



Universiteit Utrecht

# Behavior as Information

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## Investigating exacerbating effects of safety-seeking behaviors on danger assessment in clinical anxiety patients versus non-clinical controls

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### **Abstract**

This study is a replication of an experiment by Gangemi, Mancini, and van den Hout (2012). It is investigated whether the performance of safety-seeking behaviors, such as hand washing and avoiding crowds, has exacerbating effects on danger perception in anxiety patients, while danger assessment in healthy individuals is mainly based on objective danger information. Three groups of anxiety patients, 30 obsessive-compulsives, 30 panic patients, and 30 social phobics, and a control group of 30 non-clinical participants rated the danger in a series of scripts in which the presence of safety-seeking behaviors (safety-seeking behaviors versus no safety-seeking behaviors) and objective danger information (objective danger versus objective safety) were systematically varied. Contrary to the Gangemi et al. (2012) findings no differences were found between patients and non-patients in the effect of safety-seeking behaviors on danger ratings. Safety-seeking behaviors only marginally affected danger perception in both groups, causing an increase in danger ratings under objectively safe conditions and a decrease in danger ratings under objectively dangerous conditions.

## **Introduction**

Anxiety is a common mood state; everyone experiences it. It is characterized by a diffuse, unpleasant, vague sense of apprehension and is usually considered adaptive in that it alerts the person to carry out certain acts that forestall danger (Sadock & Sadock, 2007). Anxiety is a future-oriented mood state (Barlow & Durand, 2009); it is concerned with anticipated events that are perceived as threatening. When anxiety gets out of hand it can take the shape of a disorder. Anxiety disorders are a large and diverse category within the realm of psychiatric illness. They are among the most prevalent mental disorders in the general population and are often chronic and resistant to treatment (Sadock & Sadock, 2007). Though diverse in their manifestations anxiety disorders in general can be characterized by excessive anxiety in the absence of true danger (Gazzaniga & Heatherton, 2006). That is, the anxiety loses its adaptive quality, the perception of future threat no longer seems rational, and the acts to forestall danger appear disproportionate and excessive. Such acts are referred to as 'safety-seeking behaviors' and may consist of avoidance of particular places, as is common in panic disorder, refraining from talking in groups, as is done in social phobia (Thwaites & Freeston, 2005), or repeated hand washing, which is symptomatic for obsessive compulsive disorder (Deacon & Maack, 2008). Safety-seeking behavior includes full avoidance of feared situations, as well as behaviors occurring within feared situations (Salkovskis, 1991). Although disputed in a recent study by Rachman, Shafran, Radomsky, and Zysk (2011), prevailing assumptions about safety-seeking behaviors are that they impede the reduction of fear by interfering with the process of threat disconfirmation (Hermans, Eelen, & Orlemans, 2007) and play a key role in the maintenance of anxiety disorders (Thwaites & Freeston, 2005). That is, by performing safety-seeking behaviors patients with anxiety disorders rob themselves of the opportunity to experience the harmlessness of a feared situation, thus perpetuating their threat beliefs. Moreover, safety-seeking behaviors are suggested to exacerbate anxiety and worsen the very concerns they were intended to alleviate (Deacon & Maack, 2008). The present study focuses on the way in which the performance of safety-seeking behavior, instead of ameliorating anxiety, may enhance a sense of threat by interfering with the process of danger assessment.

Close connections between behavior and anxiety are supported by general theories of emotion. The James-Lange theory of emotion states that the experience of

emotion is elicited by a physiological response to a particular stimulus or situation; in other words: we feel angry because we strike, anxious because we tremble (Gazzaniga & Heatherton, 2006). Arnold (1960) defined emotions as 'felt action tendencies'; different action tendencies are what characterize different emotions. In his two-factor theory of emotion Schachter added a cognitive component emphasizing the interpretation of the physiological response: when people experience arousal they initiate a search for its source (Gazzaniga & Heatherton, 2007). In an effort to empirically test these theoretical connections between behavior, emotion, and cognition Frijda, Kuipers, and ter Schure (1989) hypothesized that it should be possible to predict the names given by subjects to their emotions by the nature of their action readiness as well as from their appraisals. He found support for this hypothesis and concluded that emotional experiences consist of both appraisal and action readiness awareness and derive their identities from them (Frijda et al., 1989). "Specifically, we feel a particular emotion either because of a particular appraisal, or because of a particular change in action readiness, or because of both." (Frijda et al., 1989, p. 225). Thus, when it comes to experiencing emotion, behavior seems to play an important part in determining what it is we feel and why we are feeling it; i.e. we may indeed feel anxious because we feel we want to run away. Behavior, then, that specifically serves the purpose of safety-seeking, as typically performed by anxiety patients, has the effect of maintaining anxiety and may indeed exacerbate it (Deacon & Maack, 2008).

In addition to the aforementioned effect of preventing disconfirming learning experiences, safety-seeking behaviors also assert their influence by interfering with assessment processes. They may direct attentional resources away from disconfirming information (Powers, Smiths, & Telch, 2004), and increase attention toward feared stimuli (Lavy & van den Hout, 1994). Such a shift in attention may lead to increased perception of threat cues and threat overestimation (Deacon & Maack, 2008).

