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Behavior as information about threat in anxiety disorders: A comparison of patients with anxiety disorders and non-anxious controls

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ABSTRACT

Background: Gangemi, Mancini, and van den Hout (2012) argued that anxious patients use safety behaviors as information that the situation in which the safety behaviors are displayed is dangerous, even when that situation is objectively safe. This was concluded from a vignette study in which anxious patients and non-clinical controls rated the dangerousness of scripts that were safe or dangerous and in which the protagonist did or did not display safety behaviors. Patients were more likely to take safety behavior as evidence that the situation was dangerous, especially in safe situations. Their non-clinical group may not have been psychologically naïve. We critically replicated the Gangemi et al. study using a psychologically non-informed control group.
Method: The same materials were used and patients (Obsessive Compulsive Disorder, Panic Disorder, Social Phobia; $n = 30$ per sub-group) were compared to matched non-patients. Using Bayesian statistics, data from the Gangemi et al. samples and the present groups were (re-)analyzed testing the hypothesis relative to non-patients, patients infer threat from safety behaviors, especially if displayed in safe situations.
Results: The Gangemi et al. data yielded a Bayes factor of 3.31 in support of the hypothesis. The present Bayes Factor was smaller (2.34), but strengthened the support for the hypothesis expressed by an updated Bayes factor of $3.31 \times 2.34 = 7.75$.
Conclusions: The finding that anxious patients infer threat from safety behaviors, in particular in safe contexts, was corroborated, suggesting one way in which safety behaviors are involved in the maintenance of anxiety disorders.

1. Introduction

Anxiety patients fear that an innocuous cue or situation is followed by some terrible outcome, while in fact it is not. In other domains, reality testing in patients with anxiety disorders is undisturbed and the evidence that the feared circumstances are not followed by the dreaded catastrophe is abundant. One of the major problems in the psychology of anxiety disorders is, therefore, why irrational anxiety persists. Note that, while the feared cues are not followed by catastrophes, they *are* followed, systematically, by anxiety responses. Would people take affective responding as a source of information about e.g. danger and would anxiety patients be more likely to make such “anxiety-therefore-threat” attributions?

A positive answer to the first question is provided by evidence that risk expectancies can be emotion-based (cf. Clore, 1992; Schwarz & Clore, 1988). Also physiological response information influences stimulus evaluation. For example, Davey (1987) demonstrated that, in non-clinical individuals, false physiological

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response feedback affects the expectation of danger. Moreover, Valins and Ray (1967) reported that in clinical subjects, false feedback suggesting no heart rate response to snake slides positively influenced subsequent approach to a live snake.

There is evidence that anxiety patients are more likely to use (anxious) affect as information about threat. Arntz, Rauner, and van den Hout (1995) developed written scripts of situations that started with a neutral stem and were completed in four different manners: objective danger/protagonist anxious, objective danger/protagonist non-anxious, objective safety, protagonist non-anxious and objective safety/protagonist anxious. Anxious patients and non-anxious controls were asked to rate the 4 scenario's in terms of perceived danger. Interestingly, relative to the non-patients, anxious individuals inferred danger from the anxiety experienced by the protagonist, even when the situation was objectively safe. Using the same paradigm (scripts with neutral stem, completed by 2 × 2 endings), it was found that, relative to healthy controls, PTSD patients inferred threat from the occurrence of trauma related intrusions (Engelhard, Macklin, McNally, van den Hout, & Arntz, 2001; see also Engelhard, van den Hout, Arntz, & McNally, 2002), while patients affected by Obsessive Compulsive Disorder (OCD) tended to use feelings of guilt affect as information that threat is increased and that preventive action is less effective (Gangemi, Mancini, & van den Hout, 2007). Thus, situations feared by anxiety patients may not be followed by misfortune, but they are followed by anxiety and the fact that patients take anxiety to indicate danger may serve to maintain anxiety disorders.

