Developmental Experiences in the Prediction of Thought Action Fusion: Contribution of Religious, Familial, and Stress Factors

Noah C. Berman, M.A.

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Psychology (Clinical Psychology).

Chapel Hill
2013

Approved By:

Jonathan Abramowitz, Ph.D.

Carol Cheatham, Ph.D.

Deborah Jones, Ph.D.

Enrique Neblett, Ph.D.

Mitch Prinstein, Ph.D.

ABSTRACT

NOAH C. BERMAN, M.A.: Developmental Experiences in the Prediction of Thought Action Fusion: Contribution of Religious, Familial, and Stress Factors
(Under the direction of Jonathan S. Abramowitz, Ph.D.)

Cognitive biases, such as TAF, play a crucial role in the cognitive-behavioral model of anxiety disorders and have been shown to prospectively increase the risk of developing future psychopathology. However, little research has examined the risk factors for this theoretically important construct. Therefore, the current study examined the developmental correlates of TAF using a multi-method approach. Using both a self-report (N =407) and in vivo measure of TAF (N = 107), results indicated that religious-related variables predicted the moral bias of TAF, whereas parenting strategies and childhood trauma were associated with the likelihood bias. Distinct mediation pathways were observed, with intrinsic motivation mediating the relationship between religiosity and the moral bias; and psychological control mediating the relationship between childhood traumas and the likelihood bias. Despite these effects, comprehensive models predicting both biases were severely misfit. Results suggest that unique developmental correlates are associated with the moral and likelihood biases, and given the amount of variance unexplained by our models, other biological, psychosocial, and cultural variables need to be evaluated. Our findings are discussed in terms of developmental psychopathology and limitations are addressed.

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF FIGURES

Figure

LIST OF ABBREVIATIONS

OC   Obsessive Compulsive

OCD   Obsessive Compulsive Disorder

TAF   Thought Action Fusion

TAFS   Thought Action Fusion Scale

TAF-M   Thought Action Fusion – Moral Bias

TAF-L   Thought Action Fusion – Likelihood Bias

SCRFS   Santa Clara Religious Faith Scale

PsyC   Psychological Control

Int M   Intrinsic Motivation

Ext-S   Extrinsic Motivation - Social Subscale

Ext-P   Extrinsic Motivation – Personal Subscale

MGI-D   Maladaptive Parental Guilt Induction-Disparagement Subscale

MGI-SS   Maladaptive Guilt Induction – Self-Serving Elicitation Subscale

CTQ-EA   Childhood Trauma Questionnaire - Emotional Abuse

CTQ-PA   Childhood Trauma Questionnaire - Physical Abuse

CTQ-SA   Childhood Trauma Questionnaire - Sexual Abuse

CTQ-EN   Childhood Trauma Questionnaire - Emotional Neglect

CTQ-PN   Childhood Trauma Questionnaire - Physical Neglect

Developmental Experiences in the Prediction of Thought Action Fusion: Contribution of Religious, Familial, and Stress Factors

The role of dysfunctional beliefs in the cognitive-behavioral model of anxiety and mood disorders is widely accepted. Cognitive theories, most notably Beck's cognitive specificity theory (1976), argue that emotional disorders develop from the misinterpretation of stimuli and events. In social phobia, one might misinterpret an external stimulus (e.g., crowd's laughter) and assume to be the target of negative evaluation (Clark & Wells, 1995). In obsessive-compulsive disorder (OCD), it is common to misinterpret normal intrusive thoughts and overestimate their significance or dangerousness (Rachman, 1997, 1998; Rachman & de Silva, 1978; Salkovskis, 1985). Rachman (1998), for example, proposed that when one perceives a normally occurring intrusive thought (e.g., an unacceptable violent image) as highly significant (e.g., "Having this thought means its important") or dangerous and threatening (e.g., "Thinking this thought means I'm immoral"), it leads to anxiety and a preoccupation with the unwanted thought.

Longitudinal research suggests that the presence of certain dysfunctional beliefs and cognitive biases (e.g., the belief that thinking of doing something bad is equivalent to the corresponding action) prospectively increases the risk of developing future psychopathology, such as obsessive-compulsive symptoms (Abramowitz, Khandker, Nelson, Deacon, & Rygwall, 2006). Thus, cognitive biases represent distinct psychological diatheses or vulnerabilities and indicate an avenue by which at-risk individuals can be identified (Timpano, Abramowitz, Mahaffey, Mitchell, & Schmidt,

2011). Given the important role of cognitive biases in the development and maintenance of emotional disorders, better understanding factors that contribute to their development is critical for designing effective prevention and intervention programs (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001; Rachman, 1997; Salkovskis, Shafran, Rachman, & Freeston, 1999).

Although a number of cognitive biases have shown a relationship with anxiety and mood disorders, the current study will focus upon one cognitive factor, Thought Action Fusion (TAF), that has been implicated in Generalized Anxiety Disorder (Hazlett-Stevens, Zucker, & Craske, 2002), Panic, Social Anxiety, and Post-Traumatic Stress Disorder (Rachman & Shafran, 1999; Rassin, Diepstraten, Merckelbach, & Muris, 2001; Rassin, Merkelbach, Muris, & Schmidt, 2001), and most often, Obsessive Compulsive Disorder (Abramowitz, Storch, Keeley, & Cordell, 2007; Rassin, Muris, Schmidt, & Merckelbach, 2000; Rassin, Diepstraten, et al., 2001; Rassin, Merkelbach, et al, 2001; Rassin & Koster, 2003; Shafran, Thordarson, & Rachman, 1996; Smari & Holmsteinsson, 2001; Yorulmaz, Yilmaz, & Gencoz, 2004). TAF involves two biases that are thought to underlie the misperception of unwanted thoughts as highly significant and threatening (Shafran, et al., 1996). The *moral TAF* bias refers to morally equating thoughts and actions (e.g., a sexual thought involving one's mother is as morally repugnant as engaging in the sexual behavior). The *likelihood TAF* bias refers to the belief that thinking about a particular event increases the likelihood of the corresponding event occurring (e.g., thinking about my neighbor getting into a car accident increases the likelihood that this will occur; Shafran et al., 1996). The likelihood and moral biases

2

have shown a moderate correlation (*r*'s =.32 to .44; Rassin, Merkelbach, et al., 2001; Shafran et al., 1996), suggesting that they might be unique constructs, yet can co-occur.

TAF and Psychopathology

Salkovskis (1985) initially documented the construct of TAF, noting that patients with OCD had a tendency to assume that a "thought is like an action" (p. 574). Later researchers investigated the concept and developed a validated measure, the Thought Action Fusion Scale (TAFS; Shafran et al., 1996). Contemporary research efforts have used the TAFS, as well as in vivo behavioral paradigms, to study TAF as it relates to various psychopathological constructs.

TAF and OCD. Cognitive-behavioral models of obsessions have implicated TAF in some presentations of OCD. Rachman (1998), for instance, argued that interpreting a harmless unwanted thought (e.g., stealing from the grocery store) as morally unacceptable (e.g., equivalent to stealing) or as likely to lead to the feared outcome (e.g., shoplifting), might result in increased anxiety and an obsessional preoccupation with the thought, as well as attempts to suppress the thought or reduce anxiety (e.g., compulsive rituals or neutralizing behaviors). Using self-report measures, such as the Maudsley Obsessive-Compulsive Inventory (MOCI; Hodgson & Rachman, 1977), the Padua-Revised (Van Oppen, Hoekstra, & Emmelkamp, 1995), and the Padua Inventory –Washington State University Revision (Burns, Keortge, Formea, & Sternberger, 1996), a weak to moderate relationship between TAF and OCD symptoms has been found (*r's* between .20 and .65; Gwilliam, Wells, & Cartwright-Hatton, 2004; Rassin, Diepstraten, et al., 2001; Yorulmaz, Karanci, Bastug, Kısa, & Goka, 2007).

In addition to self-report questionnaires, investigators have used in vivo measures

to assess the relationship between TAF and OCD. These behavioral paradigms have been conceptualized as an analogue for OCD, in that one experiences an intrusive thought, which results in increased anxiety and a desire to reduce distress. The first TAF induction was conducted by Rachman, Shafran, Mitchell, Trant, and Teachman (1996), in which participants were asked to think of a beloved relative and then write a sentence indicating that they hoped the relative would be in a car accident. Results indicated that after participants contemplated this negative event, they reported increased levels of distress, feelings of responsibility, guilt, and urges to neutralize (i.e., cancel the effects of thinking the thought). Rachman et al. argued that TAF could be inferred from participants' distress and the neutralizing behaviors associated with thinking the negative thought about the relative. Bocci and Gordon (2007) similarly examined participants' response to thinking about a relative being in a car accident (i.e., likelihood TAF). Participants reported an increase in anxiety after writing the sentence, and 75% of participants engaged in a neutralizing behavior (e.g., crossing out the relative's name) following the TAF induction. Bocci and Gordon concluded that neutralization was a frequent behavior in response to the activation of likelihood TAF beliefs. A number of other researchers have also experimentally induced TAF in a nonclinical sample using Rachman et al.'s (1996) paradigm, finding elevated ratings of anxiety, likelihood, and urges to neutralize following the induction (Berman, Abramowitz, Pardue, Wheaton, 2010; Berman, Abramowitz, Wheaton, Pardue, & Fabricant, 2011; Marcks & Woods, 2007; Rassin, Merckelbach, Muris, & Spaan, 1999; van den Hout, Kindt, Weiland, & Peters, 2002; van den Hout, van Pol, & Peters, 2001; Zucker, Craske, Barrios, & Holguin, 2002).

TAF and other disorders. In addition to OCD, TAF has been implicated in a

4

number of other anxiety disorders. Due to the similarity between pathological worry and obsessive thoughts, researchers have hypothesized that TAF plays a role in the development and maintenance of the meta-cognitive beliefs associated with Generalized Anxiety Disorder (GAD; Hazlett-Stevens, et al., 2002). Hazlett-Stevens, et al. (2002) found that the scores of individuals with GAD on the TAFS likelihood subscale, but not moral subscale, were positively associated with scores on the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). Given these findings, Hazlett-Stevens, et al. suggested that individuals with GAD might overvalue the powerfulness of their worries, such that he/she might believe that worrying affects the likelihood that a feared outcome will occur (e.g., "If I worry about my mother's health, that will decrease the likelihood of her getting sick").

A similar set of TAF-like beliefs regarding the likelihood bias have also been studied in relation to social anxiety disorder, panic disorder, and post-traumatic stress disorder (Rachman & Shafran, 1999; Rassin, Diepstraten, et al., 2001; Rassin, Merkelbach, et al, 2001). In social anxiety disorder, an individual might overvalue the powerfulness of his/her thoughts on external events and might believe that having judgmental thoughts increases the likelihood of social rejection. In panic disorder, an individual might believe that thinking about physiological symptoms that are associated with panic attacks (e.g., racing heart, dizziness) will increase the likelihood of the symptoms occurring. Finally, in post-traumatic stress disorder, an individual might be fearful that thinking about the traumatic experience increases the likelihood of recurrence.

