it is predicted that taxing the PL will have no beneficial effects. Copying an array of geometric shapes in the Rey complex figure is a very taxing visuospatial task that does not involve eye movements. Gunter and

Brodner¹⁷ found not only that eye movements had their usual beneficial effects, but that the figure drawing task did as well. In fact, the effects of figure drawing were significantly stronger than the effects of eye movements. Interestingly, taxing the PL had positive effects that were just as strong as eye movements effects. Given that the retrieval task is a VSSP-routine, the effects of taxing the PL could not have taken place at the VSSP-level. The authors logically deduced that (1) eye movements have effects because they tax working memory during retrieval, (2) the competition for resources takes place at the level of the CE, (3) any sufficiently taxing task may yield positive results, and (4) a dose-response relation is suggested by the data and would theoretically be expected: the stronger the taxing of the CE, the stronger the reduction in vividness/adversity of the memory.

2. Starting from a cognitive science stance, not referring to EMDR, Holmes et al. (2009)¹⁹ reasoned that within hours (probably days)²⁰ after an aversive event, the memory of the event, and the way it is stored in long-term memory, is still flexible. Based on working memory theory, they argue that, in this acute aftermath, images of unpleasant memories are held in the VSSP, and that these images become less vivid when a concurrent task uses up the same VSSP working memory resources. This reduced vividness then cascades into reduced emotionality, and the event will produce less involuntary intrusions. Forty non-clinical participants viewed an extremely aversive film of 2 min. After 30 min memories of the films were activated. Half of the participants were asked to simultaneously play the PC game “Tetris” for 10 min, requiring nearly all VSSP resources that can be mobilized. In line with the hypothesis, participants in the Tetris group reported significant less impact and fewer intrusions of the film in the subsequent week. They showed normal actual memories of the film on a recognition test.

The findings were interpreted in terms of major clinical theories of PTSD⁷ that propose that the relative balance of sensory-perceptual versus verbal/conceptual processing of a traumatic event determines whether intrusive memories are formed, whereby a skewed balance towards sensory/perceptual aspects is pathogenic. Like Gunter and Bodner¹⁷ (see above), the authors conclude that retrieving a negative memory while simultaneously taxing working memory reduces the aversiveness of that memory. Yet, while Gunter and Bodner studied distal memories, Holmes et al. examined new trauma-like memories, and while the former authors conclude that the competition for resources takes place at the CE-level, the latter conclude that the VSSP is critically involved. Finally, Holmes et al.¹⁹ deduce that Tetris may be used as an early prevention strategy e.g., to firefighters or those involved in armed combat. The study has generated much media interest (<http://news.bbc.co.uk/1/hi/health/7813637.stm>).

3. Finally, neuro-imaging research corroborates the findings described above. Van Dillen et al. (2009)²¹ showed that presentation of aversive pictures is attended by increased activity in both “cognitive areas” (right dorsolateral frontal cortex) and “emotional areas” (bilateral amygdalae and right insula). When participants carried out mildly taxing tasks (simple arithmetic) immediately after seeing the aversive pictures, the subjective evaluation of the pictures was as negative as it was without a task. However, when the task was highly demanding (complex arithmetic), the pictures were evaluated as less negative. This is, of course, fully in line with the data discussed above. Interestingly, during high-taxing arithmetic, there was an increase in dorsolateral frontal activity and a steep reduction in amygdalae activity, which was not found during low-taxing arithmetic. Thus, the emotion-reducing effects of taxing working memory seem to have a straightforward neurobiological basis: the interventions stimulate prefrontal, cognition-related activity at the expense of amygdalae related emotional processing.

The findings summarized here provide a new, coherent and psycho(bio)logically plausible account of the effects of EMDR. The latter taxes working memory during retrieval of negative memories, which renders these memories less vivid and aversive, and this has straightforward implications for the prevention of stress problems after traumatic experiences.

This proposal addresses two issues. First, although it is highly plausible that working memory taxing is responsible for the effects of eye movements,¹⁷ Tetris,¹⁹ or mental arithmetic,²¹ it is far from clear *how* this takes place. Gunter and Bodner¹⁷ defend a CE account, but the evidence is indirect and disputable. The first aim of this proposal is to critically test by what mechanism working memory taxing results in immediate and long-term effects. Second, the findings have implications for primary prevention and treatment of posttraumatic stress symptoms. We intend to test these implications in Dutch troops stationed in Afghanistan and in PTSD patients. While the first aim is primarily theoretical, the results will enhance our understanding of current and new clinical interventions, and may have direct implications for clinical practice. Likewise, while the prevention and intervention studies primarily serve to test a clinical application, the results will be informative about theoretical issues as well. This proposal includes six studies: study 1-4 focuses on the mechanism of reduced vividness/adversity of memories, study 5 focuses on prevention of combat stress-related mental health problems, and study 6 focuses on further refining of treatment. These studies will be described below.

A. The mechanism

The *mechanism* by which simultaneous taxing working memory and retrieving negative memories has beneficial effects will be elucidated in four related experiments. All will be carried out using healthy volunteers (university students).

1. VSSP or CE?

While Holmes et al. argue that taxing the VSSP is involved in the reduction of vividness/adversity of memories, Gunter and Bodner regard their experiments as evidence that this is incorrect, and that it is actually the CE. However, note that Holmes et al. only used a VSSP taxing task (Tetris), while the strongest effects in Gunter and Bodner's studies occurred for a figure-drawing task that also clearly taxes the VSSP. Van Dillen et al. used a CE taxing task (mental arithmetic) and found positive effects. In the absence of a *direct comparison* of the relative effects of VSSP taxing and CE taxing, it remains unclear if, and to what degree, we should attribute working memory taxing to involvement of the former or the latter.

We will construct tasks that will interfere with the VSSP or CE components of working memory, while the amount of resources needed for the two tasks will be matched by making sure that both tasks produce an identical slowing down on a simultaneous Auditory Reaction Task. If, compared to baseline performance, the deterioration in reaction times is identical for the VSSP task and the CE task, we will conclude that both tasks make identical demands on working memory. The VSSP task will be a variant of Tetris, and the CE task will be random numbers generation. We will critically test, using Gunter and Bodner's adaptation of our retrieval task,¹⁰ which of the two tasks is superior in reducing vividness and emotionality of aversive memories.