A different perspective is offered by the cognitive account of safety-seeking behavior. It states that what is actually avoided by performing such behaviors is eminent disaster or catastrophe, and that these threats are strongly believed (Salkovskis, 1991). From this perspective, looking for safety would be a logical and comprehensible choice of action. However, the unfortunate result may be that the non-occurrence of feared catastrophes becomes associated with the performed safety-seeking behavior, leading the individual to believe they've narrowly escaped

disaster only because of their own effort, thus confirming the risk they are in (Salkovskis, 1991). This is what Salkovskis (1991) refers to as a 'near-miss' experience: "Nothing happened, because I made an effort and took preventative action." Beliefs regarding the risk of a feared situation are protected and enhanced, instead of disconfirmed. Still, one may wonder why such crippling threat beliefs are not readily discarded in the face of disconfirming evidence. Perhaps cognitive dissonance mechanisms provide an explanation (Aronson, Wilson, & Akert, 2007). In the absence of an external justification for the performed safety-seeking behavior (disaster), internal justification is needed to avert cognitive dissonance. This justification is found in strong and amply available threat beliefs, causing actual safety to be attributed to the performed safety-seeking behavior, instead of the harmlessness of the situation: "Surely, I would not have behaved in this way if I had no reason to." In summary, behavior that serves to avoid a feared situation or that occurs within a feared situation is utilized as a source of information in the assessment of that same situation: "I act anxiously, so there must be danger."

In the area of social psychology the concept of behavior as a source of information is well established. Asking other people what they think or watching what they do helps us reach a definition of the situation (Kelly, in Aronson et al., 2007). Especially in crisis situations or situations that are ambiguous the behavior of others becomes an important factor. Informational social influence leads us to conform because we see other people as a source of information to guide our behavior, and the mechanism of pluralistic ignorance causes us to assume nothing is wrong in an emergency situation because no one else looks concerned (Aronson et al., 2007). If monitoring the behavior of others can assist in the appraisal of the situation, could our own behavior not also serve as a source of information? Surely, though, we first appraise and then act accordingly, instead of basing our appraisal on how we act? Not necessarily. Many aspects of action occur without awareness (Choudhury & Blakemore, 2006). Libet, Gleason, Wright, and Pearl (1983) studied motor consciousness and found that awareness of the initiation of a movement is not derived from the sensory signals arising from the moving limb, but from signals that precede the movement, i.e. the unconscious cerebral initiative. Furthermore, the action readiness potential in the Supplementary Motor Area occurs a full second earlier than the actual movement; the awareness of the intention to move occurs 800ms after the action readiness potential (200ms before the action), which means the brain initiates or prepares, well before any awareness of such preparations

(Choudhury & Blakemore, 2006). It seems possible that we react first and realize later. This perspective opens up the possibility that safety-seeking behaviors, though mostly perceived as a logical reaction to a threatening situation, may in fact be at the heart of the appraisal process that determines the danger level of that very situation.

Needless to say, if danger assessment is based on behavior aimed at seeking safety instead of objective safety information, threat cognitions will tend to be confirmed, thus justifying new safety-seeking behaviors; a vicious circle. As stated above, the disproportionate use of safety-seeking behavior, i.e. using them in the absence of objective danger is symptomatic of anxiety disorders. Very few empirical studies, however, have investigated the relationship between safety-seeking behavior and the development of anxiety symptoms. A notable exception is a study by Deacon and Maack (2008). Using a within-subjects, A/B/A phase change design they investigated the hypothesis that exposing undergraduate students to a series of safety-seeking behaviors, such as hand-washing, carrying hand-sanitizer, and avoiding touching money, would lead to an increase in their levels of contamination fear. They found support for this hypothesis and concluded that safety-seeking behaviors might indeed actively contribute to the emotional, cognitive and behavioral aspects of contamination fear. Engaging in safety-seeking behavior may cause selective attention towards potential contaminants, resulting in threat overestimation (Deacon & Maack, 2008). In an attempt to more specifically study the effects of safety-seeking behavior on danger assessment Gangemi, Mancini and van den Hout (2012) devised an experiment largely based on that of Arntz, Rauner, and van den Hout (1995). Arntz et al. tried to determine whether pathological anxiety is related to the tendency to base danger perceptions on physiological response information, following a method of emotional reasoning often seen in anxiety patients: "If I feel anxious, there must be danger". It was found that anxiety patients, more than healthy controls, tend to infer danger not only on the basis of objective danger information, but also on the basis of a subjective anxiety response (Arntz et al., 1995). Gangemi et al. (2012) adopted this method of reasoning and focused it on safety-seeking behavior: "If I avoid, there must be danger". From this perspective as well evidence emerged that in evaluating the danger of an event anxiety patients are influenced not only by objective danger information, but also by information regarding safety-seeking behavior, whereas non-clinical controls are not (Gangemi et al., 2012). Specifically, when presented with information about performed safety-seeking behavior within a series of scripted stories, all participants rated the danger

of a situation higher than when this information was not provided. However, the clinical groups, i.e. obsessive-compulsives, social phobics, and panic patients, were affected by the safety-seeking behavior information to a significantly higher degree than non-clinical controls. This was especially the case when scripts were objectively safe. It was also found that the extent to which anxiety patients' danger ratings were influenced by safety-seeking behavior information was, to a certain degree, disorder-specific. That is, the danger rating of obsessive-compulsives and social phobics, but not panic patients, were affected more by safety-seeking behavior information when they faced a script that was directly related to their pathology. Overall, these findings offer support for the assumption that individuals who are affected by anxiety disorders, i.e. who perceive threat in the absence of objective danger, may use the behaviors that they perform to seek safety as a source of information for assessing the danger level of the situation, thereby protecting their threat beliefs, justifying the need for new safety-seeking behaviors, and perpetuating the vicious circle of pathological anxiety.

Notably, the clinical participants in the Gangemi et al. (2012) study were approached at the start of their treatment at a psychotherapy practice in Rome, while the non-clinical controls were recruited through advertisement at the Department of Psychology at Cagliari University. This is a potential weakness in the experiment. The healthy controls, though matched for age, gender, and years of education, were likely more knowledgeable than their clinical counter-parts regarding psychological (research) theory, as the majority was either psychology student or staff. This may have influenced their scores.