The TAF-like beliefs that relate to both OCD and other anxiety disorders are

similar in their overestimation of likelihood, however, Berle and Starcevic (2005) note that the response to the triggering TAF thoughts differs between patients with OCD and other anxiety disorders. Those with OCD tend to respond with neutralizing behaviors (e.g., compulsions), whereas those with other anxiety disorders tend to respond with avoidance (e.g., avoiding public places where a panic attack might occur). Although behavioral responses to TAF-like thoughts might differ, research suggests that individuals with anxiety disorders tend to experience the likelihood TAF bias, when compared to nonanxious and depressed individuals (Abramowitz, Whiteside, Lynam, & Kalsy, 2003). On the other hand, the moral bias might be specifically related to depressive concerns, as indicated by small to medium correlations (r's = .10 to .42) between the moral subscale of TAFS and self-report measures of depression (Abramowitz et al., 2003; Rassin, Merkelbach, et al, 2001; Shafran et al., 1996). Additionally, mediational models have indicated that only the TAFS moral subscale, but not the likelihood subscale, is associated with depressive symptoms when measures of trait anxiety are controlled for (Abramowitz et al., 2003). It is hypothesized that individuals' tendency to engage in self-blame and personalization, as well as experience feelings of excess guilt explains the relationship between the moral bias and depressive symptoms (Berle & Starcevic, 2005).

As is evident from the reviewed literature, TAF-like beliefs occur in a range of psychopathological concerns. The likelihood bias has been associated with various anxiety disorders; the moral bias has shown a relationship to depressive symptoms. These findings support the cognitive model of emotional disorders and implicate TAF as an important cognitive bias. But what, then, contributes to the development of this

6

cognitive bias? To date, very little research has investigated this question. The current study, therefore, aims to elucidate religious, familial, and stress-related factors (i.e., developmental experiences) in childhood and adolescence that might predict TAF.

Given the lack of research in this domain, it is informative to draw from Salkovskis et al.'s (1999) proposed developmental pathways for OCD-related cognitions more broadly. Salkovskis et al.'s theoretical work can direct the current study's identification of relevant developmental experiences. Of their proposed pathways, two are particularly relevant to TAF: (1) exposure to rigid or extreme rules of conduct and duty and (2) experiencing a misfortunate negative event (Salkovskis et al., 1999). These two possible "pathways" to TAF are reviewed next.

Rigid Rules

Salkovskis et al. (1999) proposed that the imposition of strict behavioral or moral principles could contribute to the development of a set of beliefs involving standards for thinking and behaving. Authority figures and institutions, such as parents and certain religions, can reinforce these attitudes about the equivalence of thoughts and behaviors through guilt, as well as the explicit possibility of worldly or divine retribution for thinking "bad" thoughts. Some religious doctrines, for instance, suggest that having certain immoral thoughts is sinful. Children taught this phenomenon of "sin by thought" might feel morally responsible for controlling their own thought processes, leading to increased preoccupation with their thinking. Children who internalize the notion that negative intrusive thoughts are sinful might also misinterpret those thoughts as dangerous or threatening.

Although Salkovskis et al. (1999) theorized how a number of factors give rise to rigid rules of moral conduct and behavior, no research has investigated how these developmental experiences compare to one another in the prediction of TAF. Therefore, the following factors that Salkovskis et al. (1999) implicated in the origin of rigid rules will be reviewed: type of religion, strength of religiosity, and parenting strategies. I will also highlight each construct's demonstrated or potential relationship to TAF. Subsequently, I will present extant research supporting Salkovskis et al.'s (1999) second pathway, that negative or traumatic experiences influence TAF.

Religious affiliation and religiosity. Before presenting research evaluating the relationship between religion and TAF, it is necessary to review: the definition of religion, the difficulties inherent in studying the relationship between religion and psychopathology, and the methodological approaches commonly taken when assessing religion and religiosity. For the purposes of this study, religion will refer to an "organized system of beliefs, rituals, practices, and community, which is oriented toward the sacred" (Dew, Daniel, Armstrong, Goldstron, Triplett, & Koenig, 2008, p. 382). By adopting this definition, a religious group is considered distinct if the organization espouses a purportedly unique set of belief systems and accompanying ritual practices.

The measurement of religiosity, as it relates to TAF (or OCD symptoms more generally), has varied considerably across studies. Many researchers have constructed self-report indices to assess religiosity, with questions evaluating religious service attendance, affiliation, and/or subjective strength of religiosity (Abramowitz, Deacon, Woods, & Tolin, 2004; Abramowitz, Huppert, Cohen, Tolin, & Cahill, 2002; Abramowitz et al., 2003; Rassin & Koster, 2003; Siev, Chambless, & Huppert, 2010;

Steketee, Quay, & White, 1991; Yorulmaz, Gencoz, & Woody, 2009). Each study's unique and self-constructed measure of religiosity reduces the reliability and generalizability of the results, and moreover, it is likely that the measures are not thoroughly assessing the complexity of the construct (Shreve-Neiger & Edelstein, 2004).

Although recent studies in this field (e.g., Berman et al., 2010) have utilized validated self-report questionnaires to assess religiosity, other methodological limitations limit the external validity of the results. For instance, Berman et al. (2010) dichotomized Protestant participants into "high" and "low" religious categories, which decreases power (MacCallum, Zhang, Preacher, & Rucker, 2002) and limits the generalizability to other religions or samples (Allison, Gorman, & Primavera, 1993). Given the methodological and statistical weaknesses present in the various studies that have assessed the relationship between religiosity and TAF, it is difficult to generalize their findings. Therefore, future studies examining this relationship should use a validated measure of religiosity that is frequently employed and consider religiosity to be a continuous variable (Marino, Lunt, & Negy, 2008).

Although previous studies examining the relationship between religiosity and TAF have methodological flaws, their findings hold important theoretical implications. Using self-report questionnaires, research suggests that certain religious groups have a positive association between religiosity and TAF (Abramowitz et al, 2004; Rassin & Koster, 2003; Sica, Norvara, & Sanavio, 2002; Siev & Cohen 2007; Siev et al., 2010; Yorulmaz et al., 2009). Moreover, this relationship appears to be most pronounced among Christians and Muslims (Abramowitz et al., 2004; Rassin & Koster, 2003; Siev & Cohen, 2007; Siev et al., 2010; Yorulmaz et al., 2009). Most recently, Siev et al. (2010)

9

found that after controlling for strength of religiosity, religious Christians (both Catholics and Protestants) scored higher than Jews on moral TAF. Additionally, Siev et al. (2010) demonstrated a positive relationship between religiosity and moral TAF in a Christian sample.

In addition to self-report questionnaires, in vivo behavioral paradigms have been used to demonstrate religious group differences in TAF. For instance, Berman et al. (2010) asked highly religious Protestants and Atheists/Agnostics to insert their most beloved relative into the following two sentences: "I hope _____ gets into a car accident today" (likelihood TAF) and "I hope I have sex with _____" (moral TAF). Participants were instructed to contemplate these thoughts, write them down on a note card, and then answer a variety of follow-up questions (e.g., anxiety, likelihood of event occurring, and moral wrongness of thinking the thought). Results indicated that highly religious Protestants, compared to nonreligious participants, more strongly believed that thinking about a loved one being in a car accident influenced the likelihood of such an accident occurring. Moreover, the highly religious Protestants believed that it was more morally unacceptable to think about and write down the thought about incest. Finally, acts to neutralize or "undo" the effects of thinking about and writing down the two target thoughts were more common among the religious participants, relative to the nonreligious group. Thus, results from both the self-report and in vivo measures suggest that certain religious groups perceive the presence and meaning of negative unwanted thoughts to be more personally significant, influential, and immoral.

It has been hypothesized that religious group differences in TAF are due to differences in religious doctrine (Berman et al., 2010; Cohen & Rozin, 2001; Salkovskis

et al., 1999; Siev & Cohen, 2007; Yorulmaz et al., 2009). In Christianity, instructive Bible verses that reference "sin by thought" are considered to be religious directives that might promote TAF-like beliefs. For instance, in Jesus' *Sermon on the Mount*, he states, "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; New American Standard Version). This verse implies that thinking about something immoral is comparable to engaging in immoral behavior (i.e., moral TAF).

Given that Muslims have also exhibited a relationship with TAF (Yorulmaz et al., 2004; Yorulmaz et al., 2009), it is important to highlight the elements of Islamic religious doctrine that might influence this phenomenon. In Islam, there are strict religious rules (e.g., regular prayer) and behaviors (e.g., cleanliness) that must be followed to achieve salvation (Ghassemzadeh, Mojtabai, Khamseh, Ebrahimkhani, Issazadegan, & Saif-Nobakht, 2002). Moreover, intrusive thoughts and doubts about religious practices (termed "vesvese/waswas") are considered to be evil forces (Al-Issa & Qudji, 1998). Thus, in Islam, the control one is expected to maintain over thoughts and the negative association related to doubting one's religion might affect how strongly one perceives the moral importance of thoughts (Yorulmaz et al., 2009).

The reviewed findings for both Christianity and Islam are consistent with Salkovskis et al.'s (1999) assertion that religious doctrine, which contains standards for the unacceptability of certain thoughts, coupled with the threat of divine punishment for disobedience, fosters TAF-like beliefs. Thus, when a devoutly religious individual experiences certain negative or otherwise irreverent thoughts, TAF beliefs might be activated, leading to an interpretation of the thought as unacceptable and perhaps needing

11

to be neutralized, "undone," or "dealt with." However, these results do not suggest that religious teachings cause TAF beliefs; it might be that individuals who experience TAF are drawn towards certain religions or to strengthen their religiosity (Berle & Starcevic, 2005; Berman et al., 2010; Rassin & Koster, 2003). Additionally, because not all highly religious Christians and Muslims experience TAF-like beliefs that cause clinical distress, it might be that more important than one's religion is an overly rigid interpretation of the belief system and disproportionate fear of punishment (Salkovskis et al., 1999). Given past research, in the present study, I will examine the hypothesis that religiosity will positively predict both the moral and likelihood biases of TAF across all participants affiliating with a religion. Additionally, depending on the sample's variability in religious affiliation, I will examine whether religious affiliation moderates the relationship between religiosity and TAF, such that individuals affiliating with Christianity and/or Islam will possess a stronger relationship between religiosity and TAF.

While many researchers have demonstrated a relationship between religion and TAF, other factors that have not been measured (e.g., motivation for religion, family factors) might also contribute to TAF. Moreover, these unmeasured variables might similarly be related to religion and/or religiosity; therefore, when such variables are controlled for, the relationship between religion and TAF might weaken (Dew et al., 2008). From a treatment perspective, it is critical to ascertain other factors associated with TAF in addition to religion, since clinicians cannot refute a patient's religious beliefs as a mode of cognitive restructuring. However, certain parenting strategies or family factors that might influential in TAF *can* be therapeutically addressed and modified.