Anxiety responses not only consist of feelings and physiological arousal, but also encompass safety behaviors, defined as actions intended to detect, avoid, escape or neutralize a feared outcome (cf. Cuming et al., 2009; Deacon & Maack, 2008). Deacon and Maack (2008) tested the effects of OCD relevant safety behavior on worries about contamination. Healthy individuals engaged for two weeks in OCD relevant safety behaviors, such as hand-washing, carrying hand-sanitizer, and avoiding touching money. As a result their levels of contamination fear increased. Deacon and Maack failed to include a control group leaving it unclear if and to what extend the effects were due to matters other than the manipulation like e.g. the repeated assessment. In a conceptually similar study, Olantunji, Etzel, Tomarken, Ciesielski, and Deacon (2011), tested the effects of safety behaviors on health anxiety. Thirty healthy individuals carried out a long range of health related behaviors (washing or disinfecting hands each time after eating, avoid touching public door handles, taking daily multivitamin etc.) for a week. Compared to a no intervention control group, the experimental group ($n = 30$) reported increases in health anxiety, hypochondriacal beliefs, contamination fear and the self-reported changes were paralleled by behavior on a behavioral avoidance task (Olantunji et al., 2011).

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 the script studies described above (Arntz et al., 1995; Engelhard et al., 2001; Gangemi et al., 2007). Written scripts were developed with a neutral stem with four different completions: the scenario ended objectively safe vs. objectively dangerous, while the protagonist did vs. did not display safety behavior. Each of the four versions of the scripts were rated for dangerousness by 31 OCD patients, 22 Panic Disorder patients, 17 Social Phobics and 31 non-anxious controls. When the protagonist displayed safety behaviors, all groups tended to rate scenario's more dangerous as compared to the no-safety behavior versions, but the clinical groups were more affected by safety behavior information than the healthy control group. This was especially the case when scripts were objectively safe. 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 ratings by obsessive-compulsives and social phobics, but not by panic patients, were affected more by safety-seeking behavior information when they faced a script that was directly related to their anxious concerns. Overall, this suggests that anxiety patients not only use anxious feelings as evidence for threat (cf. Arntz et al., 1995) but that the same hold true for safety behavior. This tendency to infer threat from safety behavior may serve to maintain anxiety disorders.

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, the majority being either psychology student or staff, while matched for age, gender, and years of education, were, relative to their clinical counter-parts, possibly more knowledgeable regarding psychological research and theory. The same "behavior as information" effects observed in patients may materialize in a control group with less potential psychological sophistication.

The current study, carried out in the Netherlands, is a replication of the Gangemi et al. (2012) experiment, carried out in Italy, the main difference being that the non-clinical control group was not recruited in University circles. It was hypothesized that, relevant to the non-clinical control group, danger ratings of the anxiety patients are more affected by safety behavior displayed by the protagonists. There are two reasons to expect that this patient/control difference is especially outspoken in situations that are objectively safe. A theoretical argument is that the crucial difference between anxiety patients and others is not the fear for realistic threat but the occurrence of fear in unthreatening situation. An empirical argument is that this phenomenon (patient/control differences in effects of safety behaviors most prominent in safe situations) was indeed observed by Gangemi et al.

2. Method

2.1. Participants

Three clinical groups and one non-clinical control group took part. The clinical groups consisted of anxiety patients from the Altrecht Academisch Angstcentrum (AAA) in Utrecht, the Netherlands. 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 ($SD = 10.4$); 9 male and 21 female social phobics, mean age 30.3 ($SD = 9.3$); and 15 male and 15 female obsessive-compulsives, mean age 33.3 ($SD = 11.7$). 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 males and 20 females, mean age 34.7 ($SD = 13.9$)) was created using a snowball sampling procedure. Research assistants asked friends and acquaintances from non-student and non-academic circles to participate and asked these participants to ask their friend/acquaintances. As the sample increases recruitment criteria became more specific to match the demographic characteristics of the patient sample. The total sample size was $N = 120$, with a mean age of 33.2 ($SD = 11.5$). 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.

2.2. Materials and procedure

A paper and pencil task was given which consisted of booklet with a series of scenarios, each followed by several 100 mm Visual Analogue Scales (VASs). On the first page the following instructions were presented: "This is an investigation into the appraisal of events. Several stories will be presented to you. After each story is read, you will be asked to judge it by rating various aspects. Please evaluate these events as if they are happening to you. There are no right or wrong answers. We are only interested in your personal judgment. It is very important that you try to identify yourself with the description as much as possible."