The current study is a replication of the Gangemi et al. (2012) experiment, with the important exception that an essentially non-knowledgeable, matched control group was used. Obsessive-compulsives, panic patients, and social phobics were compared to this group on their danger ratings. Each subject rated the perceived danger of a number of situations presented in a series of scripts in which information about the use of safety-seeking behaviors (safety-seeking behaviors vs. no safety-seeking behaviors) and information about objective danger (danger vs. safety) were systematically varied in a  $2 \times 2$  within-subjects design. It is hypothesized that danger ratings in the healthy control group will be affected mainly by objective danger information and not by safety-seeking behavior information, while all clinical groups are expected to also infer danger from safety-seeking behavior information.

## Method

### *Participants*

Three clinical groups and one non-clinical control group took part in the experiment. The clinical groups consisted of anxiety patients from the Altrecht Academisch Angstcentrum (AAA); an anxiety treatment and research program in collaboration with Utrecht University. Originally, 36 patients with Panic Disorder (PD), 32 patients with Social Phobia (SP), and 30 patients with Obsessive Compulsive Disorder (OCD) participated. After matching for level of education, six PD-patients and two SP-patients were excluded, leaving 30 anxiety patients in each group: 10 male and 20 female panic patients, mean age 34,7 (S.D. = 10,4); 9 male and 21 female social phobics, mean age 30,3 (S.D. = 9,3); and 15 male and 15 female obsessive-compulsives, mean age 33,3 (S.D. = 11,7). They were diagnosed during intake at the AAA, using the Structured Clinical Interview for DSM-IV (SCID; First, Gibbon, Spitzer, & Williams, 1996). All patients were at the start of their treatment when they participated in the experiment. A control group of 30 individuals (10 male and 20 female, mean age 34,7 (S.D. = 13,9)) was created using a snowball sampling procedure, making the total sample size  $N = 120$ , with a mean age of 33,2 (S.D. = 11,5). The healthy controls were matched for gender, age and level of education. To rule out the presence of any axis I disorders they were administered the abbreviated SCID. The clinical groups and non-clinical controls did not differ significantly in sex ( $\chi^2(3, 120) = 3.2, p = .37$ ), age ( $F(3, 116) = .98, p = .41$ ), or educational level ( $F(3, 116) = 1.3, p = .27$ ). All participants gave written informed consent.

### *Materials and procedure*

The experiment consisted of a paper and pencil task, in which participants were asked to read a series of scripted stories and subsequently appraise them. Four scripts were presented: one that was PD-relevant (1. *crowded elevator*), one that was SP-relevant (2. *social interaction*), and two that were OCD-relevant (3. *infected wound/washing* and 4. *gas tap/checking*). Using two different OCD-relevant stories instead of one was needed to account for the more heterogeneous clinical presentation of this disorder, in which two symptom patterns seem most common: fear of contamination and pathological doubt (Sadock & Sadock, 2007). Each script started with an introduction as a base, but then developed along four different storylines, containing either: 1) safety-seeking behaviors and objective danger, 2)

safety-seeking behaviors and no objective danger, 3) no safety-seeking behaviors and objective danger, or 4) no safety-seeking behaviors and no objective danger. Thus, in total, participants read and appraised sixteen storylines (included in full and in Dutch in Appendix A). A randomized reading order was implemented, with the restriction that each of the four scripts was represented in each consecutive group of four storylines, and that two storylines from the same script were separated by at least one from a different script. In order to preclude carry-over effects the within-subjects variables *objective danger information* and *safety-seeking behavior information* were varied systematically across the different scripts and across the different storylines from the same script. All participants received and read the stories in the same random order, which is presented in Table 1.

Table 1.

*Randomized reading order of the different disorder-related scripts and their storylines*

Nr.	Script	Storyline	
		Safety-seeking behaviors	Objective Danger
1.1	PD	yes	yes
2.2	SP	no	yes
3.3	OCD (washing)	yes	no
4.4	OCD (checking)	no	no
1.4	PD	no	no
4.3	OCD (checking)	yes	no
3.2	OCD (washing)	no	yes
2.1	SP	yes	yes
3.1	OCD (washing)	yes	yes
2.3	SP	yes	no
1.2	PD	no	yes
3.4	OCD (washing)	no	no
1.3	PD	yes	no
4.2	OCD (checking)	no	yes
2.4	SP	no	no
4.1	OCD (checking)	yes	yes



Each storyline was printed on a separate piece of paper followed by four 100mm long Visual Analogue Scales (VAS) on which the participants were asked to appraise the storyline they had just read. The first VAS dealt with *danger level*, the dependent variable. The other three scales were used as decoys, to prevent participants from guessing the nature of the experiment or remembering their previous ratings. The task was preceded by a brief written introduction, including an exemplary VAS-rating. During each experimental session a staff member was present at all times.

## Results

### *Validity and reliability*

Prior to the experiment done by Gangemi et al. (2012), from which the Dutch versions of the sixteen storylines were derived, a manipulation check was executed to assess whether the storylines were a sufficiently valid measure of the two main independent variables, Danger and Safety-seeking behavior. Eighteen psychotherapists, unaware of the hypothesis under investigation, rated the storylines on the presence of objective danger and safety-seeking behavior using two visual analogue scales. A 2 x 2 repeated-measures ANOVA yielded strong main effects of both Danger on danger-ratings and Safety-seeking behavior on safety-seeking behavior-ratings (Gangemi et al., 2012). Gangemi and colleagues also assessed test-retest reliability by administering the task twice to a subgroup of the control-group, with an interval of three to five weeks, providing support for reliable and stable danger ratings (Gangemi et al., 2012).