2. Dose-response relations

A crucial step in determining causality is the determination of dose-response relationships. Gunter and Bodner¹⁷ found larger effects of the Rey complex figure task relative to eye movements, and this is attributed to the former requiring more working memory resources than the latter. However, the authors did not independently assess whether the Rey task really *is* more demanding. To establish a dose-response relationship, we should not merely *assume* task differences in resource requirements, but we should experimentally *establish* if such differences exist and if they are related to different outcomes. First, study 2 will test if the beneficial effects are positively related to the degree of taxing. Second, for working memory taxing effects to occur, it seems vital that the memory is retrieved *during* working memory taxing. However, if taxing is extreme, individuals may not have any resources left for simultaneously retrieving memories. The theory predicts that positive effects should not occur. Thus, one should predict that the dose response-effects will bend down at the extremes of working memory taxing.

Using the VSSP or CE task from study 1 that produced the strongest effects, we will develop 3 or 4 variations of the task that differ in the degree of working memory taxing. This will be established

with the Reaction Time paradigm described in study 1. We will test whether there is a positive dose-response relationship, with stronger effects when taxing increases from absent to mild and severe, and whether the effect declines when taxing is extreme.

3. Is blurring of memory during working memory taxing causally involved?

Common to the reviewed interventions (EMDR, Tetris, PL task, arithmetic) is that the memory is retrieved and gets *blurred* during the intervention. Generally speaking, when attention is shifted away from a memory trace, the latter begins to decay.^{e.g.,22} It is plausible that the blurring of memory during working memory taxing is not a side-effect, but may causally contribute to the later loss of vividness/adversity. Accordingly, taxing working memory during retrieval may exhibit its beneficial effect because it causes temporary and repeated blurring. The crucial implication would be that taxing working memory is not necessary, and that inducing temporary but repeated blurring of the memory during retrieval is sufficient.

We will ask participants to retrieve negative memories through the procedure used in studies 1 and 2. In the experimental condition, we will ask them to switch attention to a dot appearing on the screen at regular intervals (e.g., 10 sec). In the control condition, no such instruction will be given during retrieval. Note that switching attention to the dot will blur memory, but requires hardly any cognitive effort. To the degree that blurring of memory is the crucial agent, we predict that shifting attention produces beneficial effects that are of comparable magnitude to those seen with working memory taxing.

4. How do the intervention(s) produce long-term effects?

The effects of EMDR in clinical settings extend beyond the EMDR-session. Likewise, eye movements in laboratory studies have long-term effects. Why are the effects not time-limited and why do they outlive the clinical or experimental session of working memory taxing? There are two hypotheses. One holds that the nature of the memory trace remains unaffected, but that “meta-cognitive” appraisals are affected. During EMDR, individuals may experience that retrieval is less aversive than expected. While the appraisal of the memory is changed, its nature is held to be unaffected. Second, as with initial consolidation, memories remain labile when they are recalled,²⁰ and, due to the intervention, visual images may become transformed during reconstruction from memory due to changed semantic encodings.^{see23} The memory trace *itself* should then be affected.

We will examine whether the memory itself is affected in two ways:

- a) Vividness of memory will be assessed with a perceptual identification task, involving degraded colors in eight steps from the brightest to the most degraded format, and an emotionally neutral figure that is similarly degraded from vivid to vague. Participants are asked to rate the vividness of their own memory. If eye movements affect the memory trace itself, the eye movement group will come to rate memories as less colorful and more vague, compared to a ‘just retrieval’ group.
- b) Valence of memory will be assessed with an affective priming task,²⁴ comprising four phases. First, the negative memory and several words specifically related to this memory (e.g., city) are identified. Second, during a pre-test, these words and other words are presented as prime (subliminally), followed by neutral, positive, or negative targets. Neutral cues will be words and non-words, and the person is instructed to say YES as soon as possible to a word and NO to a non-word. Affective priming is expected: after trauma words, negative targets should be facilitated and positive targets should be inhibited. Third, the working memory taxing task is administered (task determined by studies 1-4), while the experimental group retrieves aversive memories and the control group retrieves neutral memories. Finally, the lexical decision task is repeated. If eye movements reduce emotionality of memory itself, the experimental group, compared to the control group, should show reduced facilitation of negative targets and reduced inhibition of positive targets.

B) Clinical implications: prevention and treatment of posttraumatic stress symptoms

Studies 1-4 will serve to enhance our understanding of the mechanisms involved in the working memory taxing/retrieval effects. Meanwhile, it is sufficiently clear *that* reduction in adversity of memory can be achieved by working memory taxing procedures.^{e.g.,10,19,25,26} The clinical implication is that if, in the immediate aftermath of trauma, a working memory taxing task is given while the individual is stimulated to retrieve the memory of what happened, the incidence and severity of posttraumatic stress symptoms will be reduced. This will be tested. The study will be designed so that its findings can be generalized to all deployed service members. In addition, if taxing is the therapeutic mechanism underlying eye movements (Tetris, etc.), then any task that taxes working memory optimally could be effectively used in the treatment of intrusive memories. This will be tested in a clinical case-series.

5. Can PTSD be prevented by early intervention with Tetris?

Effective treatments for PTSD exist, but crisis interventions that reduce the build-up of symptoms in the early trauma-aftermath are lacking.⁸ Talking therapy as crisis intervention has caused concern,²⁷ and single-session psychological debriefing can worsen later symptoms²⁸ or have no effects.²⁹ Until recently, interest in the early disruption of consolidation of trauma memories has focused on pharmacological interventions,²⁰ like propranolol,³⁰ but the magnitude of effects seems small. Findings of Holmes et al.¹⁹ suggest that Tetris may be a theory-driven (non-invasive) cognitive alternative to potentially prevent PTSD. It taxes working memory (the person needs to see, focus on, and act, at great speed), the same resources that would normally be used to consolidate future intrusive memories.