Following this instruction, an explanation of how to use the VAS was given and an example of a VAS with a rating was provided. For the three areas (OCD, panic disorder, and social phobia) four scripts were then presented: infected wound and gas tap (OCD relevant), crowded elevator (panic disorder relevant), social interaction (social phobia relevant). The panic disorder relevant and social phobia relevant scripts were adapted from the Arntz et al. (1995) experiment. However, all the SBs were derived from the examples given in the DSM-IV-TR (the *Diagnostic and Statistical Manual of Mental Disorders,* 4th ed., text rev; American Psychiatric Association, 2000). The choice to use two OCD-related scripts and only one panic-disorders related and one social-phobia related scenarios, was due to the fact that relative to other anxiety disorders, OCD is rather heterogeneous in terms of eliciting cues, catastrophes feared, and safety behaviors, although they are mainly ascribable to two classes: washers and checkers.

For each script, there were four versions. Each version started with the same stem but ended differently: 1) with objective safety information and no-SB; 2) with objective safety information and SB; 3) with objective danger information and no-SB; and 4) with objective danger information and SB.

To prevent carry-over effects and stereotypical ratings on the basis of identical descriptions of behavior information, the SB and no-SB information varied systematically between the three areas and also between the scripts of the same area. The sixteen scripts were printed on different pages and randomly ordered with the restriction that the first four scripts consist of scripts of the four different stories, as done in the second, third, and last group of four scripts, and that scripts with the same story are separated by at least one script of another story. The same random order was applied to all participants. As a first example, the four washing scripts start as follows:

> "You are cooking for yourself and your loved ones when a sharp pain reminds you of the small wound on your hand that has become infected and is protected only by a band-aid."

> The *objective safety/no-SB* script continues as follows:
>
> "You remember a documentary you recently saw on TV which gave a very detailed explanation of the main ways diseases are transmitted and caught. It explicitly mentioned that cooking with an infected wound on the hand is absolutely harmless. You go on cooking."

> The *objective safety/SB* script continues as follows:
>
> "You remember a documentary you recently saw on TV which gave a very detailed explanation of the main ways diseases are transmitted and caught. It explicitly mentioned that cooking with an infected wound on the hand is absolutely harmless. You start washing your hands repeatedly and insistently."

> The *objective danger/no-SB* script continues as follows:
>
> "The thought comes to you that when one of your family members fell ill with hepatitis B, the doctor not only informed you about the severity of the disease, which can lead to death, but also about the possibility of catching it yourself and becoming a healthy carrier without realizing it, capable of passing the disease on. You go on cooking".

> The *objective danger/SB* script continues as follows:
>
> "The thought comes to you that when one of your family members fell ill with hepatitis B, the doctor not only informed you about the severity of the disease, which can lead to death, but also about the possibility of catching it yourself and becoming a healthy carrier without realizing it, capable of passing the disease on. You start washing your hands repeatedly and insistently."

The four social interaction scripts were constructed as follows. Start of the scripts:

> "At a large birthday party, you are about to give a speech in front of all the guests. You have prepared your speech very well and full of self-confidence you begin to speak. You have difficulty getting the audience's attention, and so you crack a joke to draw attention."

> The *objective safety/no-SB* script continues as follows:
>
> "And indeed, you succeed in attracting attention, people laugh and everyone is looking friendly and interested and you keep on talking …"

> The *objective safety/SB* script continues as follows:
>
> "And indeed, you succeed in attracting attention, people laugh and everyone is looking friendly and interested in you. You quickly stop talking and go away, avoiding to look at the others …"

> The *objective danger/no-SB* script continues as follows:
>
> "Suddenly, they get quiet, and you get looks of disapproval. You start to stammer, are not sure how to continue, and everyone is looking at you. You keep on talking …"

> The *objective danger/SB* script continues as follows:
>
> "Suddenly, they get quiet, and you get looks of disapproval. You start to stammer, are not sure how to continue, and everyone is looking at you. You quickly stop talking and go away, avoiding to look at the others …" (The other two scripts can be obtained from the authors upon request).

