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The relationship between religion and thought–action fusion: Use of an in vivo paradigm

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ABSTRACT

Research has demonstrated that higher levels of religiosity are positively correlated with thought–action fusion (TAF), a set of cognitive biases found to be associated with obsessive–compulsive symptoms. However, previous studies have exclusively relied on a nomothetic approach to measuring TAF using a single self-report instrument, the thought–action fusion scale. The current study examined the relationship between religiosity and TAF using an in vivo behaviorally-based assessment in which participants thought about and wrote down thoughts of negative events involving loved ones. Forty-three highly religious Protestant Christians were compared to 30 Atheists/Agnostics on their in vivo ratings of anxiety, estimates of likelihood, and moral wrongness related to the negative thoughts. Results indicated that compared to the non-religious participants, those who were highly religious believed that writing and thinking about the negative events was more morally wrong and increased the likelihood of the event. Results are discussed in terms of the potential relationship between certain religious teachings and TAF-related beliefs about the importance, significance, and influence of thoughts.

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Thought–action fusion (TAF; Shafran, Thordarson, & Rachman, 1996), which is a set of cognitive biases that have been studied at length with regard to obsessional problems (i.e., obsessive–compulsive disorder [OCD]; Berle, & Starcevic, 2005), refers to faulty beliefs about the relationship between mental events and behaviors. *Moral* TAF is the belief that thinking unacceptable thoughts is the moral equivalent of performing unacceptable behaviors (e.g., “Thinking about cursing is as bad as saying a curse word”). *Likelihood* TAF is the belief that thinking about an event increases the probability of the event or even causes it to occur. TAF occupies a central role in contemporary cognitive-behavioral models of obsessions. Rachman (1998), for example, posited that when a person appraises a harmless unwanted thought (e.g., a senseless sexual thought about a relative) as morally unacceptable (e.g., equivalent to committing incest) or as likely to lead to the corresponding event, the result is anxious (obsessional) preoccupation with the thought, as well as urges to dismiss or neutralize it (e.g., using compulsive rituals). Research consistently demonstrates a relationship between TAF and OCD symptoms (for a review see Berle & Starcevic, 2005), and it is therefore important to understand the factors that might contribute to the development of TAF.

Although TAF probably results from multiple factors, theorists and researchers have been interested in how religion might

contribute to its development. Salkovskis, Shafran, Rachman, and Freeston (1999), for example, suggested that religious institutions which impose explicit moral standards for thinking and behaving, which are inculcated by authority figures (e.g., clergy) and include the possibility of punishment (e.g., damnation) might foster the development of rigid and maladaptive beliefs about thoughts and their influence. Indeed, some religious imperatives resemble moral TAF, such as the 10th commandment from the Bible which forbids one from *coveting* (i.e., *wishing* to have) another person’s “property” (including his wife). Additionally, in the *Sermon on the Mount*, Jesus warns his followers, “I say to you that everyone who looks on a woman to lust for her has committed adultery already in his heart” (Matthew 5:27–28). Initial studies of individuals from different religious groups (e.g., Protestants, Catholics, Jews) have found positive associations between religiosity and TAF, particularly *moral* TAF (Abramowitz, Deacon, Woods, & Tolin, 2004; Rassin & Koster, 2003; Sica, Novara, & Sanavio, 2002; Siev & Cohen, 2007). That is, highly religious people, relative to non-religious or less devout individuals, perceive the presence and meaning of negative unwanted thoughts as more personally significant, influential, and immoral. This relationship appears to be pronounced among Protestant Christians relative to other religious groups (Rassin & Koster, 2003; Siev & Cohen, 2007), perhaps because Protestants engage more strongly in their religion when compared to other forms of Christianity (Rassin & Koster, 2003).

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A limitation of the existing literature on the relationship between religion and TAF, however, is that researchers have exclusively relied on a nomothetic approach to assessing TAF involving a single self-report scale, the thought–action fusion scale (TAFS; Shafran et al., 1996). While the TAFS is psychometrically stable and very useful, research on TAF would also benefit from the development of methodologically varied and idiographic measurements of this construct, such as interview or in vivo behaviorally-based assessments. In the present study, we sought to extend previous findings by examining the association between religiosity and TAF using a semi-idiographic in vivo procedure involving the induction of personally relevant negative thoughts. Moreover, unlike in previous studies, we examined neutralizing behavior as an analogue for compulsive rituals in response to the induction of negative thoughts.