To examine whether Tetris may prevent symptoms, an RCT will be conducted. Soldiers deployed to Uruzgan will be recruited within 24 hours after exposure to critical incident. Health professionals deployed to Uruzgan will recruit the participants and conduct the study. They will be trained and supervised by the researchers. Treatment integrity will be checked. Participants will be randomly allocated to a Tetris condition (playing Tetris on a handheld machine for 20 min) or a 'no task' control condition. Prior to both conditions, participants will be asked to repeatedly bring the critical incident to mind. One week later (within deployment) brief questionnaires will be administered to assess the frequency/intensity of intrusive memories and other symptoms. About one month after returning from Uruzgan, questionnaires and clinical interviews will be administered by the researchers (blinded to condition) to assess combat-related stress problems, including PTSD, depression, use of alcohol and cigarettes, and physical health symptoms. We will test whether individuals in the Tetris condition, compared to the controls, show less symptomatology.

6. Does taxing working memory increase treatment gains?

If taxing working memory is the therapeutic mechanism underlying EMDR (Tetris, etc.), then tasks that produce larger taxing would be preferable to tasks that provide less taxing. Gunter and Bodner¹⁷ found that auditory/visual distractor tasks produced benefits that were negatively correlated with working-memory capacity. Using a case-series design, we will examine if working memory taxing can be effectively used in the treatment of intrusive memories.

We will recruit soldiers with PTSD, and give two 45-min sessions of (A) alternating bilateral tones (usual variant of EMDR) and (B) a central executive taxing task (mental arithmetic/random numbers generation).³¹ Each condition lasts 5 min using a block-design. The order (A-B-A-B-A-B or B-A-B-A-B-A) is randomly allocated. We will measure within-session vividness and aversiveness of the to-be-retrieved traumatic memory. To the degree that working memory taxing will be higher in condition B, we expect that B will produce larger reductions in vividness and aversiveness.

3a-3. Originaliteit en innovatieve kenmerken van huidige studie

These studies build on earlier and ongoing research on deployment-related problems carried out by the first applicant. This has resulted in a substantial number of international publications that have provided new insights in the prevalence of deployment-related problems and factors that reliably predict which individuals are vulnerable to post-traumatic symptoms. The present studies, while biologically informed, have a cognitive and behavioral focus. The theoretical focus on working memory is at the edge of science. Note that the most relevant papers were published in 2008/2009. The studies will enhance our understanding of the factors that are responsible for the improvement that is often seen during EMDR. It suggests new treatment methods that will be evaluated.

3a-4. Methode: design, study sample; measures; data analysis; timetable

S1-4 will be carried out in Prof. van den Hout's laboratories. In S5, soldiers will be invited to participate during three deployments to Uruzgan. The clinician who introduces and supervises the tasks will ascertain that, when signing the informed consent, (1) reality-testing is undisturbed: the individual is not psychotic or derealized; knows where/at what time the incident happened, its nature, who was present, and what happened between the incident and moment of testing, and (2) the person fully understands the procedure in the experimental and control condition. S6 will take place at CMH.

For S1-4, we estimate N=60 per experiment, pending power calculations after pilot experiments. For S5, a power calculation^{cf.17} indicates that N=34 is sufficient (d=1; power=.80; α =.05; 2-sided). Considering 20% drop-out, N=40 will be enrolled. S6 involves 6 participants.

Timetable

	Year1	Year2	Year3	Year4
1.		S5:sample3(t=0)		S6
2.		S2		
3.	S5:sample1(t=0)	(S5:sample3;deployed) (S5:sample2;home) S2		
4.	S5:sample1(t=0) S1	S5:sample2(t=1) S2	S4	
5.	S5:sample1(t=0) S1	S2:analysis/report		
6.	S1			
7.	(S5,sample1;deployed) S5:sample2(t=0) S1	(S5:sample3;home)		
8.	S5:sample2(t=0) S1:analysis/report	S5:sample3(t=1)	S5:dissemination	
9.	S5:sample2(t=0) S1:analysis/report	S5:analysis/report		
10.	S2			
11.	(S5:sample2;deployed) (S5:sample1;home) S5:sample3(t=0)			
12.	S5:sample1(t=1) S5:sample3(t=0)	S3	S6	Dissertation