### *Danger-ratings in anxiety-patients versus healthy controls*

The danger-ratings were analyzed by means of a 4 x 2 x 2 mixed ANOVA, with Diagnosis (OCD vs. PD vs. SP vs. healthy controls) as the between-group factor, and Safety-seeking behaviors (safety-seeking behaviors vs. no safety-seeking behaviors) and Danger (objective danger vs. objective safety) as the within-group factors. Prior to analysis, four missing values were replaced by the mean score on their respective conditions.

As suggested in Figure 1., a main effect of Danger on danger ratings was obtained ( $F(1, 116) = 303.42, p < .001, \eta^2 = .72$ ). With objective danger scripts ( $M = 5.54, SD = 1.81$ ) participants rated the danger significantly higher than with objective

safety scripts ( $M = 3.44$ ,  $SD = 1.87$ ). Furthermore, a main effect of Diagnosis on danger ratings was found ( $F(3, 116) = 3.02$ ,  $p = .03$ ,  $\eta^2 = .07$ ). Regardless of the presence of objective danger or safety-seeking behaviors, the three patient groups (OCD:  $M = 4.98$ ,  $SD = 3.15$ ; PD:  $M = 4.72$ ,  $SD = 3.17$ ; SP:  $M = 4.41$ ,  $SD = 2.98$ ) rated the danger higher than the healthy controls ( $M = 3.84$ ,  $SD = 3.0$ ). Pair-wise comparisons revealed significant differences in danger ratings between the OCD-group and healthy controls ( $p = .01$ ), and between the PD-group and healthy controls ( $p = .03$ ), but not between the SP-group and healthy controls ( $p = .15$ ). Also, the differences in danger ratings between the three patient groups were not significant (OCD versus PD:  $p = .53$ ; OCD versus SP:  $p = .16$ ; PD versus SP:  $p = .44$ ). No interaction effect between Danger and Diagnosis occurred ( $F(3, 116) = 1.3$ ,  $p = .28$ ). In the presence of safety-seeking behaviors danger was generally rated higher compared to when they were absent, resulting in a borderline significant main effect for Safety-seeking behavior ( $F(1, 116) = 3.57$ ,  $p = .06$ ,  $\eta^2 = .03$ ). The influence of safety-seeking behavior was further defined by an interaction effect between Safety-seeking behaviors and Danger ( $F(1, 116) = 37.70$ ,  $p < .001$ ,  $\eta^2 = .25$ ). Figure 1. illustrates that in the objective safety condition danger ratings increased when safety-seeking behaviors were present ( $M = 3.75$ ,  $SD = 2.03$ ), relative to when they were absent ( $M = 3.13$ ,  $SD = 1.65$ ), while in the objective danger condition they decreased when safety-seeking behaviors were present ( $M = 5.39$ ,  $SD = 1.77$ ), relative to when they were absent ( $M = 5.69$ ,  $SD = 1.84$ ). Contrary to what was hypothesized, no interaction effect between Safety-seeking behaviors and Diagnosis was found ( $F(3, 116) = .98$ ,  $p = .41$ ), implying that the presence of safety-seeking behaviors did not affect the danger ratings of the patient groups significantly different than the ratings of healthy controls. This was the case regardless of objective danger information, that is, no three-way interaction was found between Safety-seeking behaviors, Danger and Diagnosis ( $F(3, 116) = 1.67$ ,  $p = .18$ ).

Overall, these results do not unambiguously support the hypothesis that danger ratings of healthy controls are mainly influenced by objective danger information, while clinical groups are more inclined to infer danger from safety-seeking behaviors; danger assessment of both groups was affected by objective danger information and only marginally by the presence or absence of safety-seeking behaviors. Crucially, the hypothesized Safety-seeking behaviors X Diagnosis interaction was not significant, and neither was the Safety-seeking behaviors X Danger X Diagnosis interaction.

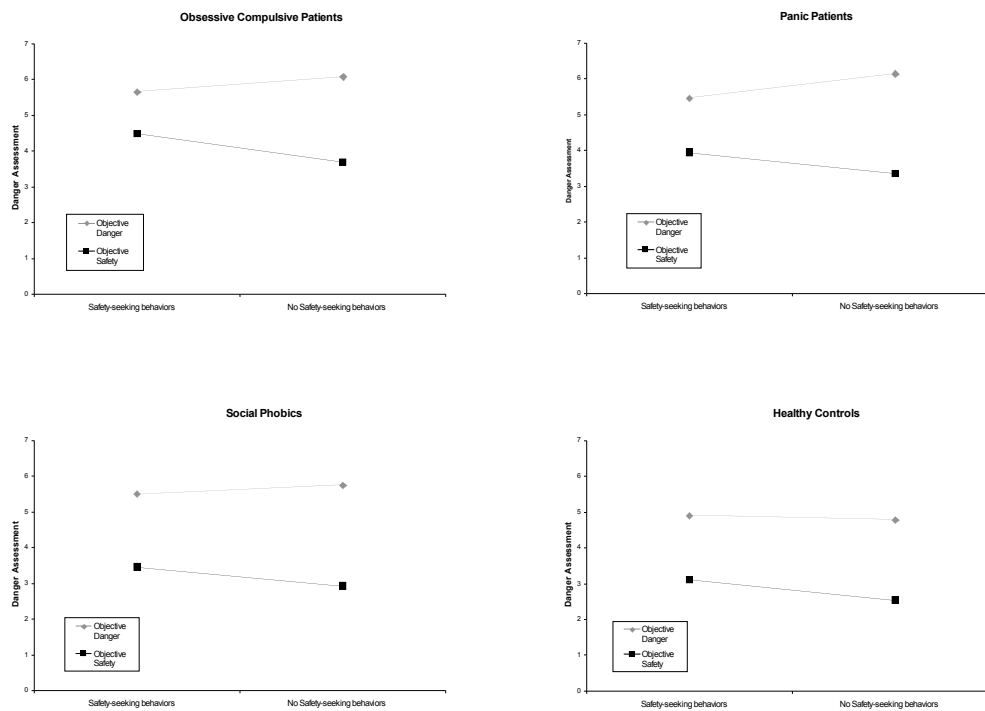


Figure 1. Main and interaction effects of the 4 x 2 x 2 mixed ANOVA for Diagnosis, Safety-seeking behaviors, and Danger conditions.

