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Author:

Williams, Alishia; Lau, Gloria; Grisham, Jessica

Publication details:

Journal of Behavior Therapy and Experimental Psychiatry

v. 44

Chapter No. 2

pp. 207-212

0005-7916 (ISSN)

Publication Date:

2013

Publisher DOI:

<http://dx.doi.org/10.1016/j.jbtep.2012.09.004>

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Thought-action fusion as a mediator of religiosity and obsessive-compulsive symptoms

Alishia D. Williams^a, Gloria Lau^b, & Jessica R. Grisham^b

^aThe Clinical Research Unit for Anxiety and Depression, School of Psychiatry, University of New South Wales

^bSchool of Psychology, University of New South Wales

Correspondence concerning this article should be addressed to Alishia Williams, Level 4 O'Brien Building at St. Vincent's Hospital, Australia 2010

Email: alishia.williams@unsw.edu.au

Telephone: +61-8382-1434

Abstract

Background and Objectives: Thought-action fusion (TAF), or maladaptive cognitions regarding the relationship between mental events and behaviours, has been implicated in the development and maintenance of obsessive-compulsive disorder (OCD). As some religions promote TAF-like appraisals, it has been proposed that religiosity may play a role in the transformation of normally occurring intrusive thoughts into clinically distressing obsessions. No research, however, has experimentally investigated the mediating role of TAF on the relationship between religiosity and OC symptoms. Methods: 85 Christian, Jewish, and Atheist/Agnostic participants were exposed to an experimental thought-induction protocol and reported on their associated levels of distress, guilt, feelings of responsibility, and urge to suppress target intrusions experienced during a 5-minute monitoring period. Participants also completed measures of obsessive-compulsive symptomatology, TAF beliefs, and general psychopathology. Results: Using PROCESS and bootstrapping analyses, a test of the conditional indirect effects of religiosity on obsessive-compulsive symptoms revealed that Christianity moderated the effects of religiosity on moral TAF beliefs, which in turn mediated the relationship between religiosity and obsessive-compulsive symptoms. Furthermore, in the Christian group, moral TAF beliefs mediated the relationship between religiosity and ratings of guilt and responsibility following the experimental protocol. Limitations: The use of university students with moderate levels of religiosity. Conclusions: Collectively the results suggest that obsessional thinking is not attributable to religion per se, but that teachings underlying certain religious doctrines may fuel TAF beliefs that are implicated in the maintenance of OCD.

Keywords: thought-action fusion; obsessive-compulsive disorder; religiosity; moderated-mediation

1. Introduction

The occurrence of persistent intrusive thoughts is one of the core features of obsessive-compulsive disorder (OCD), yet research demonstrates that unpleasant, upsetting intrusive thoughts are normally experienced by 80-90% of the population (Rachman & de Silva, 1978). The experience of unwanted intrusive thoughts may be considered on a continuum, from an intrusive thought that is only fleetingly registered in an individual's mind to a clinically distressing recurrent obsession (Abramowitz, Whiteside, Kalsy & Tolin, 2003; Purdon, 1999; Purdon & Clark, 1994). While thoughts of a disturbing nature are common and easily dismissed by most individuals, current cognitive theories propose that individuals are more susceptible to developing clinically relevant obsessions when they misinterpret thoughts as overly significant or when they feel an inflated sense of responsibility for their thoughts (Rachman, 1998; Salkovskis, Shafran, Rachman & Freeston, 1999).

Research has supported the notion that responsibility is important in the development and maintenance of obsessive-compulsive symptomatology in both clinical and non-clinical samples (Bouchard, Rhéaume & Ladouceur, 1999; Wilson & Chambless, 1999), and has been associated with increased frequency of intrusions as well as distress (Rassin, Merckelbach, Muris & Spaan, 1999). Individuals who endorse a sense of inflated responsibility also have a higher tendency to engage in thought-action fusion (TAF), a related cognitive bias that also appears to predispose individuals to developing obsessional thoughts (Amir, Freshman, Ramsey, Neary & Brigidi, 2001). TAF refers to the propensity to inappropriately assume causal associations between one's thoughts and the external reality, considering thoughts as *a) the moral equivalent of physical actions (TAF-morality – e.g., wishing harm on someone is equivalent to actually causing harm), or b) making a physical outcome more likely (TAF-likelihood – e.g., thought of a specific situation increases the probability that the situation will actually occur)*. Whilst intrusive thoughts are simply dismissed by most individuals, people