3b. Wordcount voor 3a

3997

3c. Literatuurreferenties Maximaal 35 referenties

1. Tanielian, T., Jaycox, L.H., & the Invisible Wounds Study Team (April, 17, 2008). *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*. RAND Review. <http://www.rand.org/multi/military/veterans/>
2. Engelhard, I.M., van den Hout, M.A., Weerts, J., Arntz, A., Hox, J.J.C.M., & McNally, R.J. (2007b). Deployment-related stress and trauma in Dutch soldiers returning from Iraq: Prospective study. *British Journal of Psychiatry*, *191*, 140-145.
3. Engelhard, I.M., van den Hout, M.A., Weerts, J., Hox, J., & van Doornen, L.J.P. (2009). Prospective data on the relationship between posttraumatic stress disorder and physical health in troops deployed to the 2003 Iraq War. *International Journal of Clinical and Health Psychology*, in press.
4. Dirkzwager, A.J.E., Bramsen, I., Adèr, H., & van der Ploeg, H.M. (2005). Secondary Traumatization in Partners and Parents of Dutch Peacekeeping Soldiers. *Journal of Family Psychology*, *19*, 217-226.
5. Kessler, R. C., Merikangas, K. R., Berglund, P., et al (2003) Mild disorders should not be eliminated from the DSM-IV. *Archives of General Psychiatry*, *60*, 1117-1122.
6. Engelhard, I.M., Arntz, A., & van den Hout, M.A. (2007a). Limited specificity of PTSD symptoms: a comparison of patients with PTSD, healthy controls, and patients with other anxiety disorders. *British Journal of Clinical Psychology*, in press.
7. Dalgleish, T. (2004). Cognitive approaches to posttraumatic stress disorder: The evolution of multirepresentation theorizing. *Psychological Bulletin*, *130*, 228-60.
8. Foa, E.B., Keane, T.M., & Friedman, M.J. (2004). *Effective treatments for PTSD*. Guildford Press.
9. Arntz, A., de Groot, C., & Kindt, M. (2005). Emotional memory is perceptual. *Journal of Behavior Therapy and Experimental Psychiatry*, *36*, 19-34.
10. Van den Hout, M., Muris, P., Salemink, E., & Kindt, M. (2001). Autobiographical memories become less vivid and emotional after eye movements. *British Journal of Clinical Psychology*, *40*, 121-130.
11. Bisson, J.I., Ehlers, A., Matthews, R., Pilling, S., Richards, D., & Turner, S. (2007). Psychological treatments for chronic post-traumatic stress disorder: Systematic review and meta-analysis. *British Journal of Psychiatry*, *190*, 97-104.
12. Werkgroep angststoornissen (2003). *Multidisciplinaire richtlijn angststoornissen. Richtlijnen voor de diagnostiek, behandeling en begeleiding van volwassen cliënten met een angststoornis*. Utrecht: Trimbos-instituut.
13. Russell, M.C. (2008). Scientific resistance to research, training and utilization of eye movement desensitization and reprocessing (EMDR) therapy in treating post-war disorders. *Social Science & Medicine*, *67*, 1737-1746.
14. Herbert, J.D., Lilienfeld, S.O., Lohr, J.M. et al., (2000). Science and pseudoscience in the development of eye movement desensitization and reprocessing: Implications for clinical psychology. *Clinical Psychology Review*, *20*, 945-971.
15. McNally, R.J. (1999). EMDR and mesmerism: A comparative historical analysis. *Journal of Anxiety Disorders*, *13*, 225-236.
16. Perkins, B.R. & Rouanzoin, C.C. (2002). A critical evaluation of current views regarding eye movement desensitization and reprocessing (EMDR): Clarifying points of conclusion. *Journal of Clinical Psychology*, *58*, 77-97.
17. Gunter, R.W. & Bodner, G.E. (2008). How eye movements affect unpleasant memories: Support for a working-memory account. *Behaviour Research and Therapy*, *46*, 913-931.
18. Baddeley, A. (1997). *Human memory: Theory and practice*. East Sussex, UK: Psychology Press.
19. Holmes, E.A., James, E.L., Coode-Bate, T., & Deerprouse, C. (2009). Can Playing the Computer Game "Tetris" Reduce the Build-Up of Flashbacks for Trauma? A Proposal from Cognitive Science. *PLoS ONE*, *4*, e4153- doi:10.1371/journal.pone.0004153.
20. Ressler, K.J. & Mayberg, H.S. (2007). Targeting abnormal neural circuits in mood and anxiety disorders: From the laboratory to the clinic. *Nature Neuroscience*, *10*, 1116-1124.

21. Van Dillen, L. F., Heslenfeld, D.J., & Koole, S.L. (2009) Tuning down the emotional brain: An fMRI study of the effects of cognitive load on the processing of affective images. *NeuroImage*, in press.
22. Barrouillet, P., & Camos, V. (2001). Developmental increase in working memory span: Resource sharing or temporal decay? *Journal of Memory and Language*, 45, 1-20.
23. Kosslyn, S.M. (1999). *Image and brain*. Cambridge, MA: MIT.
24. Hermans, D., Vansteenwegen, D., Crombez, G., Baeyens, F., & Eelen, P. (2002). Expectancy–learning and evaluative learning in human classical conditioning: Affective priming as an indirect and unobtrusive measure of conditioned stimulus valence. *Behaviour Research and Therapy*, 40, 217-234.
25. Andrade, J., Kavanagh, D., & Baddeley, A. (1997). Eye-movements and visual imagery: A working memory approach to the treatment of post-traumatic stress disorder. *British Journal of Clinical Psychology*, 36, 209-223.
26. Kavanagh, D., Freese, S., Andrade, J. & May, J. (2001). Effects of visuo-spatial tasks on desensitization to emotive memories. *British Journal of Clinical Psychology*, 40, 267-280.
27. McNally, R.J., Bryant, R.A., & Ehlers, E. (2003). Does early psychological intervention promote recovery from posttraumatic stress? *Psychological Science in the Public Interest*, 4, 45-79.
28. Bisson, J.I., McFarlane, A.C., & Rose, S. (2004). Psychological debriefing. In E.B. Foa, T.M. Keane, & M.J. Friedman (Eds). *Effective treatments for PTSD*. New York: Guildford Press.
29. Sijbrandij, M., Olf, M., Reitsma, J.B., Carlier, I.V.E., & Gersons, B.P.R. (2006). Emotional or educational debriefing after psychological trauma. *British Journal of Psychiatry*, 189, 150-155
30. Pitman, R.K., Sanders, K.M., Zusman, R.M. et al. (2002). Pilot study of secondary prevention of posttraumatic stress disorder with propranolol. *Biological Psychiatry*, 51, 189-192.
31. Neath, I. (1998). *Human memory*. Cole Publishing Company.

3d. Kennisdisseminatie

De onderzoeken ad 5 en 6 zijn potentieel van belang voor Defensie. Indien de uitkomsten positief zijn heeft dat implicaties voor behandeling en preventie van posttraumatische symptomen van militairen. De interventies die worden onderzocht in studies 5 en 6 zijn goed vast te leggen in een protocol. Afhankelijk van de uitkomsten van deze studies kunnen klinici van Defensie, in nauw overleg met de huidige aanvragers dergelijke protocollen opstellen en betrokken behandelaars trainen in de praktische uitvoering

3e. Budget

€ 200.000

Onderzoeksgroep

4a. Samenstelling onderzoeksgroep

- a) Hoofdaanvrager: Prof. Dr. Iris M. Engelhard
- b) medeaanvrager(s): Prof. Dr. Marcel A. van den Hout en Dr. Monique A.M. Smeets
- c) beoogde uitvoerder(s): aan te stellen AIO
- d) andere betrokken onderzoekers (adviseurs, samenwerkingsverbanden):

Naam	Titel(s)	Affiliatie
Emily Holmes	Dr.	University of Oxford, Dept of Psychiatry, UK
Raymond Gunter	Dr.	University of Calgary, Canada
Albert Postma	Prof. Dr.	Psychonomie, UU
Lotte van Dillen	Dr.	Sociale Psychologie, UU
Hellen Hornsveld	Dr.	Klinische en Gezondheidspsychologie, UU
Kees Ijzerman	Kol-arts	Militaire GGZ, Utrecht

Internationaal zal er worden samengewerkt met Dr. Emily Holmes (Oxford), een expert op het gebied van imagery en PTSS en Dr. Raymond Gunter (Calgary), gespecialiseerd in het werkgeheugen.