To address these issues, we recruited two groups of participants: highly religious Protestants (HRP group) and Atheists/Agnostics (AA group). We restricted our religious sample to Protestants (a) to minimize heterogeneity of religious background and (b) because the relationship between religiosity and TAF appears to be most pronounced among this religious group. Atheist and Agnostic individuals were included together because these groups identify themselves as possessing at least some skepticism toward religious teachings. All participants were instructed to contemplate two personally relevant negative thoughts—one pertaining to a relative having a car accident and the other pertaining to having sex with a relative—and rate their degree of anxiety, perceived moral wrongness of thinking the thought, and perceived likelihood of the corresponding event coming true. Participants were subsequently given the opportunity to neutralize the negative thoughts. We hypothesized that the HRP group would show evidence of more TAF cognitions relative to the AA group. Specifically, we predicted that relative to the AA group, the HRP group would (a) report greater anxiety while thinking about and writing the thoughts, (b) rate the moral wrongness of thinking these thoughts and the likelihood of the corresponding events as higher, and (c) show more neutralizing behavior.

Method

Participants

Two hundred and fifty-five undergraduate students at a large university in the southeastern United States completed a screening battery of self-report measures and agreed to be contacted to participate in laboratory experiments for course credit. Of these 255, 73 individuals (28.6%) met the inclusion criteria for the present study (see below) and agreed to provide informed consent to participate following a full description of the procedures. The HRP group was comprised of 43 participants who self-identified on a demographic questionnaire as Protestant and scored in the “highly religious” range (>33) on the Santa Clara Religious Faith Scale (SCRFS; Plante & Boccaccini, 1997). The remaining 30 participants self-identified on a demographic questionnaire as Agnostic or Atheist and comprised the AA group.¹

Procedure

After completing a battery of self-report measures online (see Measures section) participants who could be classified as HRP or AA (as defined above) were invited to participate in the present

study, which was ostensibly about “thoughts and feelings.” Each participant was tested individually at a computer in a laboratory setting by a research assistant who had been trained in the research protocol and was kept blind as to the participant’s group status. All procedures had been approved by the university IRB and informed consent was obtained before beginning each participant’s session.

Our protocol was a modified version of Rachman, Shafran, Mitchell, Trant, and Teachman’s (1996) procedure in which a negative thought was induced, and neutralizing strategies were assessed. In our study, participants were first asked to indicate their current (baseline) level of anxiety from 0 (not at all) to 100 (extremely anxious) using a computerized visual analogue scale (VAS).

Next, participants were asked to think of a close (and beloved) relative, such as a parent or sibling, and write the person’s full name on a note card that was provided. The experimenter then placed the note card next to the computer monitor. Participants were then presented with one of two thoughts that were in the form of a sentence displayed on the computer screen (in counterbalanced order) designed to activate TAF beliefs: “I hope I have sex with _____” and “I hope _____ is in a car accident today.” Participants were instructed to copy the sentence onto another note card, inserting their close relative’s name into the blank.

Immediately after writing each sentence, participants were asked to close their eyes and think about the event occurring. Then, they were asked to use the computerized 0–100 VAS to indicate (a) their current level of anxiety, (b) their perceived likelihood of the event occurring because of thinking and writing down this thought, and (c) the perceived moral wrongness of thinking and writing down the thought.

After completing these three in vivo ratings, a prompt appeared on the 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 then performed any such neutralizing behavior (e.g., crossing out the sentence, turning over or tearing the note cards, etc.) in response to this prompt.

Once this process was complete for the first thought, it was repeated for the second. After completing the procedure for both thoughts, participants were debriefed about the actual purpose of the study, thanked for their participation, and dismissed.

Measures

The following self-report measures were completed as part of the screening battery and used in present study.

Center for epidemiological studies – depression scale (CES-D; Radloff, 1977)

The CES-D is a 20-item measure that assesses general psychological distress. Participants are asked to rate how often they have felt (or behaved) in certain ways (e.g., “I felt sad”) over the past week. Items are summed to obtain a total score ranging from 0 to 60. The measure possesses good internal consistency in nonclinical samples ($\alpha = .85$; Radloff, 1977) and is strongly correlated with the Beck Depression Inventory ($r = .87$; Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995).

