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Highlights

- ▶ Examined whether TAF is related to the target of the negative thought.
- ▶ Used a TAF induction that manipulated the familiarity of the target subject.
- ▶ Thinking of a *relative* being diagnosed with cancer was associated with greater TAF.
- ▶ The more personally significant the thought, the more distress it provoked.
- ▶ Findings support *Rachman's (1997, 1998)* cognitive model of obsessions.

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Shorter communication

The effects of familiarity on thought–action fusion

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ABSTRACT

The present study examined whether beliefs about the importance of thoughts (i.e., thought–action fusion; TAF) are related to the target subject of the negative thought. One hundred and seven undergraduate students were randomly assigned to imagine either a beloved relative or a stranger being diagnosed with cancer and provided in vivo ratings of anxiety, likelihood, moral wrongness, urge to neutralize, and how upsetting the event would be if it occurred. Results indicated that thinking of a relative being diagnosed with cancer provoked more distress, urges to neutralize, and higher estimates of likelihood, as well greater use of mental neutralizing behaviors, compared to thinking of a stranger. Contrary to our prediction, the groups did not differ in their ratings of the moral wrongness. These findings broadly support the assertion that the more personally significant a negative intrusive thought, the more it will provoke distress and urges to neutralize. Results are discussed in terms of the cognitive model of obsessions and clinical implications are addressed.

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Thought–action fusion (TAF; Shafraan, Thordarson, & Rachman, 1996) is a set of cognitive distortions that have been studied at length with regard to obsessional problems (i.e., obsessive-compulsive disorder [OCD]; for a review see Berle & Starcevic, 2005). These distortions involve erroneous and maladaptive beliefs about the relationship between mental events and overt behaviors. Specifically, *Moral* TAF is the belief that thinking unacceptable thoughts is the moral equivalent of performing unacceptable behaviors (e.g., thinking about having sex with one's mother is as immoral as having sex with one's mother). *Likelihood* TAF is the belief that thinking about an event increases its probability (e.g., thinking about one's house burning down increases the likelihood of a fire; Shafraan et al., 1996). TAF has been implicated in cognitive-behavioral models of obsessions. Rachman (1997, 1998), for example, argued that interpreting an innocuous cognitive intrusion (e.g., the thought of stealing from the grocery store) as morally unacceptable (e.g., equivalent to stealing) or as likely to lead to an unwanted outcome (e.g., shoplifting), results in increased anxiety and obsessional preoccupation, as well as attempts to dismiss the thought or reduce the anxiety (e.g., via neutralizing behaviors).

Semi-idiographic in vivo techniques for inducing and measuring TAF in the laboratory have been developed and allow researchers to study the parameters of this phenomenon. Briefly, this procedure

involves prompting the study participant to think a negative or “immoral” thought about someone, and then measuring distress and related variables. Yet in existing studies, researchers have only asked participants to have negative thoughts about a close (“beloved”) relative; and none have examined whether TAF is influenced by the closeness of the relationship with the target person in the unwanted thought. Perhaps it is assumed that because of the personal significance, a familiar and “beloved relative” is the most salient target for a TAF induction. Rachman (1997, 1998), for example, proposed that the distress and frequency associated with intrusive, obsessional thoughts is related to the significance of that thought. Moreover, others (e.g., Berman, Abramowitz, Wheaton, Pardue, & Fabricant, 2011; Rachman, 1997) have called for additional studies to determine whether manipulating the parameter of personal significance affects beliefs such as TAF. Accordingly, in the present study, we empirically examined whether TAF is more strongly activated when participants think about harm befalling a familiar and beloved person (i.e., a relative) *vs.* an unfamiliar (i.e., stranger in the community) person.

Discerning the relationship between TAF and familiarity has both theoretical and clinical implications. Theoretically, understanding the parameters of TAF will lead to more refined cognitive-behavioral models of obsessional processes. Previous studies, for example, have explored whether TAF beliefs are activated for positive, as well as negative events (Amir, Freshman, Ramsey, Neary, & Brigidi, 2001), and the degree to which such beliefs are present in different religious groups (Abramowitz, Deacon, Woods, & Tolin, 2004; Berman, Abramowitz, Pardue, & Wheaton, 2010; Rassin & Koster, 2003;

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Sica, Norvara, & Sanavio, 2002; Siev, Chambless, & Huppert, 2010; Siev & Cohen, 2007; Yorulmaz, Gencoz, & Woody, 2009). These findings have helped advance the understanding of factors that lead to the development and maintenance of obsessions. From a clinical perspective, findings from such studies allow prevention and treatment researchers to better tailor their interventions (Rachman, 1997; Salkovskis, Shafran, Rachman, & Freeston, 1999).