In accordance with the Gangemi et al. (submitted) study, it was further investigated whether the influence of safety-seeking behaviors on the danger ratings of the patient groups might be specific for their particular domain of clinical anxiety. For this purpose a Behavior as Information Index was construed, in which the differences in danger ratings with and without safety-seeking behaviors were computed for each script and each patient group. This resulted in nine indices (Table 2.), as the two OCD-scripts (washing and checking) were combined into an average OCD-score.

The difference scores were analyzed with a 3 x 3 mixed ANOVA, comparing Diagnosis (OCD vs. PD vs. SP) as the between-group factor, and Script (OCD vs. PD vs. SP) as the within-group factor. A main effect for Script was obtained ( $F(1.83, 158.91) = 8.32, p = .001, \eta^2 = .09$ ). Independent of the patient group, the difference scores between the Safety-seeking and the No Safety-seeking behaviors conditions were greater for the OCD-script ( $M = 4.2, SD = 3.57$ ) than for the PD-scripts (PD:  $M = 2.63, SD = 2.35$ ) and the SP-script ( $M = 2.94, SD = 3.26$ ). Pair-wise comparisons showed significant differences between the OCD-script and the PD-script ( $p < .001$ ), between the OCD-script and the SP-script ( $p = .008$ ), but not between the PD-script

and the SP-script ( $p = .38$ ). The danger ratings of participants from all three patient groups were affected by safety-seeking behavior information most when they were presented with an OCD-script. No main effect of Diagnosis was obtained ( $F(2, 87) = .28, p = .77$ ), nor a Script X Diagnosis interaction ( $F(4, 87) = 1.12, p = .35$ ).

Table 2.

*Behavior as Information Index: mean danger ratings on scripts with safety-seeking behaviors minus scripts without safety-seeking behaviors for the three script types and the three patient groups.*

Diagnosis	Script		
	OCD	PD	SP
OCD	-2.31 (5.33)	1.47 (3.84)	2.06 (3.73)
PD	-3.08 (5.03)	-.14 (3.26)	1.58 (4.65)
SP	-2.69 (4.16)	1.11 (3.08)	1.00 (4.00)

## Discussion

Safety-seeking behaviors are suggested to not only prevent threat disconfirmation (Hermans, et al., 2007) and maintain anxiety disorders (Thwaites and Feeston, 2005), but also exacerbate anxiety by interfering with the very process of danger assessment (Powers et al. 2004; Lavy, & van den Hout, 1994, Salkovskis, 1991). Gangemi et al. (2012) found support for the hypothesis that information about the performance of safety-seeking behaviors enhances the sense of danger in anxiety patients compared to healthy individuals, suggesting that safety-seeking behaviors do not ameliorate, but aggravate anxiety, specifically for clinically anxious individuals. The results of the current replication of this study contrast with these findings. Patients as well as non-patients based their danger ratings on objective information about the danger of the situations they were presented with, and information on safety-seeking behaviors only marginally affected this assessment. This would imply that, in their assessment of danger, anxiety patients do not particularly use information about safety-seeking behaviors to their disadvantage and that anxiety disorders are not subject to any specific exacerbating effects of such behaviors.

This pattern of results, however, demands a closer look. Where it was expected that adding safety-seeking behavior information would lead to higher

danger ratings for anxiety patients regardless of the objective danger information, safety-seeking behaviors seemed to cause danger ratings to *drop* when a situation was objectively dangerous and to make them go up when a situation was objectively safe, regardless of the diagnosis of the participant. Thus, it seems that not the diagnosis of the individual assessing the danger, but the context in which the danger is assessed that determines the effect of safety-seeking behaviors. In an objectively dangerous situation measures taken to reduce threat actually make the situation seem less dangerous, leading participants to give lower danger ratings. When similar measures are taken in a situation that is essentially safe, these measures may serve as an indication for the participant that the situation is not safe after all, and inflate their danger ratings. Indeed, why would safety-seeking behaviors be needed if the situation were completely innocuous? Or, in terms of the behavior-as-information rational: “If I act anxiously, there must be danger”. In this sense, participants in the current study did use behavior as a source of information.

However, where Gangemi et al. (2012) found anxiety patients to use safety-seeking behavior as information to a significantly stronger degree than non-patients, no such differences were found in the current study. This difference in outcome cannot be attributed to diverging scores between the two control groups, as the pattern of results for these groups is largely comparable: both control groups show slight increases in danger ratings under both dangerous and safe conditions (turn to Appendix B. for a graphic comparison between the results of both studies). The danger inflating effect of safety-seeking behaviors in objectively safe situations was overall stronger in the Italian experiment, as illustrated by the steeper slopes of the objective safety lines in Appendix B. Also clearly visible in Appendix B. are the reassuring effects of safety-seeking behaviors in objectively dangerous situations for the anxiety patients in the current study, which contradict the pattern seen for the Italian patients. Overall, there appear to be two, rather obvious robust findings: objectively dangerous situations lead to higher danger ratings than objectively safe situations, and anxiety patients tend to rate danger higher than non-patients. The effects of safety-seeking behavior cannot be interpreted unambiguously. Only its danger inflating effect in objectively safe situations appears to be supported. Most importantly, however, the specificity of this effect for individuals suffering from anxiety disorders, as it was found by Gangemi et al. (2012), could not be replicated in this study, and might have been a chance hit.