Each script was followed by four VASs on which the participant could judge various aspects of the event. The first VAS was the dependent variable. "Absolutely not dangerous" was printed on its left side and "extremely dangerous" was printed on its right side. The other three VASs were added as filler items to reduce the possibility that participants would remember their ratings. The three additional VASs asked for ratings of safety, responsibility, and good vs. bad expected outcome. VAS ratings were measured in mm. In all cases an experimenter was present and introduced the task, also preventing participants from returning to previous pages.

Prior to the experiment done by Gangemi et al. (2012), from which the Dutch versions of the sixteen storylines were translated, 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 × 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 s1 danger ratings (Gangemi et al., 2012).

3. Statistical analysis

Data were statistically tested using a Bayesian model selection procedure developed for the evaluation of informative hypotheses, that is, hypotheses that represent explicit expectations of the researcher (Hoijtink, 2012; Klugkist, Van Wesel, & Bullens, 2011). The comparison of two such hypotheses provides a Bayes factor (BF; Kass & Raftery, 1995) expressing the degree of support for the first hypothesis compared to the alternative. More specifically, a BF > 1 shows support for the first hypothesis, while BF < 1 implies support for the alternative hypothesis.

An advantage of the Bayesian approach to data analysis is that multiple studies can easily be combined, also known as Bayesian updating. In replication, the results of the first study are updated with the results of the second study by multiplying the two resulting BFs and providing a final BF that provides the amount of evidence for the hypothesis taking results of both studies into account. Note that Null Hypothesis Statistical Testing, using e.g. ANOVA would not readily answer the question under review: to what extend do the present data add to the credibility of the pattern observed in the to be replicated study? The approach adopted precisely answers that question.

It was predicted that, relative to controls, danger ratings of patients would on the average (μ) be higher when safety behaviors (*SB*) were displayed compared to when this was not the case (*no SB*). Moreover, we expected this effect to be stronger in case of objective safety (*OS*) as compared to objective danger (*OB*). This boils down to the equation given after H1 (see below). The alternative hypothesis H2, against which H1 was tested, reads that in terms of *OS*, *OD*, *SB*, and no *SB*, patients do not differ from controls. This is reformulated below after H2.

The informative hypotheses that express the expectations of the studies were:

$$\begin{aligned} \text{H1}: & \left(\mu^{\text{patients}}_{\text{OS,SB}} - \mu^{\text{patients}}_{\text{OS,noSB}}\right) - \left(\mu^{\text{patients}}_{\text{OD,SB}} - \mu^{\text{patients}}_{\text{OD,noSB}}\right) \\ & > \left(\mu^{\text{controls}}_{\text{OS,SB}} - \mu^{\text{controls}}_{\text{OS,noSB}}\right) - \left(\mu^{\text{controls}}_{\text{OD,SB}} - \mu^{\text{controls}}_{\text{OD,noSB}}\right) \end{aligned}$$

$$\begin{aligned} \text{H2}: & \left(\mu^{\text{patients}}_{\text{OS,SB}} - \mu^{\text{patients}}_{\text{OS,noSB}}\right) - \left(\mu^{\text{patients}}_{\text{OD,SB}} - \mu^{\text{patients}}_{\text{OD,noSB}}\right) \\ & = \left(\mu^{\text{controls}}_{\text{OS,SB}} - \mu^{\text{controls}}_{\text{OS,noSB}}\right) - \left(\mu^{\text{controls}}_{\text{OD,SB}} - \mu^{\text{controls}}_{\text{OD,noSB}}\right) \end{aligned}$$

In addition to the Bayes factor, for both the Gangemi data and the current study, an effect size *d* for the hypothesized effect was computed as $d = (C_{\text{patients}} - C_{\text{controls}})/\text{MS}_{\text{residual}}$, that is, the standardized difference between patients and controls in the contrast $C = (M_{\text{OS,SB}} - M_{\text{OS,noSB}}) - (M_{\text{OD,SB}} - M_{\text{OD,noSB}})$, where *M* stands for the sample mean. With this quantification larger values for *d* show larger effects in the sample for the under H1 hypothesized pattern, while $d = 0$ will be observed when the alternative hypothesis H2 is true.

