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Counterconditioning in the treatment of spider phobia: effects on disgust, fear and valence

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Abstract

From the perspective that disgust is a core feature of spider phobia, we investigated whether the treatment efficacy could be improved by adding a counterconditioning procedure. Women with a clinically diagnosed spider phobia ($N = 34$) were randomly assigned to the regular one-session exposure condition (EXP) or to the exposure with counterconditioning condition (CC). In the CC-condition tasty food-items were used during the regular exposure exercises and the participants' favourite music was played. Both treatment conditions appeared very effective in reducing avoidance behaviour and self-reported fear of spiders, strongly attenuated the disgusting properties of spiders and altered the affective evaluations in a positive direction. CC was not more effective in altering the affective valence of spiders than EXP and was not superior with respect to the long term treatment efficacy at 1 year follow up. Apparently, regular exposure treatment is already quite effective in altering the affective-evaluative component of spider phobia and it remains to be seen whether it is possible to further improve treatment outcome by means of procedures which are specifically designed to reduce the spiders' negative affective valence.

1. Introduction

There is increasing evidence that disgust and fear of contamination somehow underlie spider phobia. Indirect support for this position is provided by a series of studies demonstrating that common spider fear correlates with disgust sensitivity as indexed by both the Disgust

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Questionnaire (DQ; Rozin, Fallon & Mandell, 1984), a questionnaire which is mainly concerned with food contamination by animal products (Davey, 1992; de Jong & Merckelbach, 1998; Mulkens, de Jong & Merckelbach, 1996), as well as by the Disgust Scale (DS; Haidt, McCauley & Rozin, 1994), which is a broader index of disgust sensitivity covering seven domains of disgust elicitors such as body products, animals and body envelope violations (de Jong & Merckelbach, 1998; Tolin, Lohr, Sawchuk & Lee, 1997).

In line with this, women as well as children with a clinically diagnosed spider phobia were found to have higher levels of disgust sensitivity than nonphobic controls (de Jong, Andrea & Muris, 1997; Mulkens et al., 1996; Thorpe & Salkovskis, 1998). The higher levels of disgust sensitivity in the phobic groups could not be attributed to higher levels of trait anxiety or neuroticism (de Jong et al., 1997; Mulkens et al., 1996). Furthermore, the repeated finding that DQ scores of spider phobics remain unaffected after successful treatment (de Jong et al., 1997; Merckelbach, de Jong, Arntz & Schouten, 1993) clearly refutes the suggestion that high levels of disgust sensitivity as indexed by the DQ are a mere epiphenomenon of phobic fear (e.g. Thorpe & Salkovskis, 1998).

More direct evidence for the relationship between disgust and spider phobia was obtained by Mulkens and colleagues who showed that for spider phobic individuals, spiders share the crucial feature of all disgusting objects, namely that they can render perfectly good food-items inedible by brief contact, even when there is no detectable trace of the offensive item (e.g. Rozin & Fallon, 1987). During a behavioural test only 25% of a spider phobic group eventually ate (some of) a preferred cookie after it had been in short contact with a live spider versus 75% of the nonphobic women (Mulkens et al., 1996). Using an in vitro variant of this test, similar results were obtained in spider phobic children (de Jong et al., 1997).

Although it has been argued that this repugnance to eating the favourite food-item is fuelled by fear rather than disgust (e.g. Thorpe & Salkovskis, 1998), recent data render this possibility very unlikely. Note that if this would be the case, all phobic stimuli would have similar contaminating properties. Yet, in contrast to spider fearful participants, wasp fearful individuals (who are mainly afraid of being bitten) did not show a significant decline in their motivation to eat their favourite chocolate bar after it had been in brief contact with their phobic object, although the fear levels of both groups were virtually identical (Andrea, 1996). Clearly, these findings refute the idea that the contaminating properties of spiders are merely due to their fear evoking properties.

The idea that disgust plays an important role in spider phobia is further substantiated by the finding that the majority of spider phobic individuals reported that they consider their phobic stimulus (i.e. spider) as their most disgusting item (Thorpe & Salkovskis, 1998). Related, Tolin and colleagues (Tolin et al., 1997) demonstrated that the reactions of an analogue group of spider phobics to pictures of spiders were not restricted to fear but consisted of disgust as well. Note however, that during naturalistic confrontations with a spider, the threat of the spider's uncontrollable approach behaviour is likely to outstrip the typical symptoms of disgust such as feelings of dizziness, nausea and fainting. Germane to this possibility, it has been reported that in some individuals with blood-injection-injury phobia the typical (disgust related) vasovagal reaction first appeared after the fear of injections was strongly reduced (Öst, 1985; Trijsburg et al., 1996). Following this, the strong (fear-related) sympathetical activity in spider phobics may outstrip the (disgust-related) increase of parasympathical activity and this may explain why the

typical symptoms of disgust seldom occur when spider phobic individuals are confronted with a spider.