Santa clara religious faith scale (SCRFS; Plante & Boccaccini, 1997)

The SCRFS is a 10-item self-report scale which provides a reliable and valid measure of one’s strength of religiosity (e.g., I pray daily). Total scores range from 10 to 40, with higher scores

¹ Because the SCRFS assesses religious behavior (e.g., praying daily), it is not an appropriate instrument to measure one’s level of Atheism or Agnosticism.

indicating greater religiosity. Psychometric research demonstrates that scoring at or above 33 indicates “high religiosity” (Plante & Boccaccini, 1997). The SCRFS has good reliability ($\alpha = .92-.95$) and converges with other valid measures of religiosity (Plante & Boccaccini, 1997).

Thought–action fusion scale (TAFS; Shafran et al., 1996)

This is a 19-item self-report measure of beliefs about the importance of thoughts. It contains three subscales: *Moral* (12 items, e.g., “Having a blasphemous thought is almost as sinful to me as a blasphemous action,” $\alpha = 0.90$), *Likelihood-other* (four items, e.g. “If I think of a relative/friend losing their job, this increases the risk that they will lose their job,” $\alpha = .92$), and *Likelihood-self* (three items, e.g. “If I think of myself having an accident, it increases the risk that I will have an accident,” $\alpha = .84$). Each item is rated on a scale from 0 (disagree strongly) to 4 (agree strongly). The TAFS has good internal consistency (Shafran et al., 1996).

Results

Group differences on sample characteristics and clinical variables

Table 1 presents the demographic characteristics for the HRP and AA groups. There were no significant differences for age, $t(70) = .26, p > .05$, gender, $\chi^2(1) = 3.51, p > .05$, or ethnicity, $\chi^2(4) = 4.60, p > .05$. Table 1 also presents mean scores on the CES-D and TAFS for each group. Results suggested that groups did not differ on the CES-D, $t(72) = .10, p > .05$. With regard to the TAFS, the HRP group had significantly higher scores than did the AA group on the Moral subscale ($t(72) = -4.11, p < .001$), yet no differences were observed on the TAFS-Likelihood-Other ($t(72) = -.34, p > .05$) or Self subscales ($t(72) = -1.09, p > .05$).

A *t*-test was also conducted to compare the groups' self-reported initial level of VAS-indicated anxiety. No significant differences were found between the HRP ($M = 17.72, SD = 18.35$) and AA groups ($M = 13.47, SD = 15.79; t(71) = -1.05, p > .05$), indicating similar baseline levels of anxiety across groups.

Group differences on in vivo ratings

Table 2 presents the mean in vivo anxiety, likelihood, and moral wrongness ratings (0–100) for the HRP and AA groups for both

thoughts. For the car accident thought, anxiety ratings were in the moderate range, and an independent samples *t*-test indicated that the group means were not significantly different. Ratings of the perceived likelihood that thinking about and writing this sentence would result in an actual accident were fairly low, yet a similar *t*-test revealed that the HRP group's likelihood ratings were significantly higher than the AA group's. Finally, both groups indicated that it was fairly morally wrong to think about and write down this thought, although a *t*-test revealed that the difference in mean ratings was not significant.

For the incest thought, in vivo anxiety ratings again fell in the moderate range, and an independent samples *t*-test indicated that the group means were not significantly different. Ratings of the perceived likelihood that thinking about and writing down this thought would result in actually committing incest were extremely low and also not significantly different. While both groups indicated that it was quite morally wrong to think about and write the incest-related thought, a *t*-test revealed that the HRP group rated this as significantly more morally wrong than did the AA group.

Group differences in neutralizing 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. These behaviors included crossing out the name or sentence, ripping up the note cards, folding the note card, altering the sentence by inserting words such as “doesn't” or “won't,” and turning the note card over. One participant took a picture of her loved one out of a purse and held it to her heart.

We attempted to classify these behaviors according to the classification scheme described by Freeston and Ladouceur (1997). However, because most neutralizing fell into their “physical action” category (mental strategies and covert rituals were not assessed), we created a binary variable to represent whether or not a participant had engaged in any neutralizing behavior.

For the car accident thought, 14 members of the HRP group (32.5%) and 3 members of the AA group (10%) performed neutralizing behaviors. A chi-square test indicated that the frequency of neutralizing in the HRP group was significantly higher than in the AA group, $\chi^2(1) = 4.98, p < .05$. A similar test indicated that for the incest thought, the number of HRP participants ($n = 16; 37.2%$) that performed neutralizing behaviors was significantly greater than the number of AA participants ($n = 4; 13.3%$) who performed these behaviors, $\chi^2(1) = 5.00, p < .05$.