high in TAF tend to assign special significance to the thoughts. Specifically, as individuals who endorse high levels of TAF beliefs are likely to feel extremely responsible for their thoughts, they may experience more discomfort and distress when thoughts of a disturbing or immoral nature do occur (Muris, Meesters, Rassin, Merckelbach & Campbell, 2001). Subsequently, individuals high in TAF may be more likely to direct increased attention to such thoughts, resulting in increased re-occurrence of related thoughts (Rachman, Thordarson, Shafran & Woody, 1995). As such, TAF has been proposed as an individual risk factor that may lead to the development of OCD (Shafran & Rachman, 2004; Valentiner & Smith, 2008).

Certain religions promote the view that thoughts are important and even morally equivalent to action. For example, some Christian teachings endorse the idea that thoughts and actions are judged as morally equivalent (e.g., Sermon on the Mount, *“You’re familiar with the command to the ancients, ‘Do not murder’. I tell you that anyone who is so much as angry with a brother or sister is guilty of murder.”* Matthew 5: 21-22). Thus, in particular religions, certain religious beliefs may play a role in the transformation of normally occurring intrusive thoughts into clinically distressing obsessions by emphasising the importance of thoughts through TAF (Abramowitz, Deacon, Woods & Tolin, 2004; Shafran, Thordarson & Rachman, 1996). Research has demonstrated a relationship between one’s level of religiosity and obsessive compulsive (OC) symptoms and cognitions. Highly religious Protestants have been found to endorse more severe OC symptoms compared to less devout Protestants (Abramowitz et al., 2004), and relatedly, highly religious Catholics have been found to endorse greater OC-relevant beliefs (need to control thoughts, responsibility over thoughts) relative to less devout Catholics (Sica, Novara, & Sanavio, 2002). Level of religiosity has also been associated with OC beliefs in the form of TAF (Berle & Starcevic, 2005; Marino, Lunt, & Negy, 2008; Rassin & Koster, 2003). Research therefore suggests that the extent of

religious devotion is associated with OC symptoms and beliefs (see Himle, Chatters, Taylor, & Nguyen, 2011 for a review). However, as there are substantial theological differences between different religions, the link between religiosity, TAF and OC symptoms may not be ubiquitous across all religions. There may be key differences between religious teachings concerning judgements about morality and the importance of thoughts. For example, Christianity places great emphasis on thoughts and intentions but relatively few behavioural prescriptions as one's eternal status hinges on *belief* rather than *deeds* (Cohen, 2003). On the other hand, Judaism emphasizes action and behavioural adherence more than belief. A Judaic religious text, *Kidduhshin 40a*, states that “*a good thought is regarded as a good deed...but He, does not regard a bad thought...as an actual deed*”.

To examine this issue empirically, Siev and Cohen (2007) compared Christians and Jewish (Orthodox, Conservative, Reform) on levels of TAF and reported that Christians scored higher on TAF-Moral and that religiosity only correlated with TAF beliefs in the Christian group. However, they did not find consistent differences on the other TAF subscales – Likelihood-Other, Likelihood-Self, and interpretation of the results was limited by the correlational nature of the design and by the lack of a measure of obsessive-compulsive symptoms. These limitations were partially addressed by a novel study by Berman, Abramowitz, Pardue, and Wheaton (2010). They employed an idiographic approach in which highly religious Protestants and Atheists/Agnostics were asked to generate negative thoughts about a beloved family member (1. hoping the family member would be in a car accident, and 2. hoping to have sex with the family member) and to rate their associated anxiety, perceived moral acceptability, and perceived likelihood of the thought coming true (Berman et al., 2010). As expected, the Protestant group reported elevated TAF-Moral and engaged in more neutralizing acts compared to the Atheist/Agnostic group, but mixed results were found for the in vivo ratings. Rating of anxiety and moral wrongness did not differ