Perhaps, then, spider phobia can be best conceptualised as a fear of physical contact with a disgusting stimulus. For most disgusting stimuli the chances of unwanted and unexpected physical contact are negligible, as they are relatively immobile (e.g. faeces, blood, maggot) and/or do not tend to enter people's private territories (e.g. snail, worm). In contrast, spiders frequently cross the border of people's private living space and can move quickly. Therefore, the threat of unwanted physical contact seems much larger for spiders than for other disgusting objects or animals. Following this, the interaction of the spiders' disgusting properties and the threat of unwanted physical contact constitutes the fear of spiders. Germane to this, Davey (1993) found that disgust sensitivity considerably adds to individuals' fear ratings of a novel animal when it is modulated in an interactive fashion by beliefs about being physically contacted or attacked by the animal.

From the conceptualisation of spider phobia as an interaction of two orthogonal dimensions, there are two different starting points for the treatment of spider phobia. First, one can try to remove the intrinsically negative characteristics of spiders; second, one can learn the phobic individuals that the chance of unwanted physical contact is, in fact, extremely small. Clearly, the regular one-session in vivo exposure treatment (Öst, 1989a) takes hold of the latter dimension, as people learn during the exposure exercises that spiders, in fact, try to avoid physical contact and are highly predictable and well controllable. To the extent that individuals are encouraged to make prolonged physical contact with spiders, the regular in vivo exposure may also help to reduce the disgusting properties of spiders (cf. Rozin & Fallon, 1987). In line with this there is preliminary evidence indicating that the spiders' contaminating properties are attenuated after a one-session exposure in vivo (de Jong et al., 1997).

Although several studies have demonstrated that a 2.5 h one-session exposure is very effective in reducing fear and avoidance behaviour in spider phobia (e.g. Arntz & Lavy, 1993; Öst, Salkovskis & Hellstrom, 1991), thus far the treatment of spider phobia is neither specifically tailored to reduce the disgust evoking status nor to alter the more general negative appreciation of spiders. Germane to this, Baeyens and colleagues wrote: "..., one would predict that the standard exposure based therapies are not able to alter this primary affective-evaluative component of the disorder (...). Clinical observation seems to confirm this prediction: after exposure therapy, the avoidance behaviour may be drastically reduced, but spiders remain nasty little animals. Maybe a counterconditioning experience provides the only way to change the negative evaluation of spiders towards more neutrality" (Baeyens, Eelen, van den Bergh & Crombez, 1989, p. 286); and "...For example, some animal phobias clearly better fit with the evaluative learning than with the signal-learning conceptualization (Matchett & Davey, 1991). Phenomenologically, the phobic object may be feared and/or disliked for itself rather than signalling the occurrence of a negative event; animal phobias often present themselves without detectable contingency awareness and are often extremely resistant to corrective verbal information concerning the stimulus contingencies; finally, exposure therapy (extinction procedure) is often not successful in altering the 'intrinsic' negative valence of the phobic object" (Baeyens, Eelen & van den Bergh, 1992, p. 134).

Neutralising the negative affective-evaluation of spiders and reducing the spiders disgusting properties may well further reduce individuals avoidance behaviours as well as

their fear responses (cf. Rachman, 1981). In addition, it seems reasonable to argue that reducing the 'intrinsic' negative valence of spiders may help to prevent the return of phobic complaints. That is, unexpected future encounters with spiders or accidental physical contact is less likely to reinstate phobic fear if spiders are considered as neutral or even positive stimuli.

The present study was designed to investigate this issue in a clinical context. First, we explored whether and to what extent, a regular one-session exposure in vivo treatment already alters the affective valence of spiders as well as their disgusting properties. Second, we tested whether the treatment of spider phobia would be more effective with respect to measures of fear, valence and disgust if a counterconditioning procedure was added, which was specifically designed to reduce the spiders' disgusting properties as well as their more general negative affective valence. Therefore, a treatment-seeking group of spider phobic women were treated individually by means of a one-session exposure in vivo along the lines of Öst (1989a). In the counterconditioning condition, tasty food-items were presented during the regular exposure exercises and the participants' favourite music was played.