Discussion

TAF is a set of cognitive biases involving exaggerated and dysfunctional beliefs about the importance, moral significance, and

Table 1
Sample demographic characteristics and descriptive statistics on self-report measures.

| Demographics | HRP (n = 43) | AA (n = 30) |
|------------------|---------------|--------------|
| Gender | | |
| Male | 9 (20.9%) | 12 (40%) |
| Female | 34 (79.1%) | 18 (60%) |
| Ethnicity | | |
| Caucasian | 25 (58.1%) | 20 (66.7%) |
| African–American | 14 (32.6%) | 3 (10%) |
| Hispanic | 1 (2.3%) | 2 (6.7%) |
| Asian | 2 (4.7%) | 3 (10%) |
| Other | 1 (2.3%) | 2 (6.7%) |
| Age (years) | | |
| Mean (SD) | 20.19 (4.47) | 19.97 (1.81) |
| Range | 18 - 47 | 18 - 25 |
| CES-D | 12.70 (10.11) | 15.2 (11.21) |
| TAFS | | |
| Moral | 19.63 (12.23) | 9.10 (7.58) |
| Likelihood–other | 2.07 (3.15) | 1.34 (2.06) |
| Likelihood–self | 2.47 (2.79) | 2.23 (2.97) |

Table 2
Mean (standard deviation) in vivo ratings of anxiety, likelihood, and morality for each sentence.

| Sentence and variable | Group | | t value ^a |
|------------------------------------------|---------------|---------------|----------------------|
| | HRP | AA | |
| I hope _____ is in a car accident today. | | | |
| Anxiety | 42.74 (29.95) | 36.80 (21.28) | -.93 |
| Likelihood | 27.60 (19.31) | 18.80 (18.31) | -1.96* |
| Moral wrongness | 75.09 (33.70) | 79.70 (27.04) | .622 |
| I hope I have sex with _____. | | | |
| Anxiety | 39.14 (29.82) | 43.57 (26.49) | .65 |
| Likelihood | 0.09 (0.37) | 1.07 (5.48) | 1.17 |
| Moral wrongness | 98.47 (6.08) | 81.23 (33.63) | -3.29** |

* $p < .05$, ** $p < .01$.
^a Degrees of freedom = 71.

influence of negative (or otherwise unwanted) thoughts, and is related to obsessional symptoms (e.g., Shafran et al., 1996). Because TAF represents a cognitive marker of OCD, authors have been interested in its possible origins and some have implicated religious beliefs that emphasize strict standards for thinking and behaving (Salkovskis et al., 1999). In the present investigation we examined the relationship between religiosity and TAF using an idiographic approach in which participants generated negative thoughts about a close relative, and while thinking about and writing these thoughts, provided in vivo ratings of their anxiety level, perceived moral acceptability, and perceived likelihood of the thought coming true.

The main results of the present study, which generally support our hypotheses, can be summarized as follows: Consistent with previous studies (e.g., Rassin & Koster, 2003), scores on the TAFS Moral subscale, but not the Likelihood subscales, were higher among the HRP than among the AA group. With regard to the in vivo ratings, the HRP participants believed that thinking and writing down a thought about a loved one being in a car accident influenced the likelihood of such an accident more than did the AA participants (i.e., for the car accident thought, the highly religious participants demonstrated greater likelihood TAF than did the non-religious participants). This group difference in likelihood estimates, however, was not found when the target thought concerned having sex with a loved one. Conversely, the HRP group, as compared to the AA group, believed that it was more morally unacceptable to think about and write down the thought about incest (i.e., for the incest thought, the highly religious participants demonstrated greater moral TAF than did the non-religious participants). This group difference in moral TAF, however, was not found with the car accident target thought. Finally, acts to neutralize or “undo” the effects of thinking about and writing down the two target thoughts were more common among the HRP, relative to the AA group.