Neutralizing behaviors also occupy a significant role in cognitive-behavioral models of obsessional problems in that they serve to immediately reduce anxiety and the perceived effects of such thoughts (Rachman, 1997, 1998). Neutralizing has been found to take the form of overt strategies, such as asking someone for reassurance that an unwanted thought is unlikely to come true, and covert strategies, such as saying a phrase or prayer to oneself to cancel the effects of the negative thought (Freeston & Ladouceur, 1997). The induction of TAF in the laboratory affords a unique context in which to observe neutralizing. We were therefore interested in neutralizing behavior as a consequence of thinking about harm befalling either a relative or a stranger.

Accordingly, in the present study, we used an in vivo TAF induction in which we randomly assigned participants to contemplate either a close relative or a stranger being diagnosed with cancer. We then measured participants' anxiety and related variables, as well as overt and covert neutralizing strategies, in response to contemplating and writing down this distressing thought. We chose cancer as the negative outcome because it is a fairly widespread and unpredictable disease. Previous studies (Berman et al., 2010; Bocci & Gordon, 2007; Marcks & Woods, 2007; Rachman, Shafran, Mitchell, Trant, & Teachman, 1996; Rassin, 2001; Zucker, Craske, Barrios, & Holguin, 2002) have used a car accident scenario which might not be equally relevant for all participants (e.g., if they choose to think about relatives who do not drive [e.g., elderly grandparents] or who drive a lot [e.g., taxi or truck drivers]). We hypothesized that compared to imagining a *stranger* being diagnosed with cancer, imagining a *relative* befalling the same fate would be associated with higher ratings of anxiety, likelihood, and moral wrongness, as well as perceiving the event to be more upsetting if it does occur ("upsettingness"), and a greater urge to engage in neutralizing behaviors. In addition, we predicted that participants imagining a *relative* being stricken with cancer would engage in more behavioral and mental neutralizing than would those imaging a *stranger* under the same circumstances.

Method

Participants

Participants were 107 undergraduate students (82.1% female) at a large university in the southeastern United States who completed an online "screening" questionnaire battery and subsequently attended an experimental session. The sample was 79.4% Caucasian, 6.5% Hispanic, 5.6% African American, 1.9% Asian, and 6.5% reporting being of "other" ethnic backgrounds. The group's mean age was 21.87 years ($SD = 3.95$).

Design and procedure

The study used a between-groups design: participants were randomly assigned to either think about a *relative* getting cancer ("Relative" condition; $n = 55$) or to think about a *stranger* getting cancer ("Stranger" condition; $n = 52$) during an in vivo TAF induction.

After providing consent, participants completed a demographic questionnaire and the study measures (see Measures section). Coles, Cook, and Blake (2007) found that the administration of anxiety-related self-report measures using Internet-based and paper-and-pencil formats yield highly comparable results. Course

credit was given for completing these measures. At the end of the last questionnaire, participants were asked to provide their contact information if they were interested in being invited to participate in the laboratory portion of the study for further course credit. Twenty-seven percent (107/401) of participants provided this information and were invited to participate in a psychology lab experiment ostensibly about "Thoughts and Feelings." Once the participant arrived at the lab for the scheduled experimental appointment, the experimenter again obtained informed consent, and then conducted the random assignment and the in vivo TAF induction as described below.

Measures

Participants were asked to report their gender, age, and identified racial or ethnic group. Online, they also completed the 21 item Depression, Anxiety, and Stress Scale (DASS; Lovibond & Lovibond, 1995), the 19 item TAFS (Shafran et al., 1996).

At the laboratory session, participants individually completed the following in vivo (behavioral) measure of TAF based on that developed by Berman et al. (2011): Each participant was first asked to indicate his or her current (baseline) level of distress/anxiety from 0 (not at all) to 100 (extremely anxious), by dragging the cursor across a visual analogue scale (VAS) on a computer screen. If the reported level of anxiety was above 30, the experimenter conducted a brief relaxation procedure. Subsequently, participants again reported their level of anxiety.

Next, participants were asked to think of a close, beloved relative such as a parent or sibling, and write this person's full name on a note card that was provided. They were also shown an 8×11 color photograph of a seemingly affable stranger that matched the gender of the relative they chose (named "Mike" or "Anna") and told that this individual was a student at the university that they attended. The participant was then asked to write the strangers' name on a different note card.