We used music because of its easy entry in the affective system and its capacity to modify affective responses (e.g. Martin, 1990). In addition, there is already preliminary evidence for the applicability of music in the treatment of animal phobia. That is, using a within subjects design Eifert and colleagues demonstrated in a group of 6 animal phobics that decreases in fear as well as positive changes in the evaluation of the feared animals were greater during exposure sessions (3×25 min) with liked music than in the sessions without music (Eifert, Craill, Carey & O'Connor, 1988). Thus, these results support the idea that liked music can be used in a clinical context to achieve positive evaluative conditioning effects. In a similar vein we expected that the use of tasty food-items during the exposure exercises would act in a way to reduce the spiders' disgusting properties and to change the evaluation of spiders in a positive direction.

The therapist encouraged the participants to eat and drink their favourite items during the exposure exercises and to observe the spider(s) while guiding them across the (unwrapped) food-items, etc. (see procedure section). The counterconditioning exercises were only performed during the final 30 min of the 3 h sessions. This was done because a considerable reduction of fear is a necessary prerequisite for carrying out such exercises successfully and to prevent the intense fear during the earlier phases of the session from reducing the positive valence of the music and the food-items rather than vice versa resulting in counterconditioning in the wrong direction (cf. Eifert et al., 1988). In the control condition, the women continued with the regular exposure exercises during the final 30 min of the session.

Following Baeyens et al. (1989, 1992) we expected that the regular exposure treatment would not alter the affective-evaluative component of spider phobia. In addition, we predicted that counterconditioning would lead to superior treatment results especially with regard to the spiders' valence and disgust evoking status. Finally, we predicted a more general (positive) effect of counterconditioning after one year follow up, as it was thought to prevent the return of phobic complaints.

2. Method

2.1. Participants

Participants were women who had a strong fear of spiders and applied for treatment at our department of Maastricht University. There were 5 men in the total sample. They were not included in the present study because their low number did not allow us to statistically control for any differences related to the participants' sex. After a telephone interview, applicants were asked to complete and return the Spider Phobia Questionnaire (SPQ; Klorman, Weerts, Hastings, Melamed & Lang, 1974) and to write down in their own words how fear of spiders interfered with their daily lives. Only individuals with SPQ scores in the phobic range (i.e. >17; Arntz & Lavy, 1993) and who indicated that fear of spiders strongly interfered with daily life were invited for an assessment procedure at our department. During a structured clinical interview, it was determined whether the fearful individuals met the criteria for specific phobia from the DSM-IV (American Psychiatric Association, 1994). For those who fulfilled the criteria ($n = 34$ women), mean score on the SPQ was 24.1 (S.D. = 3.4), which comes close to the mean SPQ-score reported by Arntz and Lavy (1993) for their sample of treatment seeking women with spider phobia. In addition, the spider phobic women underwent a Behavioural Approach Task; the BAT was scored on a 8-point scale ranging from 1 (spider at 4 meters) to 8 (spider on hand for at least 30 s) (see below for details concerning the BAT procedure). Mean BAT score was 3.6 (S.D. = 1.8). Mean age was 30 yr (S.D. = 8.2) and mean educational level was 7.6 (range = 1–11) on a scale ranging form no education finished (1) to university education (11).

2.2. Materials

2.2.1. BAT

A behavioural approach test (BAT) was used to assess the approach of a medium sized house spider. The spider was placed in a glass jar on a table. A pencil and a plastic washing-up bowl were also placed on this table. The participants were instructed as follows: "To get an impression of how far you dare to approach a spider, I will ask you to perform a number of steps. You are free to refuse each step, you are not required to force yourself. But, you should do your very best so that we get an impression of how far you dare to go. Do you have any questions concerning this procedure?" The participant was instructed to perform each step following verbal instructions given by the assistant, who remained in the corner of the room. There were 8 steps: (1) walk towards the spider as near as you can; (2) touch the jar; (3) open the jar; (4) take the jar in your hands; (5) touch the spider with the pencil; (6) put the spider in the washing bowl; (7) touch the spider with a finger; (8) let the spider walk over your hands. After each instruction, the assistant asked the participant whether she was willing to carry out the step or not. When participants refused, the instructions describing the step were repeated. To get a positive rating, participants had to start with the step immediately after the instruction and had to perform it successfully within 1 minute. The assistant neither encouraged nor praised the participant.

2.2.2. Valence

Visual Analogue Scales (VASs) were used to assess the valence of spiders. Participants were asked to rate spiders on the following dimensions: unpleasantness (extremely pleasant = 0; extremely unpleasant = 100), dreariness (not dreary at all = 0; extremely dreary = 100), nastiness (not nasty at all = 0; extremely nasty = 100), creepyness (not creepy at all = 0; extremely creepy = 100) and dangerousness (not dangerous at all = 0; extremely dangerous = 100).