Nationaal zal voor het preventie/klinisch onderzoek en de implementatie van de resultaten nauwe samenwerking worden gezocht met medewerkers van de militaire GGZ. Kol-arts K. Ijzerman is als adviseur aan het project verbonden. Dr. Vermetten wordt op de hoogte gehouden van vorderingen in het project en wordt betrokken bij de klinische studie (studie 6).

Lokaal zijn de volgende personen betrokken bij het project: Prof. Dr. Albert Postma, een expert in het geheugen, Dr. Lotte van Dillen, gespecialiseerd in emotie-regulatie en Dr. Hellen Hornsveld, een autoriteit in de behandeling van PTSS via EMDR [zie bv. Hornsveld, H. & Berends, S. (2009). *EMDR in de praktijk*. Bohn Stafleu van Loghum]. Ook zal er regelmatig overleg worden gepland met collega Prof. Dr. Rolf Kleber. De begeleidingscommissie van de aan te stellen AIO zal bestaan uit de drie aanvragers.

4b. Wetenschappelijke kwaliteit van aanvrager(s)

Beknopt CV met onderzoekservaring van aanvrager(s)

Iris Engelhard is klinische psycholoog en cognitieve gedragstherapeut i.o. Zij doet onderzoek op het gebied van de Experimentele Psychopathologie. In 2002 heeft zij haar doctoraat behaald bij de UM op het gebied van kwetsbaarheids- en beschermende factoren bij PTSS. Ze deed een jaar als visiting scholar en Fulbright scholar onderzoek bij Richard McNally van Harvard University (deels in samenwerking met Roger Pitman en Scott Orr). Zij ontving diverse wetenschappelijke prijzen voor haar werk (tweejaarlijkse *Catharine Pijls prijs* voor beste Nederlandse proefschrift op het gebied van gezondheid in 2003, *posterprijs* van de International Society for Traumatic Stress Studies in 2000 en in 2001, artikelprijs van de Nederlands-Vlaamse Onderzoeksschool Experimentele Psychopathologie in 1999-2000 en in 2001-2002) en heeft prestigieuze subsidies gekregen (Veni Vernieuwingsimpuls in 2003, Vidi Vernieuwingsimpuls in 2008).

De afgelopen jaren deed zij onderzoek naar cognitieve processen die een rol spelen bij het ontstaan, de instandhouding en behandeling van PTSS, sociale fobie, obsessief-compulsieve stoornis, spinfobie en depressie. Zij was als hoofdonderzoeker betrokken bij (1) prospectieve studies (1370 vrouwen werden vanaf de vroege zwangerschap gevolgd tot een maand na de bevalling; 649 militairen werden gevolgd van voor uitzending naar Irak/Uruzgan tot 15 maanden na terugkomst), (2) longitudinale studies (getuigen van een treinramp in België werden van kort na de ramp gevolgd tot 4 maanden later; zwangere vrouwen die met ernstige zwangerschapscomplicaties waren opgenomen in het ziekenhuis werden gevolgd tot een half jaar na de bevalling), (3) cross-sectionele klinische studies bij angstpatiënten, (4) RCT naar vroege interventie om PTSS te voorkomen bij kinderen en (5) laboratorium studies. De projecten werden oa uitgevoerd in samenwerking met Spoed Eisende Hulp van het azM, Gynaecologie van het azM, Defensie, Slachtofferhulp en RIAGG Maastricht.

Marcel van den Hout is gedragstherapeut en geregistreerd klinisch psycholoog. Van 1988 tot 2004 was hij voorzitter van een grote vakgroep van de faculteit Gezondheidswetenschappen van de UM, van 1992 tot 2004 was hij directeur van de interuniversitaire onderzoeksschool Experimentele Psychopathologie en van 1998 tot 2004 was hij hoofd van de afdeling Medische Psychologie in het azM. Vanaf 2004 is hij hoogleraar Klinische Psychologie en Experimentele Psychopathologie aan de UU. Hij is tevens voorzitter van het UU departement Psychologie en directeur van het Linschoten Instituut waar het psychologie onderzoek van de UU is ondergebracht. Hij geeft onderwijs, verricht patiëntenzorg en heeft diverse bestuurlijke en redactionele functies. Hij was eerste promotor van 32 promovendi en behoort tot de meest productieve Nederlandse psychologen en psychiaters van eind vorige eeuw (nl. nr 2 van 1973 tot 1998; Ellemers et al., 1998, *Ned T Psychologie*, 53;208-18) en de meest geciteerde auteurs in het veld (Hulstijn, 1994, *De Psycholoog*, mei, 187-9).

Monique Smeets is experimentele en cognitieve psycholoog. Ze heeft haar doctoraat in 1995 (cum laude) behaald bij de UU op het gebied van vertekeningen in het lichaamsbeeld bij anorexia nervosa. Vervolgens heeft ze als postdoc onderzoek gedaan naar hetzelfde onderwerp bij Steve Kosslyn van Harvard University, met een subsidie van de Niels Stensen Foundation. In 1998 heeft ze haar onderzoeksinteresse verlegd naar geurperceptie, nadat ze een positie had gekregen als research associate bij Pamela Dalton van Monell Chemical Senses Center in Philadelphia. Hun onderzoek richtte zich op de gezondheidseffecten van geurperceptie en werd toegepast bij Idiopathic Environmental Intolerance en Gulf War Syndrome. Nadat zij terugkeerde naar Nederland, kreeg Monique een prestigieuze Vidi Vernieuwingsimpuls subsidie van NWO voor een project over geur en gezondheid, die in augustus 2009 afloopt. Zij zal in het huidige project met name bijdragen aan de perceptuele en cognitieve aspecten van de voorgestelde onderzoeken.

Kernpublicaties van aanvrager(s) + impact factor (IF in 2006) van tijdschriften:

Maximaal 20 referenties per aanvrager.