The experimenter then randomly assigned the participant to either the Relative or the Stranger condition and presented the participant with a card on which was written the following sentence, "I hope _____ is diagnosed with cancer soon." Participants in the Relative condition were instructed to copy the sentence on another note card and insert the close relative's name. Those in the Stranger condition inserted the stranger's name when copying the sentence. After writing the sentence, the participant was asked to close his or her eyes and think about the sentence they just wrote for one minute. He or she was then asked to read the sentence out loud one time.

The participant was then asked to rate the following items on the 0–100 VAS:

1. How much anxiety do you feel right now?
2. What is the likelihood of the event occurring?
3. How morally wrong is it to write out the sentence?
4. How upsetting would it be if this event happened?
5. How strong is your urge to reduce or cancel the effects of writing the sentence?

After completing these in vivo ratings, a prompt appeared on the computer screen that read, "You may now do anything you wish to reduce or cancel the effects of writing or thinking about the sentence." This prompt was given to provide participants with the opportunity to perform behaviors that would function to neutralize the effects of the negative thought. The experimenter recorded whether or not the participant performed any such neutralizing behavior (e.g., crossing out the sentence, turning over or tearing the note cards, etc.) in response to this prompt. Another prompt then

appeared on the screen that read, “Did you do anything in your head to reduce or cancel the effects of writing or thinking about the sentence?” Participants could respond “yes” or “no.” If participants responded “yes,” they were given the opportunity to record, via text entry, a description of their covert mental neutralizing behavior.

Results

Sample characteristics

There were no significant differences between the Relative and Stranger conditions on any self-reported demographic variables: age, $t(101) = 1.54, p > .05$, gender, $\chi^2(1) = .72, p > .05$, or race/ethnicity, $\chi^2(4) = 6.03, p > .05$. The group’s overall mean TAFS score fell within the nonclinical range (Rassin, Merkelbach, Muris, & Schmidt, 2001) on both the Moral ($M = 17.90, SD = 12.53$) and Likelihood subscales ($M = 4.10, SD = 4.76$), and there were no significant between-group differences on any of the TAFS or DASS subscales (all $ps > .05$).

As described previously, a progressive muscle relaxation protocol was initiated if participants’ baseline level of anxiety exceeded 30. This was used for 15 participants, 8 in the Relative condition (14.5%) and 7 in the Stranger condition (13.5%). A Chi-square test indicated that the frequency of the relaxation protocol being initiated was not significantly different between the two groups, $\chi^2(1) = .03, p > .05$.

In vivo ratings

Table 1 presents the group means for the VAS ratings (0–100) of in vivo anxiety, likelihood, moral wrongness, and the urge to neutralize. As can be seen, these ratings mostly fell in the low to moderate range of the 0–100 scale. Given multiple related dependent measures, we used a MANOVA to examine group differences in these ratings. As a manipulation check, we first examined ratings of “upsettingness” between the Stranger and Relative condition. Results indicated a successful manipulation, such that participants in the Relative condition ($M = 92.29, SD = 17.38$) perceived the negative event to be significantly more upsetting than did those in the Stranger condition ($M = 54.14, SD = 30.87, F(1, 104) = 62.79, \eta^2 = 0.37$). Additionally, compared to the Stranger condition, participants in the Relative condition, gave significantly higher ratings of anxiety, perceived likelihood, and the urge to neutralize, during the in vivo TAF induction (effect sizes, also shown in Table 1, were medium to large). The difference in ratings of moral wrongness, however, did not reach significance, and the effect size was small.

Neutralizing behaviors

Overt behaviors

Behaviors performed in response to the prompt “You may now do anything to reduce or cancel the effects of writing or thinking

about the sentence” were recorded by the experimenter. In all, 17 participants (15.9%) engaged in such behaviors: 9 participants (8.4%) crossed out the sentence (in part or in its entirety), 1(0.9%) threw the note card with the sentence in the trash can, 5(4.7%) altered the sentence by inserting words such as “doesn’t” or “won’t,” and 2(1.9%) turned the note card face down. Using the coding scheme developed by Berman et al. (2010), a binary variable was used to represent whether or not a participant had engaged in any overt neutralizing behavior. Eleven individuals (20%) in the Relative condition and 6 (11.5%) in the Stranger condition engaged in overt neutralizing. A Chi-square test indicated that the frequency of neutralizing behaviors in the Relative condition was not significantly higher than that in the Stranger condition, $\chi^2(1) = 1.42, p > .05$.