2.2.3. Disgust questionnaire-spider (DQ-spider: de Jong et al., 1997)

To assess spiders' contaminating properties, participants were asked to rate on a 9-point scale how much they would like to eat their favourite chocolate bar after a spider has walked across the bar when it is still wrapped in its package and when the spider walked across the unpacked bar (1 = do not want to eat at all; 9 = would like to eat very much).

2.2.4. Cookie-test

The disgusting status of spiders after treatment was further explored in a behavioural test (cookie-test: Mulkens et al., 1996). In this test they had to choose from a box containing a range of different cookies, the cookie they preferred most. Following this, they had to rate on a VAS how much they wanted to eat the cookie (ranging from 0 = do not want to eat at all to 100 = want to eat very much). Next, an assistant walked in and guided a medium-sized live house spider across the cookie at a 1-m distance from the participants. As soon as the assistant left the room with the spider, the participants rated once more on a VAS how much they wanted to eat the cookie. Finally, participants were asked to eat the cookie; instructions to eat the cookie were repeated once more if they refused.

2.2.5. Food-preference list

We constructed a list of 30 food-items which were pre-selected for the counterconditioning procedure (e.g. different types of chocolate bars, cookies and drinks). Participants rated each item on a scale ranging from 1 (extremely distasteful) to 9 (extremely tasty).

2.3. Procedure

The pre-treatment assessment procedure took place approximately 1 week before treatment. During this procedure participants first underwent the standardised interview to check whether their complaints met with the DSM IV criteria for specific phobia. Then, participants performed the BAT. Immediately after the BAT they rated the valence of spiders. Following this, the contaminating properties of spiders was assessed by means of the thought experiment (DQ-spider). Finally, they rated the Food Preference list and were instructed to bring a cassette or compact disk with their favourite music on the day of treatment.

Participants were randomly allocated to one of the two treatment conditions. After the treatment session, participants rested for half an hour before they performed the post-treatment BAT. After the BAT participants, again, evaluated the valence of spiders. Following this, the spiders' contaminating properties were assessed by means of the same thought experiment procedure as was used during the pre-treatment assessment (DQ-spider). Then participants completed the post-treatment SPQ and the Food Preference list. Finally,

participants performed the cookie-test. As we expected that this test would be strongly affected by prior experience, this test was only performed after treatment and introduced as an unrelated experiment.

After the post-treatment assessments, participants were instructed about the maintenance exercises (cf. Öst, 1989b). One year after treatment, we mailed another set of questionnaires (i.e. SPQ, valence VASs and the DQ-spider) and asked the participants to return the completed questionnaires to our department.

2.4. Therapists

Therapists were 6 female students who had almost finished their studies on Mental Health Sciences at Maastricht University and had successfully passed an elementary clinical training. They received an additional training that was specifically tailored for the present study. The therapists treated pilot subjects before the actual study started. The first author supervised the therapists and was during all treatment sessions stand-by for advice and assistance.

2.5. Treatment

Participants were randomly allocated to the exposure only (EXP) group ($n = 16$) or the exposure and counterconditioning (CC) group ($n = 18$). After the explanation of the rationale, both treatments were judged as equally credible on a scale ranging from not convincing at all (0) to very convincing (100), means being 60.4 and 64.8 for EXP and CC, respectively [$t(32) < 1$]. After treatment, both groups displayed similar responses to the question whether they would recommend this treatment to friends or family members. On a scale ranging from not at all (0) to very much (100), mean ratings were 75 for the EXP group and 77 for the CC group [$t(32) < 1$]. Both treatment groups did not differ significantly at pre-test with regard to the disgust, fear and valence measures (see also Table 1; SPQ $t(32) = 1.6$, $p > 0.1$; BAT $t(32) < 1$; spiders' contaminating properties $F_{\text{hotelling's}}$ (1,32) < 1; spiders' valence $F_{\text{hotelling's}}$ (4,29) < 1).

All women were treated individually at the university laboratory. Both types of treatment started with a 2.5 h hierarchical in vivo exposure along the lines of Öst (1989a). First, the main dimensions of the patient's fear were assessed. Then, the therapist described how avoidance and escape behaviours act in a way to maintain the phobic complaints; the therapist subsequently explained the rationale of the exposure treatment and discussed possible questions concerning the treatment. Therapists in the CC condition added reference to the negative valence of spiders and their disgusting properties. They explained that after a substantial reduction of the participants' fear of spiders, prolonged and close contact of spiders with tasty food-items is likely to reduce the spiders' disgusting status. In addition, they explained that listening to their favourite music during the final part of the session may be helpful to attenuate further their negative appreciation of spiders. In both treatment conditions, it was stressed that during this session nothing would happen against the patient's will. It was further explained that the treatment requires a very active role of the patient, whereas the therapist would predominantly act as a coach.