Motivation for religion. In addition to religious affiliation and degree of religiosity, research suggests that one's motivation for religion can also influence mental health outcomes (Luyten, Corveleyn, & Fontaine, 1998). Allport and Ross (1967) initially identified intrinsic and extrinsic motivation as two types of orientations toward religion. Individuals with high levels of *intrinsic motivation* find their "master motive in religion" (Allport & Ross, 1967, p. 434), perceive it to be a vital and guiding factor in their life, and believe that religion offers a foundational set of appropriate moral and personal values. Individuals with high levels of *extrinsic motivation*, on the other hand, are motivated by external forces and perceive religion to be a tool to strengthen one's political status or social relationships. In essence, an extrinsically motivated person can be seen as utilitarian, assessing the importance of his/her religious beliefs based on its relationship to an external reward system (Ellison, 2008; Meek, Albright, & McMinn, 1995). Gorsuch and McPherson (1989) further deconstructed motivational orientation, finding that extrinsic motivation contained two components, social (i.e., religion used to gain social status or power) and personal (i.e., religious used to bolster feelings of comfort or safety). Research suggests that when the extrinsic components are combined, intrinsic and extrinsic motivation are independent constructs (Donahue, 1985), possessing a weak negative correlation (Ellison, 2008; Gorsuch & McPherson, 1989; Sheldon, 2006).

Identifying the role of motivational orientation in the prediction of TAF might provide insight into specific elements of religion that influence this cognitive bias. However, due to the paucity of research empirically evaluating how motivational orientation and cognitive biases are related, generating predictions in this domain is

difficult. It might be that intrinsically motivated individuals internalize religious directives, such as "sin by thought", more strongly, therefore contributing to greater TAF-like beliefs. Extrinsic individuals, on the other hand, might not internalize religious doctrine to the same extent since their religiosity is motivated by social, personal, and political factors. In the present study, I will examine the hypotheses that intrinsic, but not extrinsic motivation for religion, will predict both the moral and likelihood subscale of TAF and that intrinsic motivation will mediate the relationship between religiosity and both TAF biases in Protestants and Catholics.

Guilt induction. Salkovskis et al. (1999) also proposed that family factors, such as parenting, influence the development of rigid rules. Certain parenting strategies, such as guilt induction, might contribute to a child's understanding of which thoughts and feelings are appropriate or moral and which are not. Similar to motivational orientation, parental guilt induction might account for variance in TAF that has been attributed to religiosity in previous research. In order to demonstrate how this construct potentially influences TAF, I will (1) define the construct of guilt, (2) discuss the relationship between guilt and religiosity, (3) describe how parenting practices can influence guilt, and (4) relate research on guilt induction to TAF.

Guilt can be defined as remorse in response to the perceived violation of a moral principle (Klass, 1987). Thus, to experience guilt, one must be *aware* of a moral law and subjectively measure one's thoughts and behaviors against this standard (Faiver, O'Brien, & Ingersoll, 2000). But how do children come to understand these moral laws? Albertsen, O'Connor, and Berry (2006) argue that these moral principles are culturally transmitted. Two likely avenues of transmission are religion and parenting.

For some, religious beliefs are influential in the formation of moral principles (Ellis, 1980). Research has demonstrated positive correlations between religiosity and general guilt, guilt related to immoral thoughts, and shame-free guilt (Luyten, et al., 1998; Fehr & Stamps, 1979; Albertsen, et al., 2006, respectively). Although, religiosity does not fully explain one's tendency to feel and experience guilt (Luyten et al., 1998), suggesting that other factors (e.g., parenting) are influential in children's understanding of moral principles and their violation (Albertsen, et al., 2006). Parents might rely upon maladaptive guilt-inducing tactics to mold children's moral fiber and their understanding of social expectations within and outside of the family system. As a result, guilt induction might mimic the effect of religiosity on TAF.

Two forms of parental guilt-induction have been identified (Donatelli, Bybee, & Buka, 2007): *self-serving elicitation*, in which the parent over-emphasizes the sacrifices he/she has made for the child while simultaneously limiting the child's autonomy; and *disparagement*, in which the parent perseverates over the child's previous and minor transgressions and inappropriately places blames on the child when he/she was not at fault (Donatelli et al., 2007).   Research suggests that chronic exposure to high levels of parental guilt induction interferes with the child's autonomy, emotional and social growth, and management of interpersonal conflicts (Rakow, Forehand, McKee, Coffelt, Champion, Fear, et al., 2009). Consequently, parental guilt induction has been associated with the development of childhood internalizing symptoms, even when traditional parenting factors (e.g., warmth/involvement, monitoring, and discipline) were accounted for (Donatelli et al., 2007; Rakow et al., 2009; Zahn-Waxler, Kochanska, Krupnick, & McKnew, 1990).

Children's problem solving abilities might explain the development of internalizing symptoms as a result of parental guilt induction (Rakow et al., 2009). At a young age, if unwarranted blame and responsibility are placed upon the child, he/she might not possess the cognitive capabilities to differentiate between problems that he/she has caused from problems that were a result of forces beyond his/her control (Rakow et al., 2009). Consequently, in difficult to control situations, the child might bear the onus of blame and ruminate over his/her role in the outcome (Bybee, Zigler, Berliner, & Merisca, 1996). Rakow et al. (2009) argued that despite improved problem solving capabilities, acceptance of blame can continue into adolescent years.

Clear similarities can be drawn between TAF and the consequential effects of guilt induction. Parental guilt induction leads to, and TAF involves, a misappropriation of one's role in external events that are beyond his/her control (likelihood TAF) and an overvaluation of the moral wrongness associated with certain thoughts, wishes, or beliefs (moral TAF). Additionally, parental guilt induction has demonstrated a positive relationship with childhood internalizing symptoms (Donatelli et al., 2007; Rakow et al., 2009) and TAF has been implicated in the development and maintenance of anxiety and mood problems (e.g., Hazlett-Stevens, et al., 2002; Rachman, 1998; Rachman & Shafran, 1999).

No research has yet examined how parental guilt induction and TAF are related. Rather, investigators have only examined how guilt can be a product of TAF. For instance, Rachman et al. (1996) demonstrated that feelings of guilt increased following an induction of a personally relevant TAF belief. Results indicated, not surprisingly, that misinterpreting one's role in the occurrence of a catastrophic event led to heightened

feelings of guilt. Given the reviewed research, the current study hypothesizes that parental guilt induction will predict both the moral and likelihood biases of TAF, and that this parenting strategy will mediate the previously documented relationship between religiosity and TAF.

Psychological control. Parental psychological control – attempts to control a child's psychological and emotional development by intruding upon and limiting the child's thinking processes, emotional expression, autonomy, and attachment (Barber, 1996) – is a parenting strategy that promotes rigid rules of conduct and duty. Therefore, it seems that developmental experiences with psychological control are consistent with Salkovskis et al.'s (1999) "rigid rules" pathway. A critical element of psychological control is the parents' management of children's *mental* processes (e.g., thoughts and emotions). For instance, if a child yells, "My sister is so annoying! I wish she would just die," the psychologically controlling parent responds by telling him that he "should *never* think or wish such terrible things!" Research suggests that mothers, as compared to fathers, employ psychological control more often (Barber, 1996; Barber & Harmon, 2002), but that adolescent's perceive both parents to engage in this parenting strategy at comparable rates (Rogers, Buchanan, & Winchell, 2003). However, Barber, Stolz, and Olsen (2005) documented that in a longitudinal cross-national study, no gender differences in psychological control were found in parents or children. Barber et al. (2005) argued that the absence of gender differentiation highlights the universal effect of parents' emotionally intrusive behaviors.

Empirical evidence indicates that psychological control is distinct from behavioral control (i.e., parents attempt to manage and control children's overt behaviors; Rogers, et

17

al., 2003). However, research has demonstrated that both psychological and behavioral control significantly predict youth problem behaviors (Albrecht, Galambos, & Jansson, 2007; Barber, 1996; Barber, Stolz, & Olsen, 2005; Rogers, et al., 2003), with psychological control possessing a unique relationship with internalizing symptoms (Albrecht et al., 2007; Barber, 1996; Barber, et al., 2005; Petit, Laird, Dodge, Bates, & Criss, 2001; Rogers et al., 2003). Moreover, the relationship between psychological control and adolescents' psychosocial development has been consistently demonstrated in various cultures and socioeconomic statuses (Barber, et al., 2005).

Based upon the reviewed literature, the maladaptive effect of parental psychological control on children's thinking processes and autonomy seeking is a possible contributor to TAF-like beliefs. If children are made to feel dependent on their parents for management of their thoughts and emotions, they might not develop appropriate skills to *independently* discern their role in the occurrence of external events or differentiate moral from immoral thoughts. Moreover, psychologically controlling parents might exert control (e.g., "thinking is as bad as doing") over their children's moral processes, thereby shaping children's perception of the moral wrongness of certain thoughts.

Unlike parental guilt induction, little research has examined the relationship between religion and parental psychological control. This is surprising given the potential overlap between psychological control and certain religious directives to control one's thoughts and resultant emotions and behaviors. Barber's (1996) study incorporated religion into analyses and demonstrated that Mormon youth reported less parental psychological control than non-Mormon youth. Given the absence of extensive empirical

18

research examining the relationship between religious affiliation, religiosity, and parental psychological control, it might be that psychological control accounts for variance in TAF that had previously been accounted for by religiosity. Thus, the current study hypothesizes that psychological control will predict both the moral and likelihood biases of TAF and mediate the relationship between religiosity and TAF.

An important caveat is that some research suggests that parental guilt induction is a component of psychological control (Barber & Harmon, 2002), thus, it will be important to critically evaluate the relationship between these two parenting strategies to ensure that unique constructs are being considered in the prediction of TAF. It is also important to note that both parental guilt induction and psychological control are factors of parenting styles and are not, in and of themselves, parenting typologies, such as those studied by Baumrind (1967). Research has demonstrated that elements of parenting style predict psychopathology outcomes over and above traditional parenting typology measures (Donatelli et al., 2007; Rakow, 2009; Zahn-Waxler et al., 1990). Moreover, Barber (1996) highlights the need to disaggregate parenting typologies in order to show how specific components of parenting (e.g., guilt induction) relate to both positive and negative outcomes. Thus, in the current study, no measure of parenting typologies was included.

Negative Life Events

Salkovskis et al. (1999) argued that in addition to developmental factors associated with rigid rules (e.g., religion, parental guilt induction, and psychological control), negative life events (e.g., childhood trauma) could influence TAF. Research suggests that in children, traumas disrupt cognitive development and might result in

cognitive distortions pertaining to oneself, others, the environment, and the future (self-trauma model; Briere, 1996). More specifically, Briere (1996) reported that three types of cognitive distortions are associated with childhood trauma: (1) safety (e.g., preoccupied by the prospect of danger) (2) controllability (e.g., perceived helplessness) and (3) internal attribution (e.g., self-blame). These cognitive distortions are then maintained by attending to internal and external cues that support the maladaptive beliefs (Browne & Winkelman, 2007). The development and maintenance of cognitive distortions following childhood trauma might explain the increased prevalence rate of internalizing disorders following early life stress (Heim & Nemeroff, 2001). As can be seen, the cognitive distortions associated with childhood trauma overlap with the biases associated with TAF (e.g., responsibility over external events and being preoccupied by the likelihood of danger). Thus, the current study hypothesizes that childhood trauma will predict one's experience of moral- and likelihood-TAF.