Mental neutralizing strategies

Responses to the prompt “Did you do anything in your head to reduce or cancel the effects of writing the sentence?” were coded as a binary variable (“yes” or “no”). Yet if a participant responded affirmatively, he or she was asked to describe the specific mental neutralizing strategy that was used. In all, 45 participants (42.1%) in the study reported engaging in mental neutralizing during the TAF induction. These strategies were highly idiosyncratic: Examples included: “I told God that I did not mean what I said,” and “I repeated, ‘I do not want her to get cancer at any point’ several times in my head and reassured myself that the only reason I wrote that is because I am participating in an experiment.” A Chi-square test indicated that mental neutralizing strategies were used significantly more frequently in the Relative condition ($n = 29, 64.4%$) as compared to the Stranger condition ($n = 16; 35.6%$), $\chi^2(1) = 5.29, p < .05$.

Discussion

The present study used an in vivo paradigm to examine whether beliefs about the importance of thoughts (i.e., TAF) are related to the subject of the thought. In particular, we investigated whether imagining a negative outcome befalling a stranger *vs.* a beloved relative affected beliefs about the moral wrongness of thinking such thoughts and the likelihood of the corresponding event occurring. No previous studies have examined the relationship between familiarity with the target subject and TAF. Thus, the present research adds to the literature on the parameters of this cognitive bias. Our findings partially supported our hypotheses and can be summarized as follows: As predicted, thinking of a *relative* being diagnosed with cancer provoked more distress (anxiety), greater urges to reduce or cancel the effects of thinking the thought, and higher estimates of the likelihood of an actual cancer diagnosis as compared to thinking of a *stranger* befalling the same fate. Contrary to our prediction, however, the groups did not differ in their ratings of the moral wrongness of thinking these thoughts. We also found that almost half of all study participants engaged in some form of mental neutralizing; and consistent with our hypothesis, this was more frequent in the Relative, as compared to the Stranger, condition. In contrast, less than a fifth of participants engaged in overt neutralizing strategies, and contrary to our prediction, there were no group differences in the frequency of such strategies.

The findings of our study broadly support Rachman’s (1997, 1998) assertion that the more significant the negative intrusive thought, the more it will provoke distress and urges to neutralize. Drawing on cognitive models of emotion (e.g., Beck, 1976), it is the misinterpretations of one’s thoughts (i.e., TAF) that lead to the distress and urges. Our data suggest that varying the degree of familiarity or closeness of the target subject of a negative thought (i.e., a beloved relative *vs.* a stranger) influences the degree to

Table 1
Group means (standard deviation) on in vivo ratings while thinking and writing “I hope _____ is diagnosed with cancer soon”.

VAS rating (0–100)	Relative M (SD)	Range for relative	Stranger M (SD)	Range for stranger	η^2	F
Anxiety	34.09 (23.59)	0–90	23.36 (18.63)	0–80	0.06	6.76**
Likelihood	17.15 (23.36)	0–100	9.60 (13.70)	0–50	0.05	4.97*
Moral wrongness	37.80 (36.44)	0–100	28.94 (30.95)	0–100	0.2	1.83
Urge to neutralize	30.17 (32.25)	0–100	17.88 (23.34)	0–100	0.05	5.01*

Note. * $p < .05$; ** $p < .01$; *** $p < .001$. Degrees of freedom for all F tests was (1, 104).

which one perceives a thought to be foreboding (i.e., TAF), and therefore the degree of distress, urge to neutralize, and engagement in mental neutralizing behaviors. While overall levels of anxiety during the TAF induction were low (Stranger) to moderate (Relative), participants reported being extremely upset when contemplating the possibility of their relative getting cancer, and moderately upset when thinking about a relative contracting this disease. Varying the familiarity of the target subject also influenced likelihood TAF. That is, although participants generally believed that thinking about someone getting cancer was rather unlikely to lead to the development of the disease, the perceived likelihood was higher when thinking about a loved one as compared to a stranger. This is consistent with clinical observations that anxious individuals often confuse estimates of likelihood with estimates of severity. For example, because it might seem worse to cause harm to a relative, as compared to a stranger, causing harm to a relative might also seem more likely. Therefore, it is not surprising that thinking about a relative, as opposed to a stranger, contracting cancer would lead to higher likelihood TAF.

Given that our independent variable produced significant effects on beliefs about the likelihood of thoughts leading to negative events (Likelihood TAF), we were surprised to find no effect on moral TAF. This supports the notion that moral and likelihood TAF are distinct cognitive biases (e.g., Shafraan et al., 1996) and should be considered as such in future research and in cognitive-behavioral therapy for OCD. Our data suggest that, at least in the present nonclinical sample, likelihood TAF is influenced by the closeness of the target person in the unpleasant thought, but moral TAF beliefs are not.