Treatment in both conditions consisted of exposure exercises of increasing difficulty (ranging from looking at a spider in a jar to prolonged physical contact with several spiders). Within each session the type of exposure exercises were accommodated to the patient's specific fears.

The women were encouraged to design behavioural experiments to get relevant information with regard to questions which arose during the sessions. The therapist modelled exercises or behavioural experiments when it seemed indicated. The women in the EXP group received a regular 3 h exposure treatment. In the CC condition tasty food-items were used during the final 30 min. In addition, participants' favourite music was played during this final part of the treatment. Women in the CC-condition were encouraged to guide the spider(s) across the food-items; to pursue a similar procedure when the food-items were unpacked; to eat and/or drink items after these items had been in contact with the spider(s); and to eat and drink their favourite food-items during the regular exposure exercises. This counterconditioning procedure was done with the largest spider(s) the patient had learned to tolerate on their hands/arms without excessive fear during the previous 2.5 h exposure exercises.

The participants in the CC-condition completed the food-items preference list both before and after treatment. Mean scores of the items which were used during treatment were 6.7 (S.D. = 0.9) before and 6.5 (S.D. = 1.2) after treatment [$t(17) = 0.8$]. Thus, the self-reported valence of these food items was not attenuated by the counterconditioning procedure (i.e. the contingent presentation of live spiders).

2.6. Maintenance exercises

Both groups of participants received a detailed brochure (summarising the rationale, homework assignments, examples of exercises, etc.), a realistic black toy spider (medium size house spider) and a set of diary forms. As a homework assignment participants were instructed to catch a spider (or ask a friend or family member to do so) and were advised to practice the newly acquired skills as much as possible. In addition, the CC group was instructed to put the toy spider and the glass jar containing the live spider the next three weeks on the table during diner (in good sight). To control for the amount of exposure, the EXP group was instructed to watch the toy spider and the live spider in the jar for 15 min each day during the next three weeks (not during or immediately after eating or drinking). The therapists acknowledged that these exercises may seem rather uncommon, but stressed the importance for both the consolidation of the patients' treatment success and the validity of the present research project. Finally, participants were asked to indicate for each day on the diary form, how much time they had spent on what type of exposure exercises. After 3 weeks, participants returned the completed diary forms.

3. Results

3.1. Treatment effects at post-test

3.1.1. Fear

3.1.1.1. SPQ. For both groups mean SPQ scores (before and after treatment) are shown in Table 1. A 2 Group (EXP/CC) × 2 Treatment (before/after) ANOVA revealed a main effect of Treatment [$F(1,32) = 87.0$, $p < 0.001$]. This effect reflects the fact that after treatment partici-

pants showed generally lower SPQ scores than before treatment. Yet, there was no evidence to suggest that the CC group profited more from treatment than the EXP group. That is, the Group × Treatment interaction was not significant [$F(1,32) = 2.7$, $p = 0.11$].

3.1.1.2. BAT. A 2 Group × 2 Treatment ANOVA pertaining to the BAT scores revealed a similar pattern of results. Before treatment participants generally displayed far less approach behaviour than after treatment, [$F(1,32) = 100.4$, $p < 0.001$]. Again, this effect was similar for both groups. That is, there was no significant Group × Time interaction [$F(1,32) = 0.17$].

3.1.2. Valence

Mean ratings of the valence measures are shown in Table 1. A multivariate analysis of variance showed a main effect of Treatment [$F_{\text{hotelling's}}$ $(1,32) = 120.0$, $p < 0.001$], indicating that participants judged spiders more favourably after treatment than before treatment. As for the indices of fear, there were no differential effects between both treatments with regard to the indices of valence. That is, the interaction between Group and Treatment did not attain the conventional level of significance [$F_{\text{hotelling's}}$ $(1,32) = 2.2$, $p = 0.14$].