between the two groups when responding to the accident target thought, but the Protestant group rated the likelihood of this event occurring higher than the Atheist/Agnostic group. For the incest target thought, ratings of anxiety and likelihood did not differ, but the Protestant group rated the moral wrongness of this thought higher than the Atheist/Agnostic group. While demonstrating that highly religious respondents believed that writing and thinking about certain negative events was morally wrong and increased the likelihood of the event occurring, no measure of OCD was included to rule out a differential response due to OC symptoms. Additionally, Berman et al. (2010) did not include a comparison religious group, therefore the specificity of this effect to Christianity remains unknown. Most recently Inozu, Karanci, and Clark (2012) compared a sample of Christian and Muslim students on measures of OCD symptoms and beliefs. Although TAF beliefs were not assessed, the Authors reported that the observed relationship between religiosity and obsessionality was attenuated when accounting for related beliefs about mental control efforts and responsibility/threat estimation. Despite leading cognitive-behavioural models of OCD that implicate TAF-related appraisals and beliefs in the development and maintenance of the disorder (see Rachman, 1998), to our knowledge no research has experimentally investigated the mediating role of TAF on the relationship between religiosity and OC symptoms and cognitive phenomena.

The current study therefore aimed to provide a more stringent test of the role of TAF in conferring increased responsibility and guilt in particular religious groups by employing an experimental thought induction protocol in Christian, Jewish, and Atheist/Agnostic religious groups. Based on previous research, it was hypothesized that religiosity (Santa Clara Strength of Religious Faith Questionnaire scores) would correlate with ratings of responsibility, thought-action fusion, and obsessive-compulsive symptoms, but only in the Christian group. It was further hypothesized that the Christian group would report elevated levels of thought-action fusion, particularly in relation to TAF-Moral in comparison to both the Jewish and

Atheist/Agnostic group. To the extent that these two proposals were supported, it was further hypothesized that 1) the relationship between religiosity and obsessive-compulsive symptoms would be moderated by religious group, and 2) that response ratings (distress, guilt, responsibility, and efforts to suppress) to the experimental thought induction protocol would be influenced by thought-action fusion beliefs. More specifically, it was hypothesized that if the indirect effect of religiosity on obsessive-compulsive symptoms via thought-action fusion was conditional (based upon Christian religious group), then the impact of religiosity on response ratings would be mediated by elevated TAF beliefs within this group. Finally, we explored whether response ratings to the experimental thought induction protocol would differ based on religious affiliation. Based on the mixed findings of Berman et al. (2010), no specific hypotheses were made.

2. Method

2.1. Participants

Participants were 85 first-year Psychology students participating in return for course credit. The sample comprised of 50 females and 35 males with a mean age of 20.06 years ($SD = 3.76$). Thirty-three participants identified themselves as Christian (26 Protestant, 5 Catholic, 2 ‘other’), 22 as Jewish, and 30 as Atheist/Agnostic. Ethical approval was obtained and all participants provided informed consent.

3. Measures

3.1. *Santa Clara Strength of Religious Faith Questionnaire* (SCSRFQ; Plante & Boccaccini, 1997). The SCSORF is a 10-item self-report measure of religiosity. It measures faith independent of one’s religious affiliation. Each item is rated on a 4-point scale ranging from “strongly disagree” to “strongly agree” (e.g., “my religious faith is extremely important to

me”, “I look to my faith as providing meaning and purpose in my life”). Total scores range from 10-40. Higher scores indicate greater levels of religiosity. The SCSORF is a valid measure of religious faith appropriate for use with a wide variety of religious orientations (Plante & Boccaccini, 1997). Cronbach’s alpha range from 0.94 to 0.97 (Plante, Yancey, Sherman, Guertin, & Pardini, 1999). To assess participant’s level of religiosity and religious affiliation, participants completed this questionnaire as well as three additional questions: “What is your religious background?”; “On average, how many hours/week are you involved in religious activities”; and “Please provide examples of your involvement”. The questionnaire was completed separately and at a different time to the experiment

3.2. *Obsessive Compulsive Inventory – Revised* (OCI-R; Foa, Huppert, Leiberg, Kichic, Salkovskis, Hajcak, et al., 2002). The OCI-R is an 18-item self-report inventory that measures obsessive-compulsive symptom severity. Participants rate the degree to which they are bothered or distressed by OCD symptoms in the past month on a five-point scale from 0 (not at all) to 4 (extremely). The OCI-R assesses a range of OCD symptomatology including washing, checking/doubting, obsessing, mental neutralising, ordering and hoarding. The OCI-R demonstrates good psychometric properties (Foa et al., 2002; Hajcak, Huppert, Simons & Foa, 2004). Cronbach’s alpha for the total score was .86 in the current sample.