Our findings are consistent with Salkovskis et al.'s (1999) notion that religious doctrine which contains standards for the unacceptability of certain thoughts, coupled with the threat of punishment (either worldly or divine) for disobedience, may foster TAF-like beliefs. Additional examples of particular Protestant teachings and instructive Bible verses (New American Standard Version) that explicitly reference “sin by thought” include: “Anyone who hates his brother is a murderer (John 3:15), and “For as he thinks in his heart, so is he” (Proverbs 23:7). These verses imply that thinking about something immoral is comparable to engaging in immoral behavior (i.e., moral TAF). Thus, when a devoutly religious individual experiences certain negative or otherwise irreverent thoughts or feelings, TAF-like beliefs may be activated, leading to an interpretation of the thought as unacceptable and perhaps needing to be neutralized, “undone,” or “dealt with” in some way. Theorists (e.g., Rachman, 1998; Salkovskis, 1999) have proposed that the misinterpretation of negative intrusive thoughts as personally significant or influential leads to clinical obsessions; and that the compulsive use of neutralizing strategies maintains the obsessions. Thus, our findings support the idea that Protestant Christianity includes certain beliefs that may be, in the clinical literature, associated with obsessional complaints (i.e., OCD).

The specificity of the group differences for the in vivo ratings of likelihood and morality across the two thoughts used in this study deserves comment. Why was thinking the *car accident* thought, but not the *incest* thought, associated with group differences in ratings of likelihood? The extremely low mean ratings and small degree of variability (among both groups) for the likelihood of the incest thought coming true suggest a floor effect. Car accidents, on the other hand, were perceived as more likely, and there was greater

variability in these ratings, allowing for the detection of group differences. It is also possible that the likelihood TAF bias is moderated by the degree to which the thinker has *control* over the corresponding event. That is, while the likelihood of a relative having a car accident is out of the participant's control, the likelihood of committing incest is within his or her control. Thus, perhaps thoughts about uncontrollable negative events are more vulnerable to likelihood TAF (at least among non-clinical individuals) than are thoughts about controllable events, and this is amplified for devoutly religious individuals.

The converse may explain why thinking and writing the *incest* thought, but not the *car accident* thought, was associated with group differences in ratings of moral wrongness. That is, the morality ratings in Table 2 are consistent with the idea that for religious individuals, thoughts about controllable events (e.g., having sex with a close relative) more readily activate moral TAF than do thoughts about uncontrollable events (e.g., a close relative having a car accident). The taboo nature of the incest-related thought might also explain the religious group difference in morality ratings for this thought, whereas the car accident thought was less personally repulsive, abhorrent, and repugnant. Future research should further investigate possible parameters of moral and likelihood TAF, such as the topic of the target thought and the controllability of the corresponding event; and investigate these parameters in clinical samples.

Contrary to our hypothesis, thinking about (a) a relative being in a car accident and (b) engaging in sexual act with one's relative, provoked no more anxiety for the HRP than for the AA groups. This finding is inconsistent with the cognitive model of obsessions as described above (e.g., Rachman, 1998) in that greater anxiety was not related to greater levels of TAF. Perhaps the HRP group relied on certain anxiety-reducing strategies inherent in their religious beliefs (and not assessed in the present study), such as knowing that they could pray or ask for forgiveness following the study.

For a number of reasons, caution is warranted regarding the conclusions that might be drawn from the present findings. First, our results do not justify the conclusion that religion has pathogenic effects. From a scientific perspective, the quasi-experimental design of this study precludes causal inferences. It cannot, for example, be ruled out that individuals with high levels of TAF subsequently become devoutly religious Protestants. Yet in spite of this, even if we presume that religion *does* promote TAF, this is not exclusive to religion. The origins of TAF and similar cognitive biases are likely complex, multifactorial, and not yet well understood (e.g., Salkovskis et al., 1999), highlighting the need for additional research of this nature. Lastly, while Protestant doctrine may emphasize certain TAF-like beliefs and attitudes, other religions may not (e.g., Siev & Cohen, 2007). Thus, the strongest conclusion that can be drawn is that the data are *in concert with* the hypothesis that certain aspects of Protestant Christianity correspond with TAF beliefs, and may therefore be correlated with obsessive–compulsive symptoms. This issue deserves further research attention.

The present findings are also based on a sample of non treatment-seeking individuals. Although cognitive biases such as TAF have been found to be present in both clinical and nonclinical samples, the findings of this study might not generalize to a sample of patients with OCD. As mentioned previously, research with such individuals marks a necessary next step in understanding the relationship between religion and TAF. Nevertheless, given that TAF exists in clinical and non-clinical individuals alike, and the consistency in findings between the present study and previous research, the current findings shed some light on the relationship between this construct and religion.

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