Present Study

Given the limited research examining developmental experiences associated with cognitive biases, the current study aims to evaluate how theoretically relevant religious, familial, and stress-related factors predict TAF beliefs. After reviewing previous research, six factors emerged as potential predictors of TAF: (1) religious affiliation, (2) strength of religiosity, (3) motivational orientation toward religion (i.e., intrinsic and extrinsic), (4) parental guilt induction, (5) parental psychological control, and (6) childhood trauma. The chosen constructs are meant to assess possible pathways associated with the development of cognitive biases (Salkovskis et al., 1999). In addition to assessing Salkovskis et al.'s (1999) developmental pathways, intrinsic motivation,

20

parental guilt induction, and parental psychological control might mediate the consistently demonstrated relationship between religiosity and TAF. Understanding other factors, besides religion, that influence TAF can assist clinicians in developing prevention programs that target therapeutically appropriate topics, such as parenting strategies. In doing so, possible developmental factors could be addressed early in life (i.e., prior to the development of TAF beliefs).

In order to examine how these various factors predict TAF, the current study employs a multi-method approach with a non-treatment seeking undergraduate sample. A student sample is appropriate for this study since TAF is not a clinical symptom per se, but rather a vulnerability factor that occurs along a continuum and is widely distributed in the general population (e.g., Beck, 1976; Rassin, Merkelbach, et al, 2001; Shafran et al., 1996). Moreover, given ample research suggesting that increased stress can lead to the development of cognitive biases and subsequent psychopathology (Finlay-Jones & Brown, 1981; Maina, Albert, Bogetto, Vaschetto, & Ravizza, 1999; McLaughlin, Kubzansky, Dunn, Waldinger, Vaillant, & Koenan; 2010; Striegel-Moore, Silberstein, Frensch, & Rodin; 1988), the naturalistic stress students experience in the beginning of their undergraduate career makes this sample ideal.

Participants will first complete self-report questionnaires that assess each construct, including TAF. Then, given the need for research to include semi-idiographic and methodologically varied measurements (Berle & Starcevic, 2005; Kazdin, 2002), a subset of participants will also complete an empirically validated in vivo behavioral measure of TAF (Berman, Abramowitz, et al., 2011). In doing so, the current study represents the first to examine the developmental correlates of TAF using multiple

assessment modalities. Based upon previous theory and empirical research, the following hypotheses are proposed:

(1) Religiosity will significantly and positively predict both moral and likelihood TAF across all participants affiliating with a religion. Depending on the variability of the sample's religious affiliation, religious affiliation will be examined as a moderator of the relationship between religiosity and TAF. It is hypothesized that religiosity will more strongly predict both TAF biases in a Christian and Muslim sample.

(2) Parental guilt induction, psychological control, and childhood trauma will significantly and positively predict both the moral and likelihood subscale of TAF.

(3) Intrinsic, but not extrinsic motivation for religion, will significantly and positively predict both the moral and likelihood subscale of TAF.

(4) Given the likely high prevalence of Christians in the study sample (based on previous sampling from the UNC Psychology Participant Pool), it is hypothesized that parental guilt induction, parental psychological control, and intrinsic motivation will mediate the relationship between religiosity and both TAF biases in a Protestant and Catholic sample. It is predicted that of these potential mediators, intrinsic motivation will account for the greatest amount of variance between religiosity and TAF.

(5) A comprehensive model that includes all indicators (religious affiliation, religiosity, intrinsic motivation, parental psychological control, guilt induction, and childhood trauma) in the prediction of moral and likelihood TAF will fit the data well.

Methods

Participants

Self-report sample. Four hundred and seven undergraduate students in introductory psychology and research methods classes at University of North Carolina at Chapel Hill completed an online questionnaire battery. Participants received course credit (introduction to psychology) or extra credit (research methods) for their participation. Table 1 outlines the demographic characteristics for this sample. As can be seen, a majority of the participants were female (68.31%) and were approximately 19-years-old. Both of these demographic measures were expected given that recruitment efforts targeted undergraduate psychology courses. Moreover, participants most frequently identified themselves as Caucasian (71.25%) and Christian (65.11%). A small number of ethnic (e.g., African-American; 11.79%) and religious minorities (e.g., Jewish; 1.4%) participants also completed study measures.

In vivo sample. One hundred and seven undergraduate students (82.24% female) completed an experimental laboratory session subsequent to completing the online "screening" questionnaire battery (see above). Demographic characteristics for this sample are outlined in Table 2. Akin to the self-report sample, the majority of participants were female (82.24%), Caucasian (79.40%), and Christian (77.5%).

Measures

The following measures were completed by participants via an online survey tool (see Procedure section):

Demographics. At the onset of the online questionnaire, participants were asked to report their gender, age, and their identified racial or ethnic group and religious affiliation. Participants were then asked: "How similar are your religious beliefs and practices to YOUR religious beliefs and practices FIVE years ago?" (1= "Very much

23

similar," 2 = "Moderately similar," 3= "Moderately dissimilar," 4= "Very much dissimilar").

Childhood trauma questionnaire – short form (CTQ-SF; Bernstein et al., 2003). The CTQ-SF is a 28-item self-report questionnaire that uses retrospective report to assess for child maltreatment. Participants rate responses on a 5-point Likert-type scale (0 = Never True to 4 = Very Often True). Five subscales are included in this measure (reported reliabilities are based on community samples) with five items per subscale: physical abuse (e.g., "People in my family hit me so hard that it left me with bruises or marks," α = .83) and emotional abuse (e.g., People in my family said hurtful or insulting things to me," α = .87), emotional neglect (e.g., "There was someone in my family who helped me feel that I was important or special," reverse coded, α = .91), sexual abuse (e.g., "Someone threatened to hurt me or tell lies about me unless I did something sexual with them," α = .92), and physical neglect (e.g., "I had to wear dirty clothes growing up," α = .61). Additionally, three items represent the minimization scale that is meant to detect the underreporting of maltreatment. As reported, the subscales possess moderate to high internal consistency. Although, the physical neglect subscale demonstrates weak internal consistency and should be interpreted with caution.

Depression anxiety stress scale - 21 (DASS-21; Henry & Crawford, 2005). The DASS is a 21-item reliable and valid self-report measure of general depression, hyperarousal, and tension in a large non-clinical sample (Henry & Crawford, 2005). It measures symptoms over the past week and contains three seven-item subscales rated on a 4-point Likert scale (0 = "Did not apply to me at all" to 3 = "Applied to me very much, or most of the time"). The Depression subscale measures dysphoric and sad mood ("I felt

that I had nothing to look forward to"; $\alpha = .88$), the Anxiety subscale measures symptoms of physical arousal and fear ("I experienced trembling"; $\alpha = .90$), and the Stress subscale measures symptoms such as tension, irritability, and overreaction to stressful events ("I tended to over-react to situations"; $\alpha = .90$).

Dimensional obsessive-compulsive scale (DOCS; Abramowitz et al., 2010). The DOCS is a 20-item self-report measure that assesses the severity of the four most consistently replicated OCD symptom dimensions (which correspond to four DOCS subscales): (1) contamination, (2) responsibility for harm and mistakes, (3) symmetry/ordering, and (4) unacceptable thoughts. To accommodate the heterogeneity of OCD symptoms and the presence of obsessions and rituals within each symptom dimension, each subscale begins with a description of the symptom dimension along with examples of representative obsessions and rituals. Within each symptom dimension, five items (rated 0 to 4) assess the following parameters of severity (over the past month): (a) time occupied by obsessions and rituals, (b) avoidance behavior, (c) associated distress, (d) functional interference, and (e) difficulty disregarding the obsessions and refraining from the compulsions. The DOCS subscales have excellent reliability in student samples ($\alpha = .83 - .93$) and the measure converges well with other measures of OC symptoms (Abramowitz et al., 2010).

Intrinsic extrinsic – revised (I/E - R; Gorsuch & McPherson, 1989). The I/E-R is a 14-item self-report scale, which measures one's intrinsic (e.g., "I try hard to live all my life according to my religious beliefs") and extrinsic motivation for religion. Two types of extrinsic motivation are assessed - social extrinsic (Es; "I go to religious services mostly to spend time with my friends") and personally extrinsic (Ep; "What religion offers me most

is comfort in times of trouble and sorrow"). Each item is rated on a 5-point Likert scale (1=strongly disagree, 5 =strongly agree). Using a sample of college students, Gorsuch and McPherson (1989) demonstrated that the intrinsic, social extrinsic, and personally extrinsic subscales had the following reliability scores: .83, .58, .57, respectively. When the extrinsic subscales are combined, an alpha of .65 was obtained. It is recognized that the reliabilities of the extrinsic scales are not strong, but this measure of religious motivation best assesses the constructs of interest.

Maladaptive guilt-induction measure (MGIM; Donatelli et al., 2007). MGIM is a 12-item self-report questionnaire assessing youth's perceived experiences with parental guilt induction. Respondents are presented with several statements regarding guilt induction and are asked to rate the truthfulness of each statement on a Likert scale from 1 (not at all true) to 7 (very true). The MGIM has two empirically demonstrated subscales. The disparagement subscale assesses child directed criticism and blame (e.g., "[My primary caregiver] makes me feel guilty even when its not my fault"; $\alpha = .84$). The self-serving elicitation subscale assesses the frequency that parents' exaggerate sacrifices that they have made for the child (e.g., [My primary caregiver] always reminds me of favors and sacrifices he/she has made"; $\alpha = .77$). As demonstrated, both subscales have good internal consistency.

Parental psychological control – youth self report (PPC-YSR; Barber, 1996). The PPC-YSR contains eight items that assess a primary caregiver's invalidation of feelings, restriction of verbal expression, personal attack, and love withdrawal (e.g., "[My primary caregiver] is always trying to change how I feel or think about things"). Respondents are asked to rate how well each statement describes his/her primary

caregiver (1= "Not like him/her," 2= "Somewhat like him/her," 3= "A lot like him/her").

Cronbach's alphas for the four possible dyads in the family were calculated, indicating

adequate internal consistency: mother/son (α = .83), mother/daughter (α = .83),

father/son (α = .80), and father/daughter (α = .83; Barber et al., 1996). Barber et al.

(1996) demonstrated that the PPC-YSR is a unidimensional measure that reliably

assesses psychological control regardless of the parent's gender, youth's gender, or the

income, and race of the family. It is important to note that items assessing guilt induction

as a form of parental psychological control were eliminated from the PPC-YSR after

factor analytic study.