Our findings with regard to neutralizing behaviors are also worthy of comment. As in previous studies that induced TAF in the laboratory (Berman et al., 2010; Bocci & Gordon, 2007; Marcks & Woods, 2007; Rachman et al., 1996), some of our participants engaged in behaviors to reduce the distress associated with the target thought or nullify the perceived effects of the thought. However, previous work has tended to focus on overt neutralizing behaviors, which were not related to familiarity with the target person in the present study. Given that many neutralizing behaviors are purely mental, however, we included an assessment of such strategies in the present study. Interestingly, familiarity with the person in the target thought was strongly associated with the frequency of mental neutralizing strategies, but not with the frequency of overt behaviors. While about one-third of participants who thought about a stranger getting cancer reported using mental neutralizing strategies, about two-thirds of those thinking about a relative mentally neutralized. Thus, stronger urges to reduce or cancel the effects of the negative thought and more frequent engagement in mental neutralizing rituals occurred when thoughts involve a loved one compared to when they involve a stranger.

Our findings support theoretical and empirical work on the importance of mental neutralizing in understanding the maintenance of obsessional problems (e.g., de Silva, Menzies, & Shafraan, 2003). According to contemporary cognitive-behavioral models, such strategies interfere with the correction of TAF-like beliefs in that following a negative thought, the nonoccurrence of a feared outcome is attributed to the neutralizing strategy, as opposed to the fact that TAF beliefs are erroneous.

The present study has implications for the assessment, study, and cognitive-behavioral treatment, of obsessional problems. First, clinicians and researchers should consider likelihood and moral TAF as separate cognitive biases. Clinicians can use unstructured interview techniques, the self-report TAFS, and in vivo behavioral measures to assess these cognitions. Second, clinicians and researchers should be aware of, and study, behavioral and mental neutralizing strategies in obsessional individuals. Thorough assessment of both types of neutralizing is especially important for

effective cognitive-behavioral therapy, which involves the use of behavioral experiments in which the validity of TAF beliefs is empirically tested without the use of neutralizing behaviors or other safety behaviors.

For a number of reasons, caution is warranted regarding the conclusions drawn from the present findings. First, although dysfunctional cognitions such as TAF are present on a continuum in the general population (e.g., Olatunji, Williams, Haslam, Abramowitz, & Tolin, 2008), the use of a nonclinical sample potentially limits the generalizability of our findings to clinical populations. Additional studies with those seeking treatment for obsessional problems are warranted. Second, some participants might have more or less experience with cancer, which may influence their ratings of anxiety, likelihood, moral wrongness, urges to neutralize, and/or degree of upsettingness. Although we did not control for this potentially confounding variable in the current study, random assignment should have distributed participants' experiences equally across the Relative and Stranger conditions. However, given that previous research (Holmes & Mathews, 2010) suggests that recall of past emotional episodes can influence the degree of mental imagery, it may be that participants in the Relative condition generated more vivid images than those in the Stranger condition. In order to rule out these potential confounds, future research should assess the vividness of the image and degree of similarity of the image to a memory or emotional episode, by utilizing measures for this purpose developed by Lipton, Brewin, Linke, and Halperin (2010). Additionally, future research should provide greater specificity for the image in order to decrease potential variability across conditions.

Third, participants were not asked to consider (a) a specific type of cancer (e.g., skin or pancreas) or (b) the cancer's severity (e.g., Stage 1 vs. Stage 4), both of which considerably affect the prognosis of the disease. The lack of specificity most likely led to individual variability in the imagined event and consequently permitted flexibility in the form or stage of the cancer. Future studies should make the outcome featured in the TAF induction highly specific. Fourth, given that the TAFS has been shown to be sensitive to change following experimental manipulations (Marino-Carper, Negy, Burns, & Lunt, 2010), future research should include the TAFS as an additional dependent variable. In doing so, researchers could gather further support that the personal significance of the target person affects either moral or likelihood TAF beliefs.

Additionally, we feel that future research should continue to explore the parameters of TAF, such as the vulnerability of the target subject in the negative thought (Rachman, 1997). For instance, when the vulnerability of the subject in the negative thought is manipulated (e.g., a pregnant woman vs. a body builder), how do participants rate their anxiety, likelihood, and moral wrongness? Similarly, to what extent are TAF-like beliefs differentially activated when factors such as age (the young vs. the elderly) or feelings toward the target subject (e.g., anger vs. neutrality vs. adoration) are manipulated? Understanding the parameters of this cognitive bias will contribute to refinements in theoretical models of obsessional problems and their treatment using cognitive-behavioral approaches.

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