3.3. *Thought Action Fusion Scale* (TAF-Scale; Shafran et al., 1996). The TAF-Scale is a 19-item self-report measure of cognitive distortions related to believing that a thought makes an event more likely, or that a thought is the moral equivalent of action. There are three subscales relating to issues of morality (TAF-moral - e.g., “*if I wish harm on someone, it is almost as bad as doing harm*”), fusion of thoughts and actions leading to harm to others (TAF-Likelihood-Others – e.g., “*If I think of a relative/friend being in a car accident, this increases the risk that he/she will have a car accident*”), and fusion of thoughts and action

leading to harm to oneself (TAF-Likelihood-Self – e.g., “*if I think of myself being injured in a fall, this increases the risk that I will have a fall and be injured*”). Each item is scored on a five-point Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree). The TAF-Scale has been shown to have good reliability with Cronbach’s alpha ranging from 0.85 to 0.96 across obsessional and non-anxious groups (Shafran et al., 1996). Cronbach’s alpha for the total score was .91 in the current sample.

3.4. *Responsibility Attitude Scale* (RAS; Salkovskis, Wroe, Gledhill, Morrison, Forrester, Richards et al., 2000). The RAS is a 26-item self-report questionnaire designed to measure general attitudes, assumptions and beliefs one holds about responsibility (e.g., “I worry a great deal about the effects of things which I do or don’t do”). Items are rated on a seven-point scale ranging from 1 (totally disagree) to 7 (totally agree). Salkovskis et al. (2000) found the RAS to possess good validity and high test-retest reliability (Cronbach’s alpha = 0.92). Cronbach’s alpha was .93 in the current sample.

3.5. *Depression Anxiety and Stress Scale – 21* (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a self-report measure of state depression, anxiety and stress. The DASS has been shown to have high internal consistency (.93) and to enable discrimination between these three negative emotional states (Lovibond & Lovibond, 1995). Cronbach’s alpha for the total score was .92 in the current sample.

4. Procedure

Participants completed all portions of the study at individual computer workstations. After informed consent, participants first completed baseline ratings of current mood, anxiety

and stress. They were then exposed to an experimental protocol adapted from Rassin (2001) that has been shown to induce obsession-like stress. Participants were instructed to ‘think of someone you hate or dislike’. This name was then inserted into a pre-typed sentence, ‘Now imagine that (named person) will be in a car accident’. The information was presented on the computer screen for 30 seconds. This became the participant’s ‘target thought’. Participants then rated their current level of distress, guilt, feelings of responsibility, and natural efforts to suppress the target thought on 0 (“not at all”) to 100 (“extremely”) visual analogue scales. All participants were then shown the following instructions (adapted from Salkovskis & Campbell, 1994): *“During the next few minutes, you may think about anything you like. You may think about the accident target thought, but you do not have to. If at any time you think of the accident target thought please press the X key for each occurrence. It is important that you continue in the same way for the full duration.”* Participants were asked to monitor their thoughts for 5 minutes following which they were again asked to rate their level of distress, guilt, responsibility, and tendency to suppress. Frequency of the target thought was measured using event marking presses on a computer keyboard to provide an index of target thought frequency during the 5 minute interval. Participants then completed the battery of self-report questionnaires.