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"; "My relationship with God is extremely

important to me"). Total scores range from 10-40, with higher scores indicating greater

religiosity. Psychometric research demonstrates that scoring at or above 33 indicates "high

religiosity" (Plante & Boccaccini, 1997). The SCRFS has good reliability (α = .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 (e.g., "Having a blasphemous thought is almost as sinful to me as a blasphemous

action," α = 0.90), *Likelihood-other* (e.g. "If I think of a relative/friend losing their job,

this increases the risk that they will lose their job," α = .92), and *Likelihood-self* (e.g. "If I

think of myself having an accident, it increases the risk that I will have an accident," α =

.84). Each item is rated on a scale from 0 (disagree strongly) to 4 (agree strongly). Items

on the TAFS have good face validity and the measure shows good internal consistency (Shafran et al., 1996).

In vivo measure of TAF. Participants who completed the online measures, agreed to be contacted by a research assistant, and identified with either a major branch of Christianity (e.g., Protestants or Catholic) or Agnosticism or Atheism were invited to participate in the in vivo (behavioral) measure of TAF based on that developed by Berman, Abramowitz, et al. (2011). This inclusion method and the in vivo protocol was reviewed and approved by the IRB.

In this paradigm, the 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 on the screen. Next, participants were asked to think of a close (and beloved) relative such as a parent or sibling and to write the person's full name on a provided note card. The participant was also shown a picture of a stranger (which matched the gender of the chosen relative) and told the individual's "name" and that he/she was a student at UNC. The participant was asked to write the strangers' name on a provided note card as well. The experimenter then placed both note cards next to the desktop monitor. Participants were then presented with four sentences and were instructed to write the sentence on the provided note card and insert either the close relative's or stranger's name (depending on the counterbalanced order) into the blank. The sentences were completed one at a time and the order of the four sentences was also counterbalanced:

(1) "I hope _____ is diagnosed with cancer soon."

(2) "I hope _____ goes deaf soon."

(3) "I hope _____ goes blind soon."

(4) "I hope _____ contracts HIV soon."

After writing each sentence, the participant was asked to close his or her eyes and think about the situation. The participant was then asked to read the sentence out loud. Before moving to the next sentence, the participant was asked to rate the following items on the 0-100 scale:

1. How much anxiety do you feel right now?

2. How much guilt do you feel right now?

3. What is the likelihood of the event occurring?

4. How much control do you have over the event occurring?

5. How responsible would you feel if the event did occur?

6. How morally wrong was it to write out the sentence?

7. How upsetting would it if this event happened?

8. How strong is your urge to reduce or cancel the effects of writing the sentence?

The experiment proceeded through these steps until this process occurred for each of the 4 sentences. If the participant refused to write any of the sentences, the experimenter noted that this is OK (i.e., "I understand this is difficult for you").

Procedure

After signing up for the experiment via an Internet based software program, participants provided consent to participate and were then directed to a secure project website where they completed the study measures in the same order. All data was

collected using Qualtrics, an online web survey development tool.[1] Upon accessing the

secure project website, participants were presented with an "instructions page." A

demographic questionnaire and the study questionnaires (see Measures section) then

appeared on subsequent pages. At the end of the last questionnaire, a debriefing

statement was presented. On the debriefing form, the contact information for the

principal investigator and the faculty supervisor was provided. Additionally, information

regarding the UNC Anxiety and Stress Disorders Clinic was given in case any participant

"wanted help for anxiety or other stress-related problems." The study was reviewed and

approved by the University IRB.

For the 107 participants who also completed the in vivo TAF measure, testing

occurred individually in the Anxiety and Stress Disorders laboratory in Davie Hall. Once

the participant arrived for the experiment, the experimenter obtained informed consent. If

the participant consented, the experimenter initiated the in vivo tasks as described above.

At the end of the experiment, the participant was given a debriefing form, which again

provided the contact information for the principal investigator and the faculty supervisor.

Information regarding the UNC Anxiety and Stress Disorders Clinic was also given in

case any participant "wanted help for anxiety or other stress-related problems." The study

was reviewed and approved by the University IRB.

Results

Data Management

---

[1] Coles, Cook, and Blake (2007) found that administering psychological assessment measures with Internet-based and paper-and-pencil formats yields highly comparable results.

It is possible that college students change their religious practices upon matriculating and moving (often for the first time) out of their parents' home. Given that the current study is, in part, concerned with how developmental experiences impact the relationship between religiosity and TAF, it is important that only participants whose religiosity has *not* changed over time be included in certain analyses. Thus, when testing religious-related hypotheses, only those participants who reported that their strength of religiosity was "moderately similar" or "very similar" to their religiosity 5 years ago (i.e., period of adolescence since most participants are first-year undergraduates) were included. If participants reported that their religiosity had moderately or drastically changed in the past 5 years, then their current ratings would not accurately reflect their developmental experience with religion. Therefore, these participants were not included in religious-related analyses.

Power analyses

Given our sample size and 10 parameter estimates, we conducted a number of power analyses for the comprehensive model. Using G*Power 3.1, power was calculated using the "Linear multiple regression: Fixed model, R^2 deviation from zero," which is part of the "F-test" family. For the self-report sample, 240 participants (excludes participants whose religiosity changed over the past 5 years) were included in the path analysis to test the comprehensive model. With an error probability rate (α) of .05, 10 predictors, and a sample size of 240, the power is .72 for small (.05), and .99 for both medium (.15) and large (.35) effect sizes. For the in vivo sample, 79 participants (excludes participants whose religiosity changed over the past 5 years) were included in the path analysis to test the comprehensive model. With an error probability rate of .05,

31

10 predictors, and a sample size of 79, the power is .19 for a small effect size (.05), .57 for a medium effect size (.15), and .95 for a large effect size (.35). As can be seen from the power analyses, the sample size for the self-report sample provides adequate power to detect a medium and large effect; however, for the in vivo sample, we can only detect a large effect size. Consequently, certain pathways might not emerge as significant if their effect size is small. In order to obtain sufficient power to detect a small effect size for either sample, we would need at least 425 participants (i.e., approximately 350 more participants for the in vivo sample).

Descriptive Statistics and Zero-Order Correlations

Self-report. We first investigated the relationship between the indicators and TAF using the self-report measure, TAFS, as the dependent variable. Descriptive statistics were calculated for the subscales and total scores for: strength of religiosity, motivational orientation toward religion (intrinsic and extrinsic), parental guilt induction (self-serving elicitation and disparagement), parental psychological control, childhood trauma (physical and emotional abuse, emotional neglect, sexual abuse, and physical neglect), and TAF (moral and likelihood). Table 3 presents the mean, standard deviation, and range for each study measure.

As can be seen, for religious-related variables, descriptive statistics were calculated separately for participants affiliating with Christianity and with Atheism/Agnosticism. Christians scored moderately high on measures of religiosity and intrinsic motivation, whereas Atheists/Agnostics' scores on these measures were moderately low (Gorsuch & McPherson, 1989; Plante & Boccaccini, 1997). Not

32

surprisingly, Atheists/Agnostics scored significantly lower than Christians on all religious-related measures ($p < .05$).

Figures 1 and 2 highlight that on measures of religiosity, the range of scores for Christians was much wider than the range for Atheists/Agnostics. Moreover, Atheists/Agnostics' scores were restricted in range, a consequence of their expectedly low levels of religiosity. A similar pattern of religious group differences was found on measures of religious motivation (Table 3). It was expected that Atheists/Agnostics would score low on these measures given that many of the religiosity (e.g., "I pray daily" and "My relationship with God is important to me") and religious motivation items (e.g., "I go to religious services because it helps me make friends" and "What religion offers me most is comfort in times of trouble and sorrow") do not apply to individuals without religious faith. Moreover, these measures were not validated in an Atheist/Agnostic sample. In the analyses that follow, rather than exclude Atheists/Agnostics, religious affiliation (or lack thereof) was considered a moderator variable. Consequently, Atheist/Agnostic participants were included in path analyses that tested the comprehensive model. However, for religious-related analyses, only results for Christian participants could be interpreted since the religious questionnaires do not accurately or reliably measure the strength or motivation for religiosity in Atheists/Agnostics.

In regards to parenting strategies, moderate levels of psychological control and parental guilt induction were found (Table 3), with the means being typical of nonclinical youth (Donatelli et al., 2007). For childhood trauma ratings, the score for each type of trauma was very low, with emotional neglect being reported most frequently. The rare reporting of childhood traumas might lead to floor effects in future analyses. Finally, for

the self-report measure of TAF, participants reported moderate levels of moral TAF and low levels of likelihood TAF, both within the range of typical responses for a nonclinical sample (Rassin, Merkelbach, et al., 2001).

Next, we evaluated zero-order correlations among the indicators and the dependent variable (TAFS). Table 4 displays the correlation matrix. For these analyses, all correlations involving religious-related variables excluded individuals whose religiosity had changed in the past 5 years (shaded region of the correlation matrix). As expected, correlations indicated that most religious-related variables were positively associated with one another. However, a distinct relationship emerged between the subscales of TAFS and religious-related variables: All four religious-related measures possessed a significant, moderate, and positive relationship with TAFS-Moral, but only the extrinsic motivation subscales possessed a significant and positive relationship with TAFS-Likelihood.

Beyond religious-related variables, strong relationships were observed between the self-serving and disparagement types of parental guilt induction. Given the strength of this relationship ($r = .87, p < .001$), subsequent analyses combined the subscales to create a total guilt induction score. In doing so, the number of parameters needing to be estimated in path analyses was minimized.

Surprisingly, both types of maladaptive guilt induction and psychological control possessed a significantly moderate and positive relationship with each type of childhood trauma. Moreover, correlations between psychological control and both types of guilt induction were significant, moderate, and positive. Given the strength of these correlations (r's between .57 and .61, $p < .001$), the creation of a "parenting strategies"

latent variable was not appropriate. It seems that psychological control and guilt

induction measure a similar type of parenting strategy (Barber & Harmon, 2002), but are

independent constructs and were treated as such in subsequent regression and path

analyses.   Lastly, all types of childhood trauma were significantly and positively

correlated with each other, with the magnitude of the relationship ranging from weak

(sexual abuse and emotional neglect; $r = .25$, $p < .001$) to moderately strong (physical

abuse and emotional abuse, $r = .68$, $p < .001$).

The relationship between parenting strategies, childhood trauma and the subscales

of the TAFS indicated that all constructs were significantly and positively related to

TAFS-Likelihood (r's range from .11 - .31); however, only emotional and physical abuse

possessed a significant, positive, and weak relationship with TAFS-Moral (significant r's

range from .13 - .20). The associations between these constructs and TAF are further

evaluated in regression and path analyses.