We first re-analyzed the Gangemi data to get a BF that tests these hypotheses. This enabled the Bayesian updating, that is, the same hypotheses were evaluated for the current study and the resulting BFs were multiplied. Analyses were performed using the software BIEMS (see Mulder, Hoijtink, & Klugkist, 2010; Mulder, Hoijtink, & de Leeuw, 2012). It is acknowledged that the cell sizes were unequal with 30 individuals in the control sample and 90 in the patient sample. However, for the Bayesian approach adopted in this study this does not represent the type of problems (i.e., no asymptotic normality and lower statistical power) that would be an issue when analyzing such unequal cell sizes using traditional (frequentist) methods.

4. Results

4.1. Scores on 4 scripts across conditions

Scores from patients and controls are given in Table 1.

4.2. Bayesian analysis of the to be replicated data

The data from the present study are given in Fig. 1 (left panel). To facilitate comparison with the to be replicated findings, the latter are included as well in Fig. 1 (right panel).

With regard to the Gangemi et al. data, Fig. 1 (right panel) indicates that patients give higher danger scores when safety behaviors are displayed and that this is especially the case in objectively safe situations: the lower lines are steeper than the upper lines. This pattern seems absent, or less outspoken in the control group. Indeed, Bayesian analysis of the Gangemi corroborates hypothesis H1 over H2, yielding a BF of 3.31. The observed effect size was $d = 1.04$.

4.3. Bayesian analysis of present data

The same analysis was carried out on the data from the present study. Fig. 1 suggests that the pattern observed in the original study (steeper lower vs. upper lines in patients as compared to controls; Fig. 1 right panel) was less outspoken in the present study (left panel). Indeed this was reflected in a BF of 2.34 that was somewhat lower compared to the BF from the Gangemi et al. study. Meanwhile the BF was obviously >1 meaning that the empirical support for hypothesis 1 was 2.34 times as strong than the support for hypothesis 2. The observed effect size was $d = 0.95$.

4.4. Bayesian updating of earlier data

Bayesian analysis allows for estimation, over the two studies, of the degree of empirical support for hypothesis 1 vs. 2 by multiplying the two BF's. Here this results in an overall BF of $3.31 \times 2.34 = 7.75$.Thus, the present data serve to increase the empirical support for the data provided by Gangemi and colleagues.

Table 1
Mean danger ratings and standard deviations for patients ($N = 90$) and controls ($N = 30$) on all four vignets and across conditions.

Safety-behavior	Group	Vignet							
		OCD (wound)		OCD (gas tap)		PD		SP	
		Safe	Danger	Safe	Danger	Safe	Danger	Safe	Danger
Safety-behavior	Patients	3.23 (2.72)	5.81 (3.00)	4.77 (2.87)	5.53 (2.73)	4.31 (2.85)	6.02 (2.57)	3.56 (3.14)	4.76 (3.13)
	Controls	2.38 (2.51)	5.48 (2.71)	3.13 (2.69)	4.54 (2.88)	3.59 (2.98)	5.71 (2.27)	3.27 (3.31)	3.88 (2.91)
No safety-behavior	Patients	3.27 (2.89)	6.20 (2.82)	5.40 (2.79)	7.17 (2.16)	3.57 (2.88)	5.94 (2.96)	2.13 (2.51)	4.65 (3.02)
	Controls	2.82 (2.63)	5.89 (2.56)	3.84 (3.25)	5.01 (3.10)	2.47 (2.60)	5.50 (2.82)	1.15 (1.38)	2.70 (2.50)

5. Discussion

Gangemi et al. (2012) reported that, in anxiety patients the presence of safety behaviors, especially in situations that are objectively safe as opposed to objectively dangerous, increased the perception of danger. We wondered whether the reported patient-control differences may have been due to their control group having being recruited in academic circles. This seems unlikely. Using the same stimulus materials and patients from the same diagnostic categories, but a non-academia related sample of control participants, we found that the latter group was little affected by information about safety behavior as in the study by Gangemi et al. (2012): the slopes of the two lines in the two lower panels of Fig. 1 are strikingly similar.