3.1.3. Disgust

3.1.3.1. DQ-spider. Means and standard deviations of the DQ-spider are shown in Table 1. After treatment, the contaminating properties of spiders was significantly weaker than before treatment. A multivariate analysis of variance revealed a main effect of treatment [$F_{\text{hotelling's}}$

Table 1
Mean and standard deviation of the indices of fear, disgust and valence as a function of treatment condition

Measures	Pre-test		Post-test		Follow-up	
	CC	EXP	CC	EXP	CC	EXP
Fear						
SPQ	23.2 (3.5)	25.1 (3.1)	14.4 (8.1)	12.5 (7.0)	11.4 (6.4)	9.8 (7.1)
BAT	3.6 (1.7)	3.8 (2.0)	6.7 (1.8)	7.1 (1.5)	not measured	not measured
Valence						
Unpleasant	95.3 (7.8)	94.8 (5.8)	66.7 (21.6)	54.9 (28.1)	67.3 (15.9)	58.6 (22.8)
Dreary	95.3 (5.8)	95.9 (5.7)	64.3 (19.3)	49.9 (27.9)	62.5 (17.4)	53.2 (23.9)
Nasty	82.2 (27.3)	81.9 (20.8)	45.5 (29.0)	39.9 (33.2)	48.1 (24.7)	45.2 (32.9)
Creepy	95.8 (5.4)	96.1 (5.2)	61.4 (23.1)	50.6 (27.5)	61.7 (19.8)	45.7 (29.7)
Dangerous	35.1 (31.9)	34.3 (26.5)	16.7 (28.6)	11.3 (14.3)	16.6 (16.4)	22.5 (28.9)
Disgust						
Thought exp.						
wrapped bar	5.4 (3.0)	4.9 (3.3)	6.8 (2.7)	7.3 (2.0)	6.0 (3.2)	6.7 (2.5)
unwrapped bar	2.3 (2.4)	2.3 (1.9)	5.8 (2.9)	5.1 (3.1)	4.8 (2.7)	4.7 (3.0)
Cookie test						
motivation pre	not measured	not measured	66.7 (19.3)	67.9 (27.5)	not measured	not measured
motivation post	not measured	not measured	46.6 (33.2)	46.6 (33.3)	not measured	not measured
Eat (%)	not measured	not measured	72.2	62.5	not measured	not measured

(1,32) = 56.8, $p < 0.01$]. This reduction of the spiders' contaminating properties was not particularly strong for the CC-group. That is, there was no significant Group (CC/EXP) × Treatment (before/after) interaction, $F_{\text{hotelling's}}$ (1,32) = 0.54, $p > 0.4$.

3.1.3.2. Cookie-test. Means and standard deviations of the data obtained during the experimental task are presented in Table 1. A 2 Group (EXP/CC) × 2 Contamination (before/after) ANOVA performed on participants' willingness to eat the cookie showed a main effect of contamination, F(1,32) = 20.6, $p < 0.001$. That is, there was a general decline in participants' motivation to eat the cookie after it had been in contact with a live spider. This effect was similar for the women who underwent the EXP and the women who underwent the CC treatment, $F(1,32) = 0.0$. Similarly, there was no significant difference between both groups with regard to the number of treated women who eventually ate the 'contaminated' cookie, χ^2 (1, n = 34) = 0.37, $p = 0.7$

3.2. Treatment effects at 1 year follow-up

3.2.1. Responders versus non-responders

First, the treated women who participated in the follow-up ($n = 24$) were compared with the women who did not ($n = 10$). From these 10 women, 2 women could not be traced after they had moved, 4 refused any further co-operation and 4 did not return the questionnaires despite repeated prompting by our research assistant. Half of the non-responders was allocated to the CC group and half to the EXP group. Thus, the drop-out rate was very similar for both types of treatments. At pre-test, responders and non-responders were very similar with regard to the measures of fear [SPQ: $t(32) < 1$; BAT: $t(32) < 1$] and the spiders' contaminating properties [$F_{\text{hotelling's}}$ (1,32) = 1.8, $p > 0.10$]. Meanwhile, non-responders tended to have a somewhat less negative appreciation of spiders than responders [$F_{\text{hotelling's}}$ (4,29) = 2.7, $p = 0.08$].

At post-test SPQ-scores were virtually identical for both groups [$t(32) < 1$]. Also the spiders' contaminating properties [$F_{\text{hotelling's}}$ (1,32) = 1.7, $p > 0.1$] as well as the valence scores [$F_{\text{hotelling's}}$ (4,29) < 1] were very similar for responders and non-responders. As responders and non-responders did not differ significantly on any of the pre and post-test measures, it seems justified to consider the responders as a representative sample of the original group of 34 women.

3.2.2. Fear

For both groups mean SPQ scores at follow up are displayed in Table 1. A 2 Group (CC/EXP) × 2 Treatment(before/fu) ANOVA revealed a main effect of Treatment, $F(1,22) = 131.8$, $p < 0.001$. This effect was similar for both types of treatment, $F(1,22) = 1.9$, $p = 0.17$. Thus, no evidence emerged to suggest that in the long run participants profit more from CC than from EXP.