Engelhard

1. **Engelhard, I.M.**, van den Hout, M.A., Weerts, J., Hox, J., & van Doornen, L.J.P. (2009). Prospective data on the relationship between posttraumatic stress disorder and physical health in troops deployed to the 2003 Iraq War. *International Journal of Clinical and Health Psychology*, in press. **(IF 2.95)**
2. **Engelhard, I.M.**, van den Hout, M.A., & McNally, R.J. (2008). Memory consistency for traumatic events in Dutch soldiers deployed to Iraq. *Memory*, 16, 3-9. **(IF=1.67)**
3. Engelhard, E.F.D. & **Engelhard, I.M.** (2008). Schokschade. In W.H. van Boom, I. Giessen, & A.J. Verheij (Red.), *Gedrag en Privaatrecht*, Boom Juridische Uitgevers, Den Haag.
4. **Engelhard, I.M.**, Rapee, R.M., & Vincken, M. (2008). De behandeling van Acute Stress Stoornis. In C. Braet & S. Bögels (Red.), *Protocollaire behandelingen voor kinderen met psychische klachten*, Boom, Amsterdam.
5. **Engelhard, I.M.**, van den Hout, M.A., Weerts, J., Arntz, A., Hox, J.J.C.M., & McNally, R.J. (2007). Deployment-related stress and trauma in Dutch soldiers returning from Iraq: Prospective study. *British Journal of Psychiatry*, 191, 140-5. **(IF=5.44)**
6. **Engelhard, I.M.**, Huijding, J., van den Hout, M.A., & de Jong, P.J. (2007). Vulnerability associations and symptoms of post-traumatic stress disorder in soldiers deployed to Iraq. *Behaviour Research and Therapy*, 45, 2317-25. **(IF=2.89)**
7. **Engelhard, I.M.**, & van den Hout, M.A. (2007). Preexisting neuroticism, subjective stressor severity, and posttraumatic stress in soldiers deployed to Iraq. *Canadian Journal of Psychiatry*, 52, 505-9. **(IF=2.53)**
8. **Engelhard, I.M.**, Arntz, A., van den Hout, M.A. (2007). Low specificity of symptoms on the post-traumatic stress disorder (PTSD) symptom scale: A comparison of individuals with PTSD, individuals with other anxiety disorders, and individuals without psychopathology. *British Journal of Clinical Psychology*, 46, 449-456. **(IF=2.06)**
9. **Engelhard, I.M.**, van den Hout, M.A., & Schouten, E.G.W. (2006). Neuroticism and low educational level predictive for the risk of post-traumatic stress disorder in women after miscarriage or stillbirth. *General Hospital Psychiatry*, 28, 414-7. **(IF=2.50)**
10. Buhlmann, U., Deckersbach, T., **Engelhard, I.M.**, Savage, C.R., Wilhelm, S., Rauch, S., Baer, L., Jenike, M.A. (2006). Cognitive retraining for nonverbal memory impairment in obsessive-compulsive disorder. *Psychiatry Research*, 144, 109-16 **(IF=2.31)**
11. **Engelhard, I.M.**, & Arntz, A. (2005). The Ex-consequencia reasoning fallacy and the persistence of PTSD. *Journal of Behavior Therapy and Experimental Psychiatry*, 36, 35-42. **(IF=1.43)**
12. **Engelhard, I.M.**, & Kindt, M. (2005). Cognitive mechanisms and posttraumatic stress disorder: Clinical and analogue research. *Journal of Behavior Therapy and Experimental Psychiatry*, 36, 1-2. **(IF=1.43)**

13. **Engelhard, I.M.**, van den Hout, M.A., Kindt, M., Arntz, A., & Schouten, E. (2003). Peritraumatic dissociation and posttraumatic stress after pregnancy loss: A prospective study. *Behaviour Research & Therapy*, 41, 67-78. (IF=2.89)
14. **Engelhard, I.M.**, van den Hout, M.A., & Kindt, M. (2003). The relationship between neuroticism, pre-traumatic stress, and post-traumatic stress: A prospective study. *Personality and Individual Differences*, 35, 381-8. (IF=1.42)
15. **Engelhard, I.M.**, van den Hout, M.A., Arntz, A., & McNally, R.J. (2002). A longitudinal study of "Intrusion-based reasoning" and PTSD after a train disaster. *Behaviour Research and Therapy*, 40, 1415-24. (IF=2.89)
16. **Engelhard, I.M.**, van Rij, M., Boullart, I., Ekhart, T.H.A., Spaanderman, M.E.A., van den Hout, M.A., & Peeters, L.L.H. (2002). Posttraumatic stress disorder after preeclampsia: An exploratory study. *General Hospital Psychiatry*, 24, 260-4. (IF=2.50)
17. **Engelhard, I.M.**, van den Hout, M.A., & Arntz, A. (2001). Posttraumatic stress disorder after pregnancy loss. *General Hospital Psychiatry*, 23, 62-6. (IF=2.50)
18. **Engelhard, I.M.**, Macklin, M.L., McNally, R.J., van den Hout, M.A., & Arntz, A. (2001). Emotion and intrusion-based reasoning in Vietnam veterans with and without chronic posttraumatic stress disorder. *Behaviour Research and Therapy*, 39, 1339-48. (IF=2.89)
19. Van den Hout, M.A., **Engelhard, I.M.**, De Boer, C., Du Bois, A., & Dek, E. (2008). Perseverative and compulsive-like staring causes uncertainty about perception. *Behaviour Research and Therapy*, 46, 1300-4. (IF=2.89)
20. Wilhelm, S., Keuthen, N.J., Deckerbach, T., **Engelhard, I.M.**, Forker, A.E., Baer, L., O'Sullivan, R.L., & Jenike, M.A. (1999). Self-injurious skin picking: Clinical characteristics and comorbidity. *Journal of Clinical Psychiatry*, 60, 454-9. (IF=5.53)