A few methodological issues may have contributed to the differing results

between the Gangemi et al. (2012) and current studies. First, in the current study a matched control group was used that was essentially non-knowledgeable concerning the subject of investigation. Possibly this was not the case with the students and, sometimes, staff that were recruited at the Department of Psychology at Gagliari University for the control group used by Gangemi and colleagues. Being familiar with the theory surrounding safety-seeking behaviors may have influenced their danger ratings. However, given the similar outcomes for both control groups, it is unlikely that such an influence would explain the found differences. Secondly, construct validity was only tested for the Italian versions of the scripts. Whether safety-seeking behaviors could be identified as reliably within the Dutch translation is uncertain. That is, possibly the Safety-seeking behaviors and No Safety-seeking behaviors conditions within the experiment were not sufficiently discernable. There are no obvious reasons, however, why the Dutch scripts would be less valid or reliable than the Italian experiment, rendering this argument obsolete. And thirdly, a considerable number of patients that participated in the current experiment had either previously received treatment (53.3 percent) or were currently in treatment (20 percent). Of those familiar with treatment 25.3 percent ( $N = 23$ ) were able to specify this as being Cognitive Behavioral Therapy (CBT). It is likely that this particular group of patients was familiar with the concept of safety-seeking behavior and how it may serve to maintain their anxiety, which possibly influenced their attitude towards the presence of safety-seeking behaviors in the different scripts. However, also in the Gangemi et al. (2012) study a considerable amount of clinical participants, i.e. 34 out of 70 (48.6 percent), had had previous CBT treatment. Additionally, realizing safety-seeking behavior's maintaining role in anxiety is quite different from understanding their possible exacerbating effects on danger assessment. Distortion of the danger ratings of these treatment-wise participants is, therefore, also an unlikely explanation of the differences in outcome.

Like the Gangemi et al. (2012) study this replication bears the limitation that it may be very different to read about a potentially fearful situation than experiencing it in real life. The factor of distance to the story cannot be easily controlled, making it possible that participants rated the danger as if the events were happening to someone else, in spite of being instructed otherwise. Highly anxious patients may have in fact distanced themselves from the presented scenario to prevent their own anxieties from being triggered. In short, it is unclear how the experimental condition will generalize to the real world.

*Speculative interpretations of the role of safety-seeking behaviors*

The results of this study suggest that safety-seeking behaviors can be helpful and adaptive in the presence of actual danger, but in an objectively safe situation lose their adaptive quality and actually inspire to perceive threat. This corresponds to Thwaites and Freeston's (2005) view that safety-seeking behaviors are mal-adaptive when they seek to avoid a feared, yet imagined catastrophe, and should be considered adaptive coping when they merely seek to reduce anxiety. In a truly dangerous situation there is an actual threat, from which the individual seeks to escape through the use of safety-seeking behaviors; this is adaptive coping. The performance of safety-seeking behaviors in an objectively safe situation implies the presence of an imagined threat; in this case, the use of safety-seeking behaviors is mal-adaptive and may have exacerbating effects on danger assessment. This, however, raises the question why someone would perform safety-seeking behaviors and, thus, experience their deleterious effects in a perfectly safe situation. It would appear that objective safety and objective danger are not easily discernable. In fact, a perfectly safe situation may not exist, because completely ruling out all danger is impossible. Anxiety patients in particular seem ill equipped to distinguish danger from safety; they often look to others for reassurance, for guarantees that nothing will happen. As we've seen, it is precisely the perception of threat in the absence of true danger that is the defining feature of clinical anxiety (Gazzaniga & Heatherton, 2006). It is inherent to being an anxiety patient to see danger where most would not. But also in the non-clinical population the assessment of danger is a subjective affair. Even in this study individuals not affected by clinical anxiety, on average, awarded higher than zero danger ratings to situations marked as objectively safe. Clearly, in one and the same situation one person may feel unthreatened, while another sees looming danger. Thus, portraying the perception of danger as an all-or-nothing, or a black-and-white process is not quite accurate. Rather, danger is assessed along a continuum, and objective danger and objective safety are only artificial categories. Therefore, it would also be inaccurate to consider safety-seeking behaviors as either adaptive under objectively dangerous conditions, or mal-adaptive under objectively safe conditions. Instead, the *degree* to which safety-seeking behaviors are adaptive should be related to the *degree* to which threat is subjectively experienced as real. In this respect, Thwaites and Freeston (2005, p. 178) argue: "*Rather than considering these as dichotomous behaviors, however, perhaps the same behavior could function, for any given person, both as an adaptive coping strategy and as safety behavior, but to different degrees*

*and in different contexts.*" Future research into the effects of safety-seeking behaviors could account for this by abolishing the dichotomous structure of objective danger and safety and substituting it with a subjective measure of the degree to which a perceived threat is experienced as real.

A state of affairs where safety-seeking behaviors can be both beneficial and detrimental to danger assessment would advocate for their judicious use in treatment, as was suggested by Rachman et al. (2011) and van den Hout, Engelhard, Toffolo, and van den Uijlen (2011). In the beginning of treatment safety-seeking behavior could be allowed for reassuring purposes and to enable the patient to endure exposure. Through the adaptive use of safety-seeking behaviors the patient could gain a sense of control over the situation and engage in approach behavior (van den Hout et al. (2011). Then, as soon as the effects of exposure become clear and threat beliefs start to diminish, the use of safety-seeking behaviors should be discouraged, and ultimately abandoned as it would be precisely then that they may lose their adaptiveness and exert their detrimental influence by re-installing recently altered threat cognitions.