5. Statistical Analyses

Tests of the indirect effects (mediation) and conditional indirect effects (moderation) were conducted using PROCESS (Hayes, 2012). This method was chosen over the causal steps approach (Baron & Kenny, 1986) based on recent research advocating for the use of modern statistical approaches to quantifying intervening variable models (Hayes, 2009). As recommended, particularly for small samples, estimates of indirect effects were generated using bootstrapping analysis (see Preacher & Hayes, 2004; Preacher, Rucker, & Hayes, 2007;

Williams & MacKinnon, 2008). Bootstrapping is a nonparametric resampling method that generates an estimate of the indirect effect and does not require assumptions about the shape of the sampling distribution that underlie the Sobel test. In bootstrapping analysis, the most stringent test of an indirect effect (mediation) is if the 95% bias corrected and accelerated confidence intervals for the indirect effect do not include the value of 0. When zero is not in the 95% confidence interval, the indirect effect is significantly different from zero at $p < .05$ (two-tailed) indicating that the effect of the independent variable on the dependent variable is contingent upon the effect of the proposed mediator (Hayes & Preacher, 2010; Preacher & Hayes, 2004). To test for conditional indirect effects (moderated mediation), the extent to which the indirect effect of the independent variable on the dependent variable *through the mediator* is contingent upon the moderator is estimated. PROCESS estimates the conditional indirect effect of the IV on the DV through the Mediator at various values of the Moderator and conducts an inferential test of the conditional indirect effect at those values. For dichotomous moderators the conditional effects are reported at each of the two values of the moderator (religious group: Jewish, Christian). It is important to note that it is not a requirement to obtain a significant total effect (IV on DV) in order to test for indirect effects using these statistical procedures (see Hayes, 2009).

6. Results

6.1. Relationship between religiosity, responsibility, thought-action fusion, and obsessive-compulsive symptomatology

One-tailed Pearson correlations were conducted separately within each religious group. As expected, level of religiosity (SCSRFQ) did not correlate with RAS, TAF, or OCI-R scores in the Atheist/Agnostic group. Religiosity also did not correlate with RAS, TAF, or

OCI-R scores in the Jewish group. However, in the Christian group level of religiosity correlated with TAF-Moral ($r = .74, p < .001$) and OCI-R ($r = .30, p < .05$), but not the TAF-Likelihood subscales or the RAS ($r = .26, p = .07$).

6.2. Group Comparisons on Primary Measures on Response Ratings

To examine differences between religious groups, separate one-way Analysis of Variance (ANOVA) were conducted for age, gender, level of religiosity, general psychopathology, OC specific beliefs, and response ratings to the experimental thought induction protocol. Means and standard deviations are reported in Table 1. There were no significant differences between religious groups on age, $F(2,82) = 1.49, p > .05$, or gender, $\chi^2(1, N = 85) = 3.23, p > .10$. Significant group differences were found for level of religiosity $F(2, 82) = 22.72, p < .05$. Follow-up post-hoc tests showed significant differences in the level of religiosity between the Atheist/Agnostic group and both the Jewish ($p < .001$) and Christian groups ($p < .001$). However, the level of religiosity between Christian and Jewish groups did not differ significantly ($p > .05$), indicating similar levels of religious involvement and devotion across the two groups. Further, groups did not differ significantly on baseline levels of stress, $F(2,82) = .625, p > .05$, anxiety, $F(2,82) = 1.05, p > .05$, or depression, $F(2,82) = .715, p > .05$. The groups differed with respect to TAF-Moral, $F(2, 82) = 14.46, p < .05$, with Christians reporting significantly higher levels of TAF-Moral compared to both the Jewish and Atheist/Agnostic groups ($p < .001$), who did not differ significantly from one another. The groups did not differ with respect to TAF Likelihood (self or other), F 's $< 1.95, p$'s $> .05$. There were also no significant differences between religious groups on the RAS, $F(2,82) = .98, p > .05$, or the OCI-R $F(2,82) = .02, p > .05$. Hence, whilst Christians endorsed higher TAF-Moral, they did not report higher levels of responsibility or OC- symptoms compared to the Jewish or Atheist/Agnostic groups. For response ratings there were no

significant differences in baseline ratings of responsibility or suppression, F 's < 2.9 , p 's $> .05$, but ratings of distress $F(2, 82) = 4.99$, $p < .01$, and guilt $F(2, 82) = 5.75$, $p < .01$, did differ. Post-hoc tests showed significant differences between the Christian and the Jewish group in levels of distress, $p < .01$, and between the Jewish group and both the Christian and the Athiest/Agnostic groups on ratings of guilt, p 's $< .05$. See Table 1 for means.