To critically test whether our data reduce or increase the empirical support for that hypothesis (or leave its support

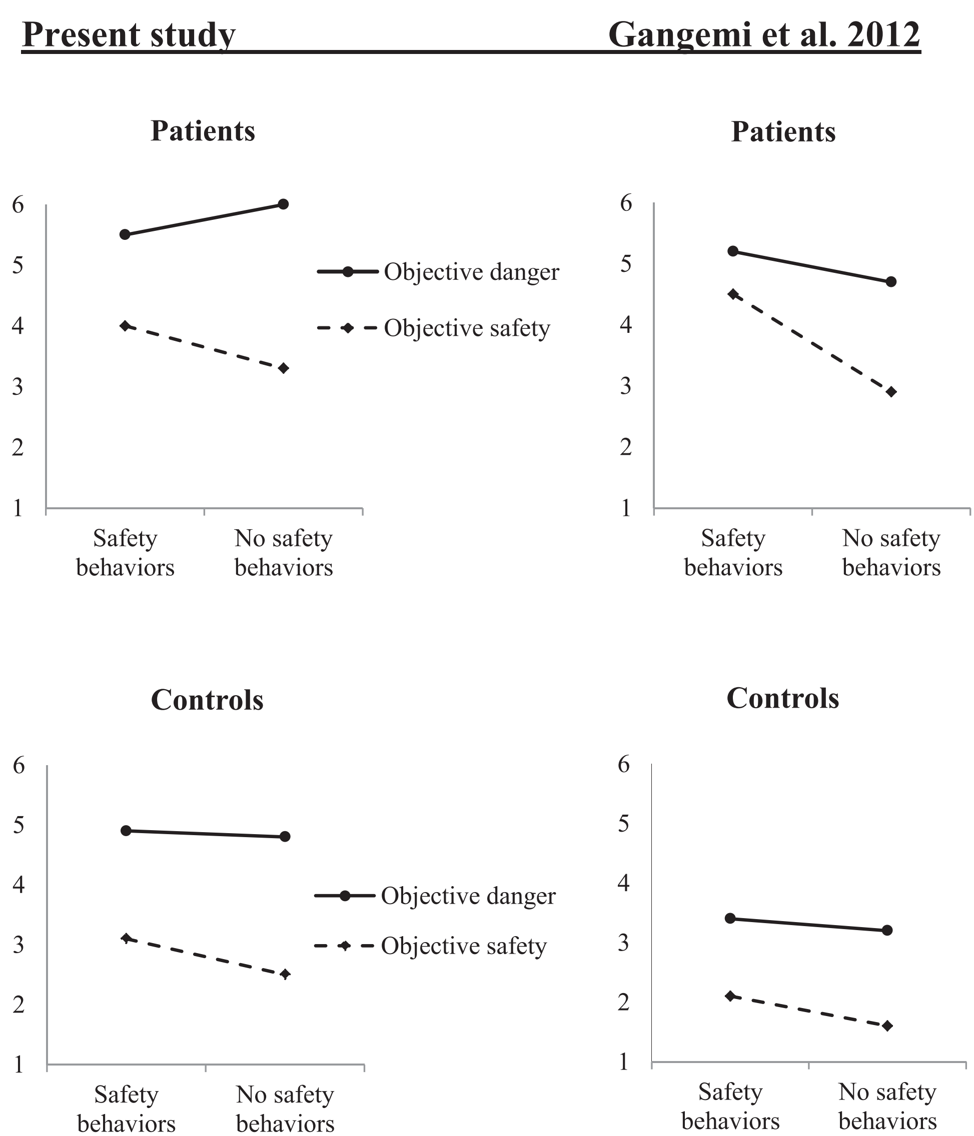

Fig. 1. Danger scores by patients and controls for scenarios that involve objective safety/danger and in which safety seeking behavior is/is not displayed. While scores were assessed using 100 mm VASs, none of the averaged scores exceeded 60 mm. To enhance comparability with the Gangemi et al. paper we omitted the decimal.

unaffected), we followed a Bayesian approach. In contrast to conventional H0 testing, Bayesian analysis gives a precise answer to the question whether a replication study increases or reduces support for earlier findings. Imagine an experimental finding with $p = .04$ and a replication displaying the same data-pattern but with $p = 0.08$. It would be misleading to call the latter a null finding that *contradicts* H1. Irrespective of any H0, Bayesian analysis allows to determine the *degree* to which the empirical support is reduced or increased following a replication study. Here, the findings were clear. While the hypothesized effects were smaller than in the Gangemi et al. study, the pattern was similar and the Bayes Factor rose from 3.31 to 7.75. Note that if a BF < 1 would have materialized in the present study, the BF would have dropped below 3.31. Thus the data served to increase the empirical support for the hypothesis under review.