In vivo. As in the self-report sample, a single measure of TAF-Likelihood and

TAF–Moral was needed. In other words, the four different TAF measures (i.e.,

inductions) needed to be evaluated to determine which (if not all) were appropriate

measurements for the DV.   Prior to simply averaging in vivo ratings for the 4 different

negative scenarios (cancer, HIV, blindness, and deafness), it was first necessary to ensure

that each TAF induction was perceived to be similarly upsetting/severe ("how upsetting

would it be if the event actually occurred"). Given that considering a *relative* being

diagnosed with a medical illness has been associated with higher ratings of TAF, when

compared to a *stranger* (Berman, Wheaton, Fabricant, Jacobson, & Abramowitz, 2011),

only sentences in which the participant considered a relative were used in present

analyses. Because of the random assignment and counterbalancing of the target subject in the induction, each participant only contemplated a relative for 2 out of the 4 sentences. For *relative* sentences, if ratings of severity were not significantly different, then participants' follow-up responses could be averaged across all inductions (e.g., each participant would end up with one score for his/her rating of likelihood). If significant differences emerged, then the sentence(s) that were rated as most upsetting would be averaged and used as the DV.

To determine whether the inductions significantly differed on ratings of severity, independent and paired samples *t*-tests were conducted. Different types of *t*-tests were needed given the counterbalanced order of the inductions and the randomization of the target subject (i.e., relative or stranger). Paired samples *t*-tests were used when the two inductions being compared (e.g., HIV-Deaf) both involved thinking about a "relative." Independent samples *t*-tests were used when the two inductions being compared (e.g., HIV-Blind) involved thinking about a stranger in one and a relative in the other. In this case, responses for the *relative* condition needed to be compared between subjects, rather than within.

As can be seen in Table 5, thinking about a relative being diagnosed with cancer or HIV was considered to be similarly upsetting or severe ($p > .05$). However, a diagnosis of cancer or HIV was rated as more upsetting than a relative going blind or deaf (p's $< .05$). Lastly, thinking about a relative going blind or deaf was rated as equally upsetting ($p > .05$). Given that the severity of a cancer or HIV diagnosis was rated to be more upsetting than blindness and deafness, the cancer and HIV in vivo ratings were averaged. Table 6 presents the means and standard deviations for the averaged in vivo

ratings. Many of the in vivo ratings were fairly low given the range of scores, but these findings are consistent with previous in vivo TAF inductions using a nonclinical sample (Berman et al., 2010). For future analyses, the in vivo rating of likelihood represents TAF-Likelihood and the in vivo rating of moral wrongness represents TAF-Moral.

As a manipulation check on the validity of our TAF induction, zero-order correlations between the subscales of the TAFS and the in vivo TAF ratings were conducted. Table 7 presents the bivariate correlations, which indicate that the relationships between the self-report scale and the in vivo measure, on the whole, were weak. However, significant and positive correlations between the variables of interest (TAFS-Moral and in vivo Moral: $r = .18, p < .05$; TAFS-Likelihood and in vivo Likelihood: $r = .18, p < .05$) were observed, which demonstrate that the TAFS and the in vivo ratings are assessing distinct constructs that can co-occur.

Descriptive statistics for the in vivo sample are provided in Table 8. To examine similarities between the self-report sample and the subset of participants involved in the in vivo paradigm, we conducted independent samples t-tests for each questionnaire. To perform these analyses, we excluded participants in the self-report sample that took part in the in vivo paradigm ($N = 107$), which allowed us to examine whether individuals that participated in the in vivo paradigm were different than those that only completed the self-report measures. Therefore, the 300 remaining participants in the self-report sample were compared to the 107 participants from the in vivo paradigm. Results indicated that there were no significant differences between the self-report and in vivo sample on any questionnaire ($p > .05$), suggesting that individuals who were recruited to participate in the in vivo paradigm were representative of the total sample.

Zero-order correlations between the indicators and in vivo ratings of TAF are presented in Table 9. Comparing these statistics to those obtained with the self-report sample, the correlations among the predictors are nearly identical in direction, magnitude, and significance. Minor differences between the self-report and in vivo sample include a loss of significance between religious motivation variables and the types of childhood trauma. More importantly, the relationship between the predictors and in vivo ratings of TAF were considerably different than those found with the TAFS. Only the in vivo moral rating was found to be significantly correlated with emotional neglect ($r = -.23, p < .05$). This observed relationship is stronger than the correlation observed in the self-report sample between emotional neglect and TAFS-Moral ($r = -.05, p > .05$). It is important to highlight that the pattern found in the self-report sample between the predictors and TAFS (i.e., all religious-related variables were positively and significantly related to TAFS-Moral; whereas parenting strategies and childhood trauma were positively and significantly related to TAFS-Likelihood) was not observed with in vivo ratings of TAF.

Hypothesis 1

Hypothesis 1 proposed that religiosity would significantly and positively predict both the moral and likelihood biases of TAF across all participants affiliating with a religion. Due to the limited variation of religious affiliation (see Table 1), participants not affiliating with Christianity or Atheism/Agnosticism were excluded. First, independent samples t-tests were conducted to determine the relationship between religious affiliation (Christian vs. Atheist/Agnostic) and TAF. Next, separate regression

38

analyses with the Santa Clara Religious Faith Scale (SCRFS) were conducted for both TAF-Moral and TAF-Likelihood.

TAFS. Independent samples t-tests indicated that Christian participants ($M = 9.82$, $SD = 8.42$) were significantly higher on TAFS-Moral compared to Atheists/Agnostics ($M = 4.71$, $SD = 6.05$; $t(202) = -3.83$, $p < .001$). Conversely, no religious group differences were found between Christians ($M = 1.77$; $SD = 3.23$) and Atheists/Agnostics ($M = 1.73$, $SD = 3.55$) on TAFS-Likelihood ($t(202) = -.07$, $p > .05$).

For strength of religiosity, the SCRFS (Table 10; Model 1a) was not a significant predictor of TAFS-Likelihood among Christians ($F(1, 155) = .94$, $p > .05$) or Atheists/Agnostics ($F(1, 42) = 3.71$, $p > .05$). However, for TAFS-Moral (Table 11), strength of religiosity (Model 1b) was a significant predictor among Christians ($F(1, 155) = 14.57$, $p < .001$) and Atheists/Agnostics ($F(1, 43) = 13.25$, $p < .01$). To determine whether religious affiliation moderated the relationship between SCRFS and TAFS-Moral, a dummy variable (Rel_Affil) was created that coded affiliation with Christianity as (0) and affiliation with Atheism/Agnosticism as (1). An interaction term was calculated that multiplied SCRFS (as a standardized variable) by Rel_Affil. A hierarchical regression was then conducted with SCRFS and Rel_Affil in Step 1 and the interaction term (SCRFS_Standard*Rel_Affil) in Step 2. Results indicated that a significant amount of variance in TAFS-Moral was accounted for when the interaction term was added to the predictor and moderator variables (ΔR^2 change $= .04$, $F(1, 97) = 4.94$, $p < .05$). Thus, religious affiliation moderated the effects of religiosity on TAFS-Moral, in that affiliation with Christianity was more strongly associated with TAFS-Moral, when compared to Atheists/Agnostics.

In vivo ratings. For in vivo ratings of TAF-Moral, independent samples t-tests indicated that Christian participants ($M = 40.66$, $SD = 36.73$) did not significantly differ from Atheists/Agnostics ($M = 31.47$, $SD = 30.57$; $t(77) = .35$, $p > .05$). Similarly, no religious group differences were found between Christians ($M = 9.87$; $SD = 20.65$) and Atheists/Agnostics ($M = 9.12$, $SD = 11.11$) for TAF-Likelihood ($t(76) = .14$, $p > .05$).

For strength of religiosity, the SCRFS did not significantly predict TAF-Likelihood (Table 12; Model 1c) for Christians ($F(1, 60) = .96$, $p > .05$) or Atheists/Agnostics ($F(1, 14) = .001$, $p > .05$). Similarly, the SCRFS did not significantly predict TAF-Moral (Table 13; Model 1d) for Christians ($F(1, 60) = .001$, $p > .05$) or Atheists/Agnostics ($F(1, 15) = .29$, $p > .05$). Moreover, religious affiliation was not found to moderate the relationship between religiosity and TAF-Likelihood or –Moral.

Summary. For the TAFS, affiliation with Christianity was associated with higher scores of TAF-Moral. Furthermore, a stronger degree of Christian religiosity significantly and positively predicted TAF-Moral. The same relationships, however, were not found with in vivo ratings of TAF-Moral; rather, no significant religious-related differences were obtained. For TAF-Likelihood, neither the TAFS nor the in vivo ratings yielded significant religious-related differences.

Hypothesis 2

Hypothesis 2 proposed that parental guilt induction, psychological control, and childhood trauma would significantly and positively predict both the moral and likelihood biases of TAF. To test this hypothesis, total scores on the Maladaptive Guilt Induction measure, Parent Psychological Control – Youth Self-Report, and the subscales on the Child Trauma Questionnaire, were separately entered into regression models that

predicted both TAF biases. Given that these analyses do not involve religious-related constructs, participants were *not* excluded if they reported a change in their strength of religiosity in the past 5 years.

TAFS. For TAFS-Likelihood (Table 10), psychological control (Model 4a; $F(1, 251) = 5.70, p < .05$), parental guilt induction (Model 5a; $F(1, 242) = .10.58, p < .001$), and childhood trauma (Model 6a; $F(5, 220) = 4.45, p < .001$) were all significant and positive predictors. Of the childhood trauma subscales, emotional abuse and physical neglect emerged as unique predictors. For TAFS-Moral (Table 11), psychological control (4b; $F(1, 251) = 2.29, p > .05$) and guilt induction (Model 5b; $F(1, 241) = .001, p > .05$) were not found to be significant predictors. However, childhood trauma (Model 6b; $F(5, 219) = 4.00, p < .01$) accounted for a significant amount of variance in TAFS-Moral, with physical abuse emerging as a unique predictor.

In vivo ratings. For TAF-Likelihood (Table 12), psychological control (Model 4c; $F(1, 101) = .07, p > .05$), parental guilt induction (Model 5c; $F(1, 104) = .50, p > .05$), and childhood trauma (Model 6c; $F(5, 73) = .48, p > .05$) were not found to be significant predictors. For TAF-Moral (Table 13), psychological control (Model 4d; $F(1, 102) = .10, p > .05$), parental guilt induction (Model 5d; $F(1, 105) = .69, p > .05$), and childhood trauma (Model 6d; $F(5, 74) = 1.68, p > .05$) were also not found to be significant predictors.

Summary. For the TAFS, parental psychological control and guilt induction, as well as childhood trauma, specifically experiences with emotional abuse or physical neglect, positively and significantly predicted TAF-Likelihood. The same relationships, however, were not found with in vivo ratings of TAF-Likelihood; rather, none of the

indicators were significant predictors. For TAF-Moral, childhood trauma, specifically physical abuse, was found to significantly predict the TAFS. However, none of the indicators were significant predictors for in vivo ratings of TAF-Moral.

Hypothesis 3

Hypothesis 3 proposed that intrinsic, but not extrinsic motivation for religion, would significantly and positively predict both the moral and likelihood biases of TAF in participants affiliating with a religion. Given that these analyses *do* involve religious-related constructs, participants were excluded if they reported a change in their strength of religiosity in the past 5 years. To test this hypothesis, separate regression analyses were conducted with intrinsic and extrinsic (social and personal subscales) motivation.