Insert Table 1 about here

6.3. Conditional indirect effect of religious group on obsessive-compulsive symptoms via thought-action fusion

In order to test for conditional indirect effects, we compared the mediating effects of TAF in a moderated mediation model (following procedures outlined by Preacher, 2012) with religiosity as the IV, OCI as the DV, TAF as the mediating variable, and religious group (Christian vs Jewish) as the bivariate moderator DASS-21 scores were included as a covariate to control for general psychopathology. The results of 5000 bootstrap resamples were computed for religious group as a moderator of the path from religiosity to OCI via TAF. The interaction between the IV and the moderator on TAF was significant, ($SE = .28$, $t = -2.33$, $p < .05$) and the direct effect of TAF on OCI was also significant, ($SE = .11$, $t = 2.09$, $p < .05$). The conditional indirect effect was significant for the Christian group (effect = .15, $SE = .08$, $LLCI = .02$ – $ULCI = .35$), but not for the Jewish group (effect = -.06, $SE = .06$, $LLCI = -.15$ – $ULCI = .12$). These results indicate that religious group (Christianity) exerts an influence on whether the effects of religiosity are transferred into a tendency to report elevated thought-action fusion beliefs, which in turn mediates the relationship between religiosity and obsessive-compulsive symptoms.

6.4. Indirect effects of religiosity on intrusion ratings via thought-action fusion

Given the indirect effect of religiosity on obsessive-compulsive symptoms via thought-action fusion was contingent upon religious group (Christian), we conducted additional analyses within this group only to investigate the relationship between religiosity and response during the in vivo task. Each model separately assessed the indirect effect of TAF Moral and TAF Likelihood-Other (given the relevance of this subscale to the experimental induction – *thinking of someone being in a car accident*) on ratings of distress, guilt, responsibility, and suppression efforts following the experimental task. DASS-21 scores were included as a covariate in all models. The mean frequency of intrusions reported during the 5 minute monitoring period was 7.00 ($SD = 5.35$). Intrusions were associated with mild levels of distress ($M = 20.61$, $SD = 26.80$), guilt, ($M = 20.30$, $SD = 26.74$), responsibility ($M = 20.30$, $SD = 28.11$), and moderate suppression efforts ($M = 36.67$, $SD = 34.52$). Results are reported in Table 2. The direct effect of religiosity on each of the DVs was not significant (this is not a requirement for mediation), however, the indirect effect of TAF Moral on guilt and responsibility ratings was significant. TAF Likelihood-Other was not a significant mediator of any of the DVs.

7. Discussion

Research has suggested a complex interplay between religiosity and psychological well-being (e.g., Cohen & Hall, 2009), including obsessive-compulsive phenomena (Abramowitz et al., 2004; Sica, Novara, & Sanavio, 2002). Religious teachings may promote certain cognitive biases, such as an inflated sense of responsibility and TAF beliefs, which are thought to contribute to the development of obsessive thoughts (Rassin & Koster, 2003; Salkovskis et al., 1999). Accordingly, the aim of the current study was to examine the association between religiosity, TAF, and OCD phenomena, and to determine whether the relationship amongst these constructs was stable across different religious groups. Further,

the present study examined the effect of religiosity on how individuals respond to an experimentally induced intrusive thought analogous to an obsessional thought in order to evaluate the mediating role of TAF.

As hypothesized, religiosity was positively correlated with TAF-Moral ratings, but only in the Christian group. Further, as emphasis on psychological fusion is more salient for particular religions (Yorulmaz, Gençöz & Woody, 2009), between-group differences on the TAF scale were anticipated, with Christians expected to endorse higher TAF-moral beliefs compared to Jews or non-believers. This hypothesis was supported. However, whilst past research has demonstrated that Christians report higher OC symptoms and hold a stronger belief about the importance, need to control, and responsibility for their thoughts relative to Jews or non-believers (e.g., Abramowitz et al., 2004; Siev & Cohen, 2007), this relation was not replicated in the current study. Christians in the current sample reported comparable levels of responsibility and obsessive-compulsive symptoms compared to the other two groups. Further, although the groups did not differ with respect to response ratings of responsibility or suppression following the experimental thought induction procedure, the Christian group reported levels of distress and guilt that were comparable to the Atheist/Agnostic group and that were lower than the Jewish group. This finding may be partially attributable to the distribution of Christians within this group as it was comprised of a mix of Protestant and Catholic denominations. The lower baseline ratings may also explain the lack of a direct effect of religiosity on the in vivo ratings of distress and guilt; nonetheless, moral TAF still evidenced an indirect effect on ratings of guilt in the Christian group.