### *Conclusion*

The results of this study offer speculative support for the assumption that safety-seeking behaviors play a role in the assessment of danger, other than preventing disconfirmation of perceived threat. However, this role may be different than was previously suggested. Instead of exacerbating perceived danger for anxiety patients and not for healthy individuals, safety-seeking behaviors, for patients and non-patients alike, may have reassuring effects under conditions of objective danger, and be reason for concern when they are performed in the absence of actual danger. It is argued, however, that danger is not assessed under dichotomous conditions of objective danger and objective safety, but along a continuum based on subjective perceptions of the realness of the threat. Safety-seeking behaviors may, therefore, not be either beneficial or detrimental to the process of danger assessment, but can be both, depending on their adaptive use.



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## Appendix A.

### **1.1 Objectief gevaar/veiligheidsgedrag**

U staat in de lift van een groot warenhuis. U wilt met de lift van de vijfde naar de eerste verdieping. U begint het benauwd te krijgen. De lift zit vol geladen met het maximaal toegestane aantal mensen. Opeens blijft de lift tussen twee verdiepingen hangen. De ventilator houdt op met draaien en de lift wil geen kant op. U ziet twee mensen flauwvallen. De lift daalt tot aan de eerst volgende verdieping, de deuren gaan open en u rent heel hard weg.

### **2.2 Objectief gevaar/geen veiligheidsgedrag**

U bent op een groot verjaarsfeest en gaat zo direct een speech geven aan alle gasten. U heeft de speech goed voorbereid en begint vol zelfvertrouwen te spreken. Om de aandacht te krijgen maakt u een grap. Opeens is de zaal stil en staan mensen u met een afkeurende blik toe te kijken. U begint te stotteren, weet niet goed hoe u nu verder moet, en iedereen staat u aan te staren. U blijft praten.

### **3.3 Objectieve veiligheid/veiligheidsgedrag**

U staat voor uzelf en uw familie te koken als een scherpe pijn u herinnert aan een zwerende wond op uw hand. Ter bescherming zit er alleen een pleister over. U denkt aan de documentaire die u laatst op tv zag waar in werd uitgelegd hoe ziektes van de ene persoon op de andere overgedragen worden. In de documentaire werd nog duidelijk gezegd dat koken met een handwond absoluut geen kwaad kan. U gaat herhaaldelijk en vasthoudend uw handen wassen.

### **4.4 Objectieve veiligheid/geen veiligheidsgedrag.**

U bent onderweg om boodschappen te doen. Plotseling denkt u: "heb ik wel het gas uit gedraaid? Was de gaskraan wel dicht? Uw hoorde laatst van een verzekeringsadviseur dat de kans op een gasexplosie heel klein is, zeker als iemand, zoals uzelf, methaangas gebruikt. De kans is zo klein dat de verzekeringsmaatschappij zijn brandverzekering tegen extreem lage prijzen verkoopt. U blijft lopen en gaat de supermarkt in.

#### **1.4 Objectieve veiligheid/geen veiligheidsgedrag**

U staat in de lift van een groot warenhuis. U wilt met de lift van de vijfde naar de eerste verdieping. U begint het benauwd te krijgen. De lift zit vol geladen met het maximaal toegestane aantal mensen. De lift daalt tot aan de eerst volgende verdieping, de deuren gaan open en U wacht tot de rest is uitgestapt.

#### **4.3 Objectieve veiligheid/veiligheidsgedrag**

U bent onderweg om boodschappen te doen. Plotseling denkt u: “heb ik wel het gas uit gedraaid? Was de gaskraan wel dicht?” Uw hoorde laatst van een verzekeringsadviseur dat de kans op een gasexplosie heel klein is, zeker als iemand, zoals uzelf, methaangas gebruikt. De kans is zo klein dat de verzekeringsmaatschappij zijn brandverzekering tegen extreem lage prijzen verkoopt. U rent naar huis en controleert meerdere keren de gaskraan.

#### **3.2 Objectief gevaar/geen veiligheidsgedrag**

U staat voor uzelf en uw familie te koken als een scherpe pijn u herinnert aan een zwerende wond op uw hand. Ter bescherming zit er alleen een pleister over. U denkt aan de keer dat één van uw familieleden ziek werd door een ontsteking. De dokter vertelde u dat zo'n ziekte dodelijk kan zijn. En ook dat de kans bestaat om zonder dat u zich daarvan bewust bent, zelf besmet te raken en drager van de ziekte te worden. U gaat gewoon door met koken.

#### **2.1 Objectief gevaar/veiligheidsgedrag**

U bent op een groot verjaarsfeest en gaat zo direct een speech geven aan alle gasten. U heeft de speech goed voorbereid en begint vol zelfvertrouwen te spreken. Om de aandacht te krijgen maakt u een grap. Opeens is de zaal stil en staan mensen u met een afkeurende blik toe te kijken. U begint te stotteren, weet niet goed hoe u nu verder moet, en iedereen staat u aan te staren. U houdt snel op met praten en loopt weg zonder naar anderen te kijken

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### **1.2 Objectief gevaar/geen veiligheidsgedrag**

U staat in de lift in een groot warenhuis. U wilt met de lift van de vijfde naar de eerste verdieping. U begint het benauwd te krijgen. De lift zit vol geladen met het maximaal toegestane aantal mensen. Opeens blijft de lift tussen twee verdiepingen hangen. De ventilator houdt op met draaien en de lift wil geen kant op. U ziet twee mensen flauwvallen. De lift daalt tot aan de eerst volgende verdieping. De deuren gaan open en u wacht rustig totdat de andere mensen zijn uitgestapt.