Fig. 1 (left panel) summarizes the present findings. It may be noted that in the objective safety condition, scores were higher when safety behaviors were displayed. However, for patients in the objective danger condition (left panel, upper part) an opposite trend is visible: danger scores were lower when the scenarios included safety behavior. In terms of the H1 equation given in 'statistical analysis', the sample mean of (a) $(\mu^{patients}_{OS,SB} - \mu^{patients}_{OS,noSB})$ was positive while the sample mean for (b) $(\mu^{patients}_{OD,SB} - \mu^{patients}_{OD,noSB})$ was negative and the positive value obtained for $(\mu^{patients}_{OS,SB} - \mu^{patients}_{OS,noSB}) - (\mu^{patients}_{OD,SB} - \mu^{patients}_{OD,noSB})$ was carried by both the positive value of (a) and the negative value of (b). This is different from the Gangemi et al. study where, in the objective danger conditions, patients had no higher scores when safety behaviors were displayed (Fig. 1 right panel, upper part). Note however that the a-priori hypothesis H1 was silent about the relative contribution of (a) and (b). Obviously this difference between the two studies (summarized by the different slopes of the upper lines in the left. vs. right upper panels of Fig. 1) may be a chance finding and speculation about its possible meaning may best be postponed until fresh data are available.

When faced with realistic threat, safety behaviors are, obviously adaptive. When the threat is unrealistic however, safety behaviors can serve to maintain the irrational threat belief. That is, the absence of a negative outcome after confrontation with the feared stimulus may be attributed to the positive effects of the safety behavior rather than to the stimulus being innocuous (Wells et al., 1995). The combined data from the replicated study and the present one suggest a different way in which safety behaviors may contribute to the maintenance of anxiety disorders. Safety behaviors, displayed in situations that are objectively safe may, by their very occurrence, be taken as evidence that the situation is dangerous. Data from the Gangemi et al. study and from the present one suggest that anxiety patients are especially prone to infer threat from behavior. Still, it is not necessarily the *irrationality* of fear that makes safety behaviors informative. Alternatively, personal concerns about threat may provide safety behaviors of oneself or others with enhanced salience and potential relevance. Concerns about personal safety in public domains stimulate governments to install video cameras, but such safety measure may paradoxically serve to enhance feelings of insecurity in those that are concerned about dangers in the public sphere. Such paradoxical effects of safety behavior can fruitfully be examined using classical conditioning paradigms (e.g. Engelhard, van Uijen, van Seters, & Velu, 2014).

In the context of CBT anxiety patients are typically urged to drop safety behaviors. Given that patients may attribute the non-occurrence of feared catastrophes to earlier safety behaviors, this seems a solid clinical approach. Meanwhile a radical and unconditional rejection of safety behavior in CBT seems unjustified. Certainly in the early stages of CBT, a "judicious" use of safety behaviors may facilitate approach behavior and promote engagement with CBT interventions (Rachman, Radomsky, & Shafran, 2008; Rachman, Shafran, Radomsky, & Zysk, 2011; Van den Hout, Engelhard, Toffolo, & van Uijen, 2011).

A limitation of the present scenario study and the studies on which it was build (Arntz et al., 1995; Engelhard et al., 2001; Gangemi et al., 2007, 2012) is that it assumes that danger ratings of a scenario in which someone else is the key character reflects how danger evaluations are made about oneself, in real life. Efforts to critically test this assumption should be welcomed.

In sum, then, the present findings add to the empirical credibility of the hypothesis and findings put forward by Gangemi et al.: Individuals not suffering from anxiety disorders use objective safety/danger information to evaluate the dangerousness of a situation while the presence or absence of safety behavior is largely ignored. Patients with anxiety disorders differ: apart from objective information about safety/dangerousness, the very occurrence of safety behavior is used to infer threat, especially so in situations that are objectively innocuous.

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