TAFS. For TAFS-Likelihood (Table 10), intrinsic motivation (Model 2a) was not a significant predictor for Christians ($F(1,156) = .22, p > .05$) or Atheists/Agnostics ($F(1,42) = .02, p > .05$). However, for Atheists/Agnostics, extrinsic motivation (Model 3a) accounted for a significant amount of variance in TAFS-Likelihood ($F(2, 42) = 5.09$, $p < .05$), with the extrinsic-personal subscale emerging as a unique predictor. For Christians, extrinsic motivation was not a significant predictor for TAFS-Likelihood ($F(2,156) = 2.39, p > .05$).

For TAFS-Moral (Table 11), intrinsic motivation (Model 2b) predicted a significant amount of variance for Christians ($F(1, 155) = 16.31, p < .001$) and Atheists/Agnostics ($F(1, 43) = 6.52, p < .05$). Similarly, extrinsic motivation (Model 3b) predicted a significant amount of variance in TAFS-Moral for Christians ($F(2, 155) = 10.09, p < .05$) and Atheists/Agnostics ($F(2, 43) = 10.11, p < .001$), with the social subscale emerging as a unique predictor for both religious groups. To determine whether

religious affiliation moderated the relationship between intrinsic or extrinsic motivation and TAFS-Moral, the dummy coded variable (Rel_Affil) and interaction terms (e.g., Standard_Intrinsic*Rel_Affil) were entered into hierarchical regression analyses. Religious motivation (intrinsic and extrinsic were conducted separately) and Rel_Affil were entered into Step 1 and the interaction terms were entered into Step 2. Results indicated that religious affiliation did not moderate the effects of religious motivation on TAFS-Moral or –Likelihood.

In vivo ratings. For TAF-Likelihood (Table 12), intrinsic motivation (Model 2c) was not a significant predictor for Christians ($F(1, 60) = 1.69, p > .05$) or Atheists/Agnostics ($F(1, 14) = 2.67, p > .05$). Moreover, neither subscale of extrinsic motivation (Model 3c) was found to significantly predict TAF-Likelihood for Christians ($F(2, 59) = .52, p > .05$) or Atheists/Agnostics ($F(2, 13) = 1.14, p > .05$). For TAF-Moral (Table 13), a similar pattern of results was obtained. Intrinsic motivation (Model 2d) did not significantly predict TAF-Moral for Christians ($F(1, 60) = .49, p > .05$) or Atheists/Agnostics ($F(1, 15) = .34, p > .05$) and neither subscale of extrinsic motivation predicted TAF-Moral (Model 4d) for Christians ($F(2, 59) = .83, p > .05$) or Atheists/Agnostics ($F(2, 14) = .07, p > .05$). Not surprisingly, religious affiliation was not found to moderate the relationship between religiosity and TAF-Moral or TAF-Likelihood.

Summary. Intrinsic motivation for religion significantly and positively predicted TAF-Moral for both Christians and Atheists/Agnostics. This relationship, however, was not observed with in vivo ratings of TAF-Moral. Further, extrinsic motivation for religion (social subscale) significantly and positively predicted the TAFS-Moral subscale for

members of both religious affiliations, but this was not replicated with in vivo ratings of TAF-Moral. For TAF-Likelihood, extrinsic motivation for religion, the social subscale, was a significant and positive predictor for Atheists/Agnostics, but this was not replicated with the in vivo rating of TAF-Likelihood. It is important to recall that due to the restricted range of Atheist/Agnostics' scores on religious measures, along with the fact that these questionnaires were neither intended for, nor validated on, this sample, the significant effects of religious motivation on TAF for Atheists/Agnostics should not be interpreted. The potentially spurious nature of these results, as well as other reasons for their significance, will be considered in the Discussion.

Hypothesis 4

Hypothesis 4 proposed that (1) guilt induction, psychological control, and intrinsic motivation would mediate the relationship between religiosity and both TAF biases, (2) this mediation would be conditional upon affiliation with Christianity, and (3) intrinsic motivation would account for the greatest amount of variance between religiosity and TAF. Specifically, this analysis tested whether intrinsic motivation (M_1), psychological control (M_2), and guilt induction (M_3) mediated the relationship between X (religiosity) and Y_1 (TAF-Moral) or Y_2 (TAF-Likelihood).

To test indirect effects, we followed Preacher and Hayes' (2008) recommendation to use the bootstrapping technique. This statistical method samples the data thousands of times and estimates the indirect effect in each resampled data set. An empirical approximation of the sampling distribution of the indirect effect (ab) and its confidence intervals is then constructed. Bootstrapping is preferred over other popular methods of testing indirect effects (e.g., Sobel test) because it possesses higher power and minimizes

Type I error rates (Preacher & Hayes, 2008).

We also tested whether religious affiliation (*W)* moderated the mediation effects. To test for moderated mediation (i.e., psychological control *only* mediates the relationship between religiosity and TAF-Moral for Christians, but not for Atheists/Agnostics), the dummy coded religious affiliation variable (Rel_Affil; *W*) and an interaction term (*X*W;* product of religiosity and dummy coded religious affiliation) were included as predictors of TAF.

To statistically test for multiple causal pathways and potential mediation, path analysis was optimal, given that it (1) estimates the magnitude and significance of hypothesized causal relationships between the indicators (predictor variables) and TAF (dependent variable), (2) uses observed variables to simultaneously assess indirect and direct effects in the prediction of TAF, and (3) provides goodness of fit indices for comprehensive models. For all of the following path analyses, note that (1) participants were excluded if they reported a change in their strength of religiosity in the past 5 years, (2) due to the multiple number of analyses and beta values, only significant findings are reported, (3) given the coding of the interaction term, parameter estimates for moderation analyses refer to those affiliating with Christianity, and (4) the parameter estimates, indirect, direct, and total effects are reported in standardized form.

TAFS. The first set of path analyses were conducted with the TAFS-Moral subscale as the dependent variable. Results indicated that for the *Mediator Model* (*M*'s as outcome), religiosity significantly predicted psychological control ($\beta = .46$, $SE = .08$, $p < .001$), guilt induction ($\beta = .11$, $SE = .02$, $p < .01$), and intrinsic motivation ($\beta = .26$, SE

= .06, $p < .01$). For the *Dependent Variable Model* (*Y* as outcome), only intrinsic

motivation was found to significantly predict TAFS-Moral ($\beta = .29$, *SE* $= .10$, $p < .01$).

Next, the indirect, direct, and total effects were examined. The direct (*c'*) and

total (*c*; direct + indirect) effects were not significant. The indirect effect of religiosity on

TAF-Moral was significant for Christians ($ab_{total\_Christians} = .12$, 95% Bootstrapping

Confidence Interval (BCI) $= .005$ - $.24$, *SE* $= .06$, $p < .05$) and for this religious group the

only significant mediator was intrinsic motivation *($ab_{intrin\_Christians} = .08$, 95% BCI $= .01$ -

$.14$, *SE* $= .03$, $p < .05$). Specifically, the relationship between strength of religiosity and

TAFS-Moral was mediated by intrinsic motivation, but this mediational effect was

conditional upon affiliation with Christianity.

The next set of path analyses were conducted with the TAFS-Likelihood subscale

as the dependent variable. Beyond those identified in the *Mediator Model* above, no

significant predictors were specific to TAFS-Likelihood. Therefore, no significant

mediation or moderation effects were detected in the prediction of TAFS-Likelihood.

In vivo ratings. The next path analyses were conducted with the in vivo rating of

TAF-Moral as the dependent variable. Results indicated, similar to the self-report

sample, that for the *Mediator Model*, religiosity significantly predicted psychological

control ($\beta = .56$, *SE* $= .13$, $p < .001$), guilt induction ($\beta = .11$, *SE* $= .03$, $p < .01$), and

intrinsic motivation ($\beta = .28$, *SE* $= .09$, $p < .01$). However, for the *Dependent Variable*

Model (*Y* as outcome), no variables significantly predicted in vivo TAF-Moral and no

significant indirect, direct, or total effects were found. Lastly, religious affiliation did not

moderate any of the mediation pathways between strength of religiosity and in vivo

ratings of TAF-Moral.

The last path analysis for this hypothesis was conducted with the in vivo rating of TAF-Likelihood as the dependent variable. Beyond those identified in the *Mediator Model* above, no significant predictors were found to be specific to in vivo ratings of TAF-Likelihood. Therefore, no significant mediation or moderation effects were detected for in vivo ratings of TAF-Likelihood.

Summary. Results indicated that in both the self-report and in vivo sample, strength of religiosity significantly and positively predicted psychological control, guilt induction, and intrinsic motivation. For TAF-Moral, moderated mediation was observed for the self-report sample, such that the relationship between strength of religiosity and TAFS-Moral was mediated by intrinsic motivation, but this effect was conditional upon affiliation with Christianity. This effect was not replicated with in vivo ratings of TAF-Moral. Moreover, no significant mediation or moderated mediation was observed in the prediction of both self-report and in vivo likelihood TAF.

Hypothesis 5

Hypothesis 5 stated that a comprehensive model - all indicators and proposed mediation and moderation effects in the prediction of the moral and likelihood biases of TAF - would fit the data well. The following goodness of fit indices were used to determine the models' goodness of fit: (1) statistically nonsignificant chi square test (indicating no difference between the sample and model covariance matrix), (2) CFI between .90 – 1.00, (3) Root Mean Square Error of Approximation (RMSEA) between .00 - .05, and (4), the 90% confidence interval for the RMSEA (used for the "test of close fit") includes "0" (Hu & Bentler, 1999).

TAFS. For TAFS-Likelihood (Figure 3), the comprehensive model is very misfit ($\chi^2(22) = 452.82$, $p < .001$; CFI = .17; RMSEA = .30; 90% CI RMSEA = 0.28 - 0.32) and the predictors significantly accounted for 14% of the variance ($p < .01$) in the DV. Additionally, the direct effects of psychological control and guilt induction that emerged in regression analyses (hypothesis 2) disappeared in the comprehensive model. As seen in Figure 4, the comprehensive model predicting TAFS-Moral is also poorly fit ($\chi^2(22) = 452.65$, $p < .001$; CFI = .21; RMSEA = .30; 90% CI RMSEA = 0.27 - 0.33), but accounted for a notable and significant amount of variance ($R^2 = 23.3\%$, $p < .001$) in the DV. All direct effects that emerged in previous analyses (religiosity, intrinsic motivation, and physical abuse) were also found to be significant pathways in the comprehensive model.

In vivo ratings. As demonstrated in Figure 5, the comprehensive model predicting in vivo TAF-Likelihood is very misfit ($\chi^2(22) = 79.19$, $p < .001$; CFI = .38; RMSEA = .21; 90% CI RMSEA = 0.17 - 0.27) and accounted for 9% of the variance ($p > .05$). As seen in Figure 6, the comprehensive model predicting in vivo TAF-Moral is also misfit ($\chi^2(22) = 84.40$, $p < .001$; CFI = .41; RMSEA = .23; 90% CI RMSEA = 0.18 - 0.28), but accounts for a significant amount of variance, 29% ($p < .05$), in the DV.