In order to more specifically evaluate the relationship amongst these constructs, separate intervening variable models were computed. Results of bootstrapping analyses revealed that Christian faith moderated the effect of religiosity on thought-action fusion

beliefs, which in turn accounted for the effect of religiosity on obsessive-compulsive symptoms. These results suggest that religious convictions are not uniquely associated with obsessive-compulsive symptoms, but that Christian beliefs may confer increased likelihood of endorsing thought-action fusion beliefs that are indeed uniquely related to obsessive-compulsive symptomatology. Although all participants in the Christian group nominated Christianity as their religious affiliation, the group was comprised of both Protestant, Catholic, and unspecified denominations, therefore it is important to note that these findings may not apply equally to all denominations of Christianity.

When considering the results of the experimental thought induction procedure, it is important to note that the protocol was modified from the original version (and that employed by Berman et al. 2010) from thinking of a loved one in an accident to wishing the car accident would occur to someone hated. The rationale behind modifying the original sentence was to foster the idea of sin, heightening the disparity with religious morals, and subsequently, to augment the effect of different religious teachings on one's response to the thought intrusion. As Christianity emphasizes concepts reminiscent of TAF-*m* (e.g., *"Anyone who hates another brother or sister is really a murderer at heart. And you know that murderers don't have eternal life within them"* 1 John 3:15) whereas Jewish teachings emphasize the importance of deeds (e.g., *"If you do good, you will be more powerful ... If you do not do good, sin awaits crouching at the door"* Kiddushin, 30b), it was not surprising that Christians were found to endorse higher TAF beliefs compared to Jewish and Atheist/Agnostic participants. Arguably, based also on the above Christian teaching, thinking of bringing harm to a hated individual should also bring about discomfort and distress. However, this was not observed in the current study as there was no direct effect of religiosity on ratings of distress following the experimental thought induction. It is possible that by introducing the notion of sin, other religious differences, not just differences in TAF-

like teachings, complicated the feelings evoked following the thought induction. For instance, Christianity also highlights the importance of forgiveness (e.g., “*If we confess our sins, he is faithful and just and will forgive us our sins and purify us from all unrighteousness*” 1 John 1:9), therefore respondents may have believed that any sinful thoughts they experienced would be forgiven. Results did, however, demonstrate a significant indirect effect of TAF-Moral on ratings of guilt and responsibility following this protocol. These results indicate that to the extent that Christian participants were also high in moral thought-action fusion, they experienced elevated guilt and a sense of responsibility for experiencing intrusions of the target thought.

The results of the current study must be considered in light of a number of limitations. Although the experimental protocol allowed for assessment of in vivo ratings of emotional response to the target intrusion, TAF beliefs were indexed by a self-report measure and were not subject to manipulation. It would be informative to simultaneously manipulate TAF beliefs to provide a more stringent test of the role of TAF in conferring increased responsibility and guilt in particular religious groups. Any conclusions drawn from the results are also limited by the quasi-experimental design. It cannot be determined whether Christians endorse elevated TAF beliefs as a result of religious teachings, or whether individuals who hold TAF beliefs are drawn to teachings that are consistent with these beliefs (Rassin & Koster, 2003). As not all religious individuals endorse TAF beliefs, other factors, such as possessing a rigid interpretation of a particular belief system or having an excessive fear of punishment, may be critical (Berle & Starcevic, 2005). This proposal could be examined in future studies. Research is also needed to determine the temporal stability of TAF beliefs in the prediction of behavioural responding or symptom expression as research suggests that some OC beliefs do not have predictive validity across time (Novara, Pastore, Ghisi, Sica, Sanavio, & McKay, 2011).