3.2.3. Valence

Mean ratings of the valence measures are shown in Table 1. A MANOVA revealed a multivariate effect of Treatment $F_{\text{hotelling's}}(1,22) = 68.2$, $p < 0.001$, indicating that progress had been consolidated from post-test to follow-up. This effect was similar for both types of

treatment. That is, there was no significant Group × Treatment interaction, $F_{\text{hotelling's}}(1,22) = 0.8$.

3.2.4. Disgust

A MANOVA revealed a multivariate effect of Treatment, $F_{\text{hotelling's}}(1,22) = 31.3$, $p < 0.001$, indicating that, in general, the contaminating properties of spiders were significantly reduced from pre-test to 1 year follow-up. Again, this reduction was similar for both types of treatment, $F_{\text{hotelling's}}(1,22) = 0.0$.

3.3. Clinical significance

Following the recommendation of Jacobson and Truax (1991), the criterion for clinically significant change was set at 2 S.D. below mean pre-treatment scores (in case of the BAT above). Immediately after treatment the percentages of women who reached a meaningful change were: SPQ 67%; BAT 76%; Disgust 47%; Valence 77%. At one-year follow up further improvement was evident with respect to the self-report index of fear: SPQ 83%; whereas the percentages for disgust as well as valence were lowered: Disgust 29%; Valence 50%. The percentages were very similar for both types of treatment. Thus, CC was not superior with respect to the number of phobic women who reached a clinically relevant reduction of phobic complaints. The relatively small percentages of improved women with regard to the contaminating properties of spiders (Disgust) is related to the relatively large SD in this sample in combination with a restricted range of the scale (1–9). In a similar vein, the findings with regard to the BAT are likely to underestimate the actual treatment efficacy. Norms of a normal population are necessary for a more accurate evaluation of the clinical relevance of the present changes. The criterion of 2 S.D. above the normal mean (Jacobson & Truax, 1991) may well be less stringent than the criterion we had to use in the absence of such norms.

4. Discussion

The major results can be summarised as follows: (1) one-session in vivo exposure treatment with as well as without a counterconditioning procedure was very effective in reducing avoidance behaviour and self-reported fear of spiders; (2) both types of exposure treatments strongly attenuated the disgusting properties of spiders and altered the affective evaluations in a positive direction; (3) in contrast to our predictions, exposure with counterconditioning was not superior with respect to the long term treatment efficacy and was not more effective in altering the affective valence of spiders than the in vivo exposure treatment without counterconditioning.

In line with previous research (e.g. Arntz & Lavy, 1993; Öst et al., 1991), the present results clearly indicate that exposure in vivo provide good results both immediately after treatment and after one-year follow up. That is, both types of behaviour treatments resulted in a considerable reduction of avoidance behaviour and self-reported fear. In addition, the percentage of women displaying a clinical significant change with respect to the SPQ-scores and the behavioural approach test were comparable to those reported by Arntz and Lavy

(1993). We expected that adding a counterconditioning procedure would result in superior results after one year follow up. This prediction was based on the idea that the exposure with counterconditioning would be more effective in altering the negative valence of spiders and their contaminating properties than exposure without counterconditioning. However, counterconditioning appeared not more effective in changing the affective valence of spiders. Following this, it may not be surprising that also the long term treatment efficacy was similar for both types of treatment.

The absence of differential effects between the two treatment conditions was not due to a lack of positive changes in the evaluation of spiders in the CC-condition. Yet, in contrast to the prediction of Baeyens et al. (1989), the regular exposure in vivo treatment appeared already quite effective in altering the affective valence of spiders. That is, even in the absence of counterconditioning there was a considerable reduction of the negative evaluation of spiders. In addition, the contaminating properties of spiders as indexed by the DQ-spider were strongly reduced after treatment and the results of the 'cookie test' after treatment revealed similar results as Mulkens et al. (1996) previously reported for her nonphobic control group (i.e. eventually about 2/3 of the phobic women in the EXP condition eventually ate the cookie after it had been in contact with a live spider versus 3/4 of the nonphobic control group). Thus, although the ordinary one-session in vivo exposure treatment is not specifically designed to undermine the spiders' disgust evoking status nor to alter the intrinsic negative valence of spiders, regular exposure appears rather effective with respect to these aspects of spider phobia.