Van den Hout

1. Boelen, P.A., Bout, J. van den, & **Hout, M.A. van den** (2003). The role of cognitive variables in psychological functioning after the death of a first-degree relative. *Behaviour Research and Therapy*, 41, 1123-36. (IF=2.89)
2. Honk, J. van, Tuiten, A., Haan, E. de, **Hout, M. van den**, & Stam, H. (2001). Attentional biases for angry faces: Relationships to trait anger and anxiety. *Cognition and Emotion*, 15, 279-97. (IF=1.62)
3. Honk, J. van, Tuiten, **Hout, M. van den**, Putman, P., Haan, E. de, & Stam, H. (2001) Selective attention to unmasked and masked threatening words: relationships to trait anger and anxiety. *Personality and Individual Differences*, 30, 711-20. (IF=1.42)
4. **Hout, M.A. van den**, Arntz, A., & Merckelbach, H. (2000). Contributions of psychology to the understanding of psychiatric disorders. In: M.G. Gelder, J.J. López-Ibor & N. Andreasen (Eds.), *New Oxford Textbook of Psychiatry* (pp. 277-292). New York, Oxford University Press.
5. **Hout, M.A. van den** & Barlow, D. (2000). Attention, arousal and expectancies in anxiety and sexual disorders. *Journal of Affective Disorders*, 61, 241-56. (IF=3.08)
6. **Hout, M.A. van den**, Engelhard, I.M., De Boer, C., Du Bois, A., & Dek, E. (2008). Perseverative and compulsive-like staring causes uncertainty about perception. *Behaviour Research and Therapy*, 46, 1300-4. (IF=2.89)
7. **Hout, M.A. van den**, Jong, P. de, & Kindt, M. (2000). Masked fear words produce increased SCRs: An anomaly for Öhman's theory of pre-attentive processing in anxiety. *Psychophysiology*, 37, 383-8. (IF=3.16)
8. **Hout, M.A. van den** & Kindt, M. (2003). Phenomenological validity of an OCD-memory model and the remember/know distinction. *Behaviour Research and Therapy*, 41, 369-78. (IF=2.89)
9. **Hout, M.A. van den** & Kindt, M. (2003). Repeated checking causes memory distrust. *Behaviour Research and Therapy*, 41, 301-16. (IF=2.89)
10. **Hout, M.A. van den** & Kindt, M. (2004). Obsessive Compulsive Disorder and the paradoxical effects of perseverative behaviour on experienced uncertainty. *Journal of Behaviour Therapy and Experimental Psychiatry*, 35, 165-81. (IF=1.43)

11. **Hout, M.A. van den**, Kindt, M., Weiland, T., & Peters, M. (2002). Instructed neutralization, spontaneous neutralization and prevented neutralization after an obsession-like thought. *Journal of Behavior Therapy and Experimental Psychiatry*, *33*, 177-89. **(IF=1.43)**
12. **Hout, M. A. van den**, Muris, P., Salemink, E., & Kindt, M. (2001) Autobiographical memories become less vivid and emotional after eye movements. *British Journal of Clinical Psychology*, *40*, 121-30. **(IF=2.06)**
13. **Hout, M.A. van den**, Pol, M., & Peters, M. (2001). On becoming neutral: effects of experimental neutralizing reconsidered. *Behaviour Research and Therapy*, *39*, 1439-48. **(IF=2.89)**
14. Jong, P.J. de, **Hout, M.A. van den**, Rietbroek H., & Huijding, J.(2003). Dissociations between implicit and explicit attitudes toward phobic stimuli. *Cognition and Emotion*, *17*, 521-45. **(IF=1.62)**
15. Kindt, M. & **Hout, M.A. van den** (2003). Dissociation and memory fragmentation: experimental effects on meta-memory but not on actual memory performance. *Behaviour Research and Therapy*, *41*, 167-78. **(IF=2.89)**
16. Lankveld, J.J.D.M. van, **Hout, M.A. van den**, & Schouten, E.G.W (2004). The effects of self-focused attention, performance demand and dispositional sexual self-consciousness on sexual arousal of sexually functional and dysfunctional men. *Behaviour Research and Therapy*, *42*, 915-35. **(IF=2.89)**
17. Lankveld, J.J.D.M., van **Hout, M.A. van den**, Spigt, M.G., & Koeveringe, G.A. van, (2003). Cognitive changes predict continued recovery of erectile functioning versus relapse after discontinuation of sildenafil treatment for male erectile dysfunction. *Psychosomatic Medicine*, *65*, 709-18. **(IF=3.36)**
18. Severeijns, R., Vlaeyen, J.W.S., & **Hout, M.A., van den** (2004). Do we need a communal coping model of pain catastrophizing? An alternative explanation. *Pain*, *111*, 226-9. **(IF=4.84)**
19. Severeijns, R., **Hout, M.A. van den**, Vlaeyen, J.W., Picavet, H.G. (2002). Pain catastrophizing and general health status in a large Dutch community sample. *Pain*, *99*, 367-76. **(IF=4.84)**
20. Thewissen, R., **Hout, M. A. van den**, Havermans, R.C., & Jansen, A. (2005). Context-dependency of cue-elicited urge to smoke. *Addiction*, *100*, 387-96. **(IF=4.09)**

Smeets

1. Beun, de, R., Jansen, E., **Smeets, M.A.M.**, Niesing, J., Slangen, J. & N.E. Van de Poll (1991). Estradiol-induced conditioned taste-aversion and place-aversion in rats: sex- and dose-dependent effects. *Physiology & Behavior*, *50*, 995-1000. **IF=2.2**
2. Bulsing, P.J., **Smeets, M.A.M.** & van den Hout, M. (2009). The implicit association between odors and illness. *Chemical Senses*, DOI: 10.1093. **IF=1.6**
3. Bulsing, P.J., **Smeets, M.A.M.**, Hummel, T., & van den Hout, M. (2007). Influence of chemosensory pain-expectancy on olfactory event-related potentials. *NeuroImage*, *38*, 164-170. **IF=5.6**
4. Bulsing, P.J., **Smeets, M.A.M.**, & Van den Hout, M.A.. (2007). Positive implicit attitudes toward odor words. *Chemical Senses*, *32*, 6, 525-535. **IF=2.5**
5. Dalton, P. & **Smeets, M.** (2004). Olfactometry: the human nose as a detection instrument. In: Hedge, A. (Ed.), 1st ed. *Handbook of Human Factors and Ergonomic Methods* (pp. 66-1- 66-8). Baton Rouge: CRC Press.
6. Opiekun, R., **Smeets, M.**, Sulewski, M., Rogers, B, Prasad, N., Vedula, U. & Dalton, P. (2003). Assessment of ocular and nasal irritation in asthmatics resulting from fragrance exposure. *Clinical and Experimental Allergy*, *33*, 1256-1265. **IF=3.6**
7. **Smeets, M.A.M.** (1999) Body size categorization in anorexia nervosa using a morphing instrument. *International Journal of Eating Disorders*, *25*, 451-455. **IF=1.9**
8. **Smeets, M.**, Bulsing, P., Van Rooden, S, Steinmann, R., de Ru, S., Ogink, N., Van Thriel, C, & Dalton, P. (2007) Odor and lateralization thresholds for ammonia: a comparison between static and dynamic olfactometry. *Chemical Senses*, *32*, 1, 11-20. **IF=2.5**