In addition, a relatively small university student sample with moderate levels of religiosity was used. Although research supports a dimensional basis of obsessions (e.g., Burns, Formea, Keortge & Sternberger, 1995), it cannot be assumed that the current differences found between religious groups would apply for clinical obsessions. Finally, participants may have engaged in surreptitious neutralizing activities during the experimental protocol, such as prayer, that may have decreased ratings of distress and affected the results. Future studies may examine whether the experience of distress and responsibility prompts specific behavioural responses akin to compulsions in OCD. Nonetheless, current results help clarify the nature of the well-documented relationship between religiosity, maladaptive appraisals, and obsessive-compulsive symptomatology and may also have clinical implications. As previously highlighted by Siev and Cohen (2007), there is a need for awareness and sensitivity when treating patients who also have religious convictions that, from a cognitive-behavioural perspective, may appear dysfunctional and maladaptive. Therapeutic decisions regarding how to most appropriately challenge TAF beliefs will necessitate clinicians obtaining specific knowledge of their patient's beliefs through the assessment process.

Acknowledgement: Portions of this paper were submitted in partial fulfillment of the requirements for the University of New South Wales Masters Of Psychology-Clinical Degree (2009) by Gloria Lau. This research was supported in part by a grant from the Australian Research Council awarded to Jessica Grisham. Alishia Williams is supported by a National Health and Medical Research Council (NHMRC) of Australia Fellowship (630746).

Table 1

Mean scores (and standard deviations) for primary variables and baseline response ratings to the thought induction protocol

	Christian (<i>n</i> = 33)		Jewish (<i>n</i> = 22)		Atheist/Agnostic (<i>n</i> = 30)	
	M	(SD)	M	(SD)	M	(SD)
Age	19.18	(1.63)	20.68	(3.86)	20.57	(5.08)
SCSRFQ	29.30 ^a	(11.34)	27.32 ^a	(8.55)	13.87 ^b	(8.20)
Dass Stress	11.09	(6.35)	10.27	(8.56)	12.73	(9.63)
Dass Anxiety	5.52	(6.19)	4.00	(5.66)	6.67	(7.51)
Dass Depression	6.24	(5.12)	6.82	(5.65)	8.07	(7.36)
TAF-Moral	23.06 ^a	(10.38)	14.36 ^b	(6.36)	11.66 ^b	(8.26)
TAF-L Other	1.51	(3.08)	2.09	(2.13)	.76	(1.67)
TAF-L Self	3.06	(3.18)	3.90	(3.16)	3.00	(3.60)
OCI-R	14.81	(8.69)	14.40	(9.27)	14.90	(9.52)
RAS	73.03	(27.30)	79.63	(14.80)	70.63	(23.65)
Distress	46.06 ^a	(30.51)	70.45 ^b	(22.98)	52.67 ^{a b}	(29.47)
Guilt	34.55 ^a	(35.36)	64.09 ^b	(28.56)	39.00 ^a	(33.46)
Responsibility	20.30	(28.33)	41.36	(37.32)	25.67	(32.23)
Suppression	27.27	(27.07)	45.00	(26.85)	64.09	(28.56)

Note. Means with difference superscripts are significantly different. SCSRFQ = Santa Clara Strength of Religious Faith Questionnaire; DASS = Depression, Anxiety, Stress Scale-21; TAF = Thought-Action Fusion scale, Moral, Likelihood Other, Likelihood Self subscales; OCI-R = Obsessive-Compulsive Inventory-Revised; RAS = Responsibility Attitude Scale.

Table 2

Summary of 5000 bootstraps resamples of the indirect effects of religiosity via thought-action fusion in the Christian group

Independent Variable (IV)	Mediators (M)	Dependent Variable (DV)	Direct Effect	Indirect Effect	95% CI
SCSRFQ		Distress	.15		
	TAF Moral			.36	-.16 – 1.31
	TAF L-Other			.10	-.12 - .28
SCSRFQ		Guilt	.02		
	TAF Moral			.58	.06 - 1.55*
	TAF L-Other			.02	-.08 - .21
SCSRFQ		Responsibility	-.02		
	TAF Moral			.63	.14 – 1.69*
	TAF L-Other			.06	-.21 - .40
SCSRFQ		Suppression	.43		
	TAF Moral			.09	-.88 – 1.30
	TAF L-Other			.06	-.24 - .44

Note. SCSRFQ = Santa Clara Strength of Religious Faith Questionnaire; TAF = Thought-Action Fusion Scale, Moral subscale, Likelihood-Other subscale.

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