### **3.4 Objectieve veiligheid/geen veiligheidsgedrag.**

U staat voor uzelf en uw geliefden een maaltijd te koken als een scherpe pijn u herinnert aan de geïnfecteerde wond op uw hand waar alleen een pleister over zit ter bescherming. U denkt aan de documentaire die u laatst op tv zag waar in detail werd uitgelegd hoe ziektes van de ene persoon op de andere overgedragen worden. In de documentaire werd nog duidelijk gezegd dat koken met een handwond absoluut geen kwaad kan. U gaat gewoon door met koken.

### **1.3 Objectieve veiligheid/veiligheidsgedrag**

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### **4.2 Objectief gevaar/geen veiligheidsgedrag**

U bent onderweg om boodschappen te doen. Plotseling denkt u: “heb ik het gas wel uit gedraaid? Was de gaskraan wel dicht?” Er zijn de laatste tijd een aantal gas explosies geweest en de brandweer heeft aangeraden de gaskraan dicht te draaien iedere keer als u het huis verlaat, zelfs is het maar voor even. De brandweer benadrukte zorgvuldig te controleren dat dit was gebeurt. U blijft lopen en gaat de supermarkt in.

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U bent onderweg om boodschappen te doen. Plotseling denkt u: “heb ik wel het gas uit gedraaid? Was de gaskraan wel dicht?” Er zijn de laatste tijd een aantal gas explosies geweest en de brandweer heeft aangeraden de gaskraan dicht te draaien iedere keer als u het huis verlaat, zelfs is het maar voor even. De brandweer benadrukte zorgvuldig te controleren dat dit was gebeurt. U rent terug naar huis en controleert meerdere keren de gaskraan.

## Appendix B.

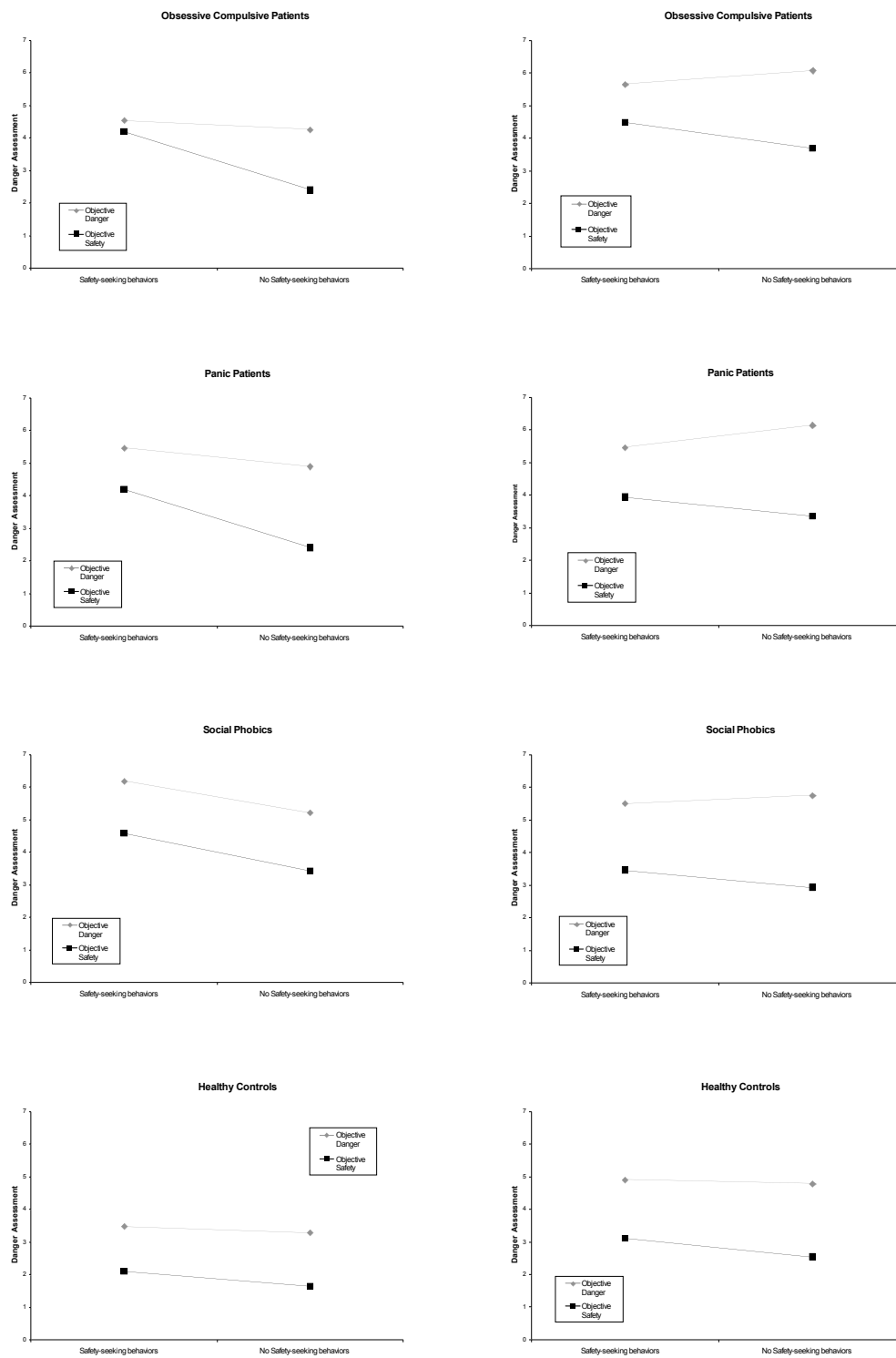


Figure 2. Main- and interaction-effects of the current study (right) compared with the main and interaction effects of the Gangemi et al. (2012) study (left).