9. **Smeets, M.A.M.**, & Dalton, P.H. (2002). Perceived odor and irritation of isopropanol: a comparison between naïve controls and occupationally exposed workers. *International Archives of Occupational and Environmental Health*, 75, 541-548. **IF=1.5**
10. **Smeets, M.A.M.** & Kosslyn, S.M. (2001). Hemispheric differences in body images in anorexia nervosa. *International Journal of Eating Disorders*, 29, 4, 409-41. **IF=1.9**
11. **Smeets, M.A.M.** , Kroeze, J.H.A. & Dalton, P.H. (2006). Setting occupational exposure limits in humans: Contributions from the field of Experimental Psychology. *International Archives of Occupational and Environmental Health*, 79, 299-307. **IF=1.5**
12. **Smeets, M.A.M.**, Maute, C., & Dalton, P.H. (2002). Acute sensory irritation from exposure to isopropanol at TLV in workers and controls: Objective versus subjective effects. *Annals of Occupational Hygiene*, 46, 4, 253-373. *LEAD Article*. **IF=1.1**
13. **Smeets, M.A.M.**, Schifferstein, H. N. J. , Boelema, S.R., & Lensvelt-Mulders, G. (2008). The Odor Awareness Scale (OAS): A new scale for measuring positive and negative odor awareness. *Chemical Senses*, 33, 725-734. **IF=1.6**
14. **Smeets, M.A.M.**, Ingleby, D., Hoek, H.W. & Panhuysen, G.E.M. (1999). Body size perception in anorexia nervosa: a signal detection approach. *Journal of Psychosomatic Research*, 46, 5, 465-477. **IF=2.1**
15. **Smeets, M.A.M.** & Panhuysen, G.E.M. (1995). What can be learned from body size estimation? It all depends on your theory. *Eating Disorders: The Journal of Treatment and Prevention*, 3, 101-115.
16. **Smeets, M.A.M.**, Smit, F., Panhuysen, G.E.M. & Ingleby, J.D. (1998). Body Perception Index: Benefits, Pitfalls, Ideas. *Journal of Psychosomatic Research*, 44, 459-464. **IF=2.1**
17. **Smeets, M.A.M.**, Smit, F., Panhuysen, G.E.M. & Ingleby, J.D. (1997). The influence of methodological differences on outcome of body size estimation studies in anorexia nervosa. *British Journal of Clinical Psychology*, 36, 263-277. **IF=1.6**
18. Stewart, T.M., Williamson, D.A., **Smeets, M.A.M.**, Greenway, F. (2001). The Body Morph Assessment: Development of a computerized measure of body image. *Obesity Research*, 9, 1, 43-50. **IF=4**
19. Williamson, D.A., Womble, L.G., **Smeets, M.A.M.**, Netemeyer, R, Thaw, J.A., Kutlesic, V., & Gleaves, D.H. (2002). The latent structure of eating disorder symptoms: A factor analytic and taxometric investigation. *American Journal of Psychiatry*, 159, 412-418. **IF=8.3**
20. Williamson, D.A., Zucker, N., Martin, C. & **Smeets, M.** (2001). Etiology and Management of eating disorders. In: Adams, H.E. & Sutzker, P.B. (Eds.): *Comprehensive Handbook of Psychopathology*, 3rd Edition. New York: Plenum.

Eerdere ervaring als (co-)promotor:

Iris Engelhard is promotor van Miriam Lommen (2008-2012) en een AIO die momenteel wordt geworven en was copromotor van Manon Vincken (2003-2007, UM).

Marcel van den Hout is als promotor betrokken bij 32 proefschriften van 1988 t/m 2008.

Monique Smeets is copromotor van Patricia Bulsing (2004-2008; promotiejaar: 2009) en een AIO die binnenkort wordt geworven.

Maximaal 10 per aanvrager; naam proefschrift en promotiejaar.

Promotor: Prof. dr. Marcel van den Hout	
1. Harald Merckelbach ' <i>Preparedness and classical conditioning of fear: A critical inquiry</i> '	1989
2. Anita Jansen ' <i>Binge eating; notes and data</i> '	1990
3. Arnoud Arntz (Cum laude) ' <i>Attention, emotion, prediction and control</i> '	1991
4. Madelon Peters ' <i>Chronic pain and pain perception</i> '	1992
5. Peter J. de Jong ' <i>Phobia: Contingencies, cognitions, and reflexes</i> '	1994
6. Jack van Honk ' <i>Selective attention to threat: Cognitive and biological mechanisms</i> ' (met Prof. Edward De Haan, UU)	1999
7. Iris Engelhard ' <i>Resilience and vulnerability factors in risk for posttraumatic stress disorder</i> ' (met Prof. Richard McNally, Harvard University)	2002
8. Jorg Huijding ' <i>Automatic affective associations and psychopathology</i> ' (met Prof. Peter J. de Jong, RUG)	2006
9. Roy Thewissen ' <i>Smoking in context: The influence of cues and contexts on urge to smoke</i> ' (met Prof. Anita Jansen, UM)	2007
10. Elske Salemink ' <i>Believing is seeing; the causal role of interpretive bias in anxiety</i> ' (met Prof. Merel Kindt, UvA)	2008

Ondertekening

Ik verklaar hierbij dat ik dit formulier naar waarheid heb ingevuld:

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Stuur het ingevulde formulier s.v.p. elektronisch naar: de ambtelijk secretaris van de RZO,
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