Several aspects of the ordinary one-session exposure treatment may help to explain its efficacy in reducing the spiders' disgusting properties. In their review, Rozin and Fallon (1987) report three different mechanisms that may act in a way to unmaking disgust responses and it can be argued that all of these mechanisms may be at work during the regular treatment. The first mechanism concerns the initiation of accepting expressions by others toward the relevant object. Following this, the modelling activities of the therapist as well as the therapist's attitude toward spiders may well have added to the positive changes of the evaluation of spiders during the ordinary exposure session. Note, however, that Rozin and Fallon expressed doubt concerning the efficacy of this type of processes for well-established disgusts (as seem the case with spider phobia).

As the second mechanism they mention 'conceptual reorientation'. This notion refers to the phenomenon that the disgust response can disappear when for example a person discovers that what she thought was rotting milk is actually yoghurt. Such a cognitive switch may also be of relevance in the context of spider phobia. That is, the majority of phobics have never had a close look at a spider (''this is really the first time in my whole life that I really look at a spider''). The mere looking at spiders, the performance of exposure exercises, looking at the modelling activities of the therapist, the information that is provided by the therapist during treatment or which they obtained themselves by means of behavioural experiments, all of these aspects of the regular treatment may have contributed to a reorientation of spiders from being atrocious, uncontrollable, attacking monsters towards the conception of spiders as tender, fragile, timid animals.

Finally, they argue that the strength of the disgust response can weaken via extinction or adaptation, for example, when someone is consistently forced into close contact with the

disgusting item (e.g. when cleaning toilets is part of your job, the aversion of dirty toilets gradually declines). In a similar vein, there is preliminary evidence to suggest that exposure may be helpful in the modification of food aversions (de Silva, 1988). Yet, as yields for disgusting items in general, spider phobics ordinarily avoid opportunities that would provide for the extinction of the disgust response. Although they may frequently view spiders at a safe distance, they clearly do not allow close contact with spiders. However, during exposure exercises they force themselves to tolerate spider(s) at a very small distance for longer periods of time and even allow spider(s) to make prolonged physical contact with their own skin, the ultimate physical boundary of the self. As disgust critically involves things foreign to the self (Rozin & Fallon, 1987), the latter procedure may be especially effective by weakening the self boundaries.

Thus, the regular one-session in vivo exposure includes several ingredients which may help to undermine the negative affective valence of spiders. The additional ameliorative effects of liked music during exposure in vivo in the study of Eifert and colleagues, may have been due to the fact that in their study the phobic individuals received a very restricted type of exposure. That is, the participants merely looked at the feared animal during 6 session of 25 min while the therapist was in an adjacent room. Thus, the phobic individuals did not handle the feared animal, received no verbal information or reinforcement and the therapist did not engage in modelling activities. It may well be that in the present study the efficacy of liked music (and tasty food items) to alter the affective valence of feared animals is blurred by the effectivity of the ingredients other than merely looking at spiders which were also included in the regular one-session in vivo exposure.

Meanwhile, it should be acknowledged that although exposure in vivo was found to be very effective with respect to all measured aspects of spider phobia, the present data suggest that there is still room for improvement, especially with regard to the spiders' valence and disgusting properties. Perhaps, the present counterconditioning procedure was of too short duration or not of sufficient strength to further neutralise the spiders' negative valence. Although there is considerable evidence that very short contingent presentations are already sufficient to alter the affective valence of neutral stimuli (e.g. Eifert et al., 1988; exp1; Baeyens et al., 1992) or to neutralise the valence of previously conditioned stimuli (e.g. Baeyens et al., 1989), it may well be that a longer counterconditioning procedure or the contingent presentation of even more intense, positively valenced stimuli are necessary for additional beneficial effects to occur in case of stimuli with a very strong negative valence. Meanwhile note with respect to the intensity of the affective valence of the tasty food items, that the present data provide no evidence to suggest that the negative evaluation of the spider was transferred onto the food-items. That is, the participants evaluation of the food-items which were used were not affected by the counterconditioning procedure. Thus, at least the present stimuli appeared to have been of sufficient intensity to prevent the occurrence of counterconditioning in the wrong direction. Yet, it still remains very well possible that the stimuli and or procedure lacked of sufficient power to further alter the affective-evaluative component of spider phobia.

Taken together, the present results clearly indicate that the ordinary one-session exposure in vivo leads to a considerable attenuation of the spiders' negative affective valence. Although there seems room for improvement, the present counterconditioning procedure provided no

additional ameliorative effects. Therefore, it remains to be seen whether it is, indeed, possible to further improve treatment outcome by means of procedures which are specifically designed to reduce the spiders' negative affective valence as well as their disgusting properties.

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