Summary. In the prediction of TAF-Moral, the comprehensive model for both the self-report and in vivo sample fit the data poorly; thus, the model implied covariance matrix does not fit my observed covariance matrix. However, the indicators, and mediation and moderation effects accounted for a significant amount of the variance in both TAF-Moral measures. In the prediction of TAF-Likelihood, the comprehensive model for both the self-report and in vivo sample fit the data very poorly and the

pathways only accounted for a significant amount of the variance in the self-report sample.

Exploratory Analyses

In addition to analyses that tested our hypotheses, we conducted exploratory analyses to better understand: (1) the impact of exclusionary criteria on model fit, (2) additional mediational pathways, and (3) the specificity of our variables in the prediction of TAF. These analyses are discussed in Appendix A.

Discussion

Cognitive biases, such as TAF, play a crucial role in the cognitive-behavioral model of anxiety disorders and have been shown to prospectively increase the risk of developing future psychopathology (Abramowitz, et al., 2006; Abramowitz, et al., 2003). Given that TAF operates as a distinct psychological vulnerability factor, inhibiting or preventing the development of TAF could help avert maladaptive psychopathological outcomes (Kraemer et al., 2001; Timpano et al., 2011). However, little research has examined the risk factors for this theoretically important construct. Therefore, the current study examined possible developmental correlates (and potential risk factors) of TAF using a multi-method approach and aimed to understand how religion, parenting practices, and childhood trauma predict TAF beliefs.

The key findings of our study can be summarized as follows: unexpectedly, religious-related variables primarily predicted the moral bias of TAF, whereas parenting strategies and childhood trauma were associated with the likelihood bias. This pattern of results suggests that the aforementioned developmental experiences possess unique relationships with each TAF bias. Moreover, distinct mediation pathways were observed

for the moral and likelihood bias: intrinsic motivation mediated the relationship between religiosity and the moral bias in a Christian sample and psychological control mediated the relationship between both emotional neglect and emotional abuse and the likelihood bias (as seen in Appendix A). Despite the demonstrated mediation and moderation effects, comprehensive models predicting each bias were severely misfit.

Our first hypothesis, that strength of religiosity would predict both biases of TAF in a Christian sample, was partially supported. Specifically, with Christian participants on self-report measures, a stronger sense of religiosity was associated with higher ratings of moral TAF. No religious group differences, however, were found for the likelihood bias of TAF, suggesting that neither affiliation with Christianity nor strength of religiosity was associated with misinterpreting the powerfulness of one's thoughts in causing external negative events. These findings are consistent with previous questionnaire research demonstrating relationships between religiosity and TAF (Abramowitz et al., 2002; Abramowitz et al., 2004; Rassin & Koster, 2003), particularly Siev and Cohen's (2010) work, which demonstrated a positive relationship between religiosity and moral TAF in a Christian sample. Contrary to our predictions, our in vivo measure of TAF was not associated with religious affiliation or strength of religiosity, which is inconsistent with research using laboratory paradigms of TAF (Berman et al., 2010).

For hypothesis 2, that parental guilt induction, psychological control, and childhood trauma would independently predict both biases of TAF, a distinct pattern emerged with self-report measures that partially supported our prediction. Childhood experiences with guilt inducing or psychologically controlling parents, as well as incidents of emotional abuse and physical neglect, uniquely predicted the likelihood bias

of TAF. This pattern of findings is consistent with Salkovskis et al.'s (1999) theoretical pathways towards the development of obsessive beliefs, in that authoritative practices (or rigid rules) within the home, along with traumatic experiences, can contribute to an inflated responsibility over the occurrence of external events.

Interestingly, neither parenting practice nor the abovementioned traumas were predictive of misinterpreting the moral wrongfulness of thoughts; only a history of physical abuse contributed to the moral bias of TAF. This relationship might stem from past instances in which the parent beat the child for having immoral thoughts (e.g., "God is dead"). Given the likelihood that the parent also beat the child for engaging in immoral behaviors (e.g., swearing in church), the child might begin to believe that having immoral thoughts is equivalent to immoral actions. Inconsistent with this hypothesis though, our in vivo ratings of TAF were not related to any type of parenting practice or childhood trauma.

Hypothesis 3, that intrinsic, but not extrinsic, motivation for religion would predict both biases of TAF in Christian participants, was partially supported. Consistent with our hypothesis and paralleling the results found for hypothesis 1, a stronger sense of intrinsic motivation for religion predicted the moral bias of TAF in Christians (in the self-report sample). This positive association provides insight into a specific element of religiosity that influences TAF. It might be that intrinsically motivated individuals internalize religious directives, such as "sin by thought," more strongly, therefore contributing to greater TAF beliefs.

Contrary to our prediction, extrinsic motivation, specifically the social subtype, also predicted moral TAF, albeit not as strongly as intrinsic motivation. These findings

indicate that individuals whose religiosity is motivated by social values (e.g., attending church to meet friends, wanting to affiliate with the "right" crowd or with powerful people) are likely to equate immoral thoughts with immoral actions. This effect might be due to the communality of extrinsic and intrinsic motivation; these two constructs possess a positive association and are therefore, not mutually exclusive. Given this relationship, it might be that intrinsically motivated individuals are not only motivated by the values of religion, but are also drawn to the strong community and social elements that are built into the foundation of religion. It is also possible that individuals who possess a high degree of extrinsic motivation frequently attend religious services for the social value and unintentionally internalize the religious directives of their faith (e.g., sin by thought).

For Christian participants, neither type of religious motivation was associated with the likelihood bias, mirroring the pattern of findings that religious-related variables solely predict the moral bias. Moreover, neither type of motivational orientation was associated with in vivo moral or likelihood ratings.

It cannot be ignored that religiosity and motivational orientation were significant predictors of TAF for Atheist/Agnostic participants. However, as previously stated, we are not interpreting significant findings for Atheists/Agnostics on religious-related predictors since these measures were not applicable/appropriate for this sample. These effects might have emerged for the following reasons: (1) Atheists/Agnostics *lower* scores on measures of religiosity were associated with *lower* TAF scores, yielding a positive correlation and the restricted range. (2) Individuals identifying as Atheists/Agnostics might have grown up within Christian households in which children were expected to go to church regardless of their personal beliefs. Consequently,

children might have internalized religious directives, despite professing and identifying as a "non-believer."

For hypothesis 4, that guilt induction, psychological control, and intrinsic motivation would mediate the relationship between religiosity and both biases of TAF in a Christian sample, and that of these potential mediators, intrinsic motivation would account for the greatest amount of variance between religiosity and TAF, our prediction was partially supported. Although religiosity did possess positive relationships with the three potential mediators, intrinsic motivation emerged as the only significant mediator between strength of religiosity and the moral bias of TAF in a Christian sample. Moreover, when intrinsic motivation was taken into account, the demonstrated relationship between religiosity and TAF-Moral was no longer present. This complete mediation suggests that viewing religion as a guiding factor in life and internalizing religious values explains the consistently demonstrated relationship between Christian religiosity and moral TAF beliefs (Abramowitz et al., 2002; Abramowitz et al., 2004; Berman et al., 2010; Rassin & Koster, 2003; Siev & Cohen, 2010). This relationship, however, was not found with the in vivo measure of moral TAF.

Contrary to our prediction, intrinsic motivation did not mediate the relationship between religiosity and the likelihood bias. Although psychological control and guilt induction were both positively associated with religiosity and the likelihood bias, these parenting strategies did not help explain the established relationship between strength of religious faith and TAF.

Hypothesis 5, that a comprehensive model would fit the data well, was not supported for either bias or methodology. Although the comprehensive models explained

a significant amount of variance in the moral (self-report and in vivo sample) and likelihood (self-report sample) biases, the models were poorly fit. This pattern of results likely indicates path misspecification and that critical variables were missing from the model.

It should be noted that in the comprehensive models, some of the direct effects that were demonstrated in previous analyses remained, while others disappeared. For the moral bias (self-report), religiosity, intrinsic motivation, and physical abuse continued to predict TAF in the context of a larger comprehensive model. This provides additional support for our hypothesis that, even when controlling for other important variables, the aforementioned constructs were meaningful predictors of TAF. For the likelihood bias (self-report), neither parenting strategies were significant predictors of TAF in the context of the larger model. This might be due to the "omitted variable" problem. Simple regression hypotheses do not take into consideration other constructs that might account for significant variance in the DV. When these constructs were included, previously significant findings disappeared because other predictors better accounted for variance in the DV (Judd & Kenny, 1981; Preacher & Hayes, 2008). Therefore, it is possible that childhood trauma and religious-related variables accounted for some of the variance in the likelihood bias that had previously been accounted for by parenting strategies.

Exploratory analyses (discussed in Appendix A) demonstrated that including participants whose religiosity had changed in the past 5 years did not improve the model fit or significantly affect indirect, direct, or total effects. Two conclusions can be drawn from these results. First, the same relationship between current religiosity and TAF exists regardless of whether one's strength of religiosity has fluctuated in the past.

54

Second, adding participants did not reveal any additional significant relationships; therefore, pathway misspecification and missing predictors, rather than the model being underpowered, are likely limitations of the model.

In examining additional mediation effects (see Appendix A), parenting practices, specifically psychological control, were found to mediate the relationship between both emotional abuse and emotional neglect and the likelihood bias. In other words, our data suggest that parents' responses (e.g., invalidation of victim's feelings) to their child's harassment contributed to the development of an inflated sense of responsibility over causing external events.

One explanation for this finding is that certain cognitive distortions associated with childhood trauma (e.g., controllability and internal attribution; Briere, 1996) parallel the sequelae of psychological control (e.g., child feels misplaced responsibility for events that he/she has not caused; Zahn-Waxler et al., 1990; Donatelli et al., 2007), and the likelihood bias. This explanation does not suggest a causal relationship; rather, the positive association among these constructs might be due to similarities in dysfunctional cognitions or an underlying latent construct.

In determining the specificity of our constructs in the prediction of TAF (see Appendix A), results indicated that the developmental constructs possess unique associations with the cognitive bias. These constructs do not similarly predict psychological distress, anxiety symptomology, or OCD symptom severity, in that no direct or indirect effects were observed with these psychopathological outcomes. Moreover, of all the outcome variables, these constructs best predicted the moral bias of TAF. The demonstrated unique effects and amount of variance explained in moral TAF

indicate that these developmental experiences possess a relationship with TAF that is distinct from other forms of psychological distress.

Throughout our multitude of analyses, a similar pattern of findings emerged: developmental experiences related to religion (affiliation, strength of religiosity, and motivational orientation) were consistently associated with the belief that immoral thoughts were equivalent to immoral actions; whereas, childhood experiences that occur within the home (e.g., parenting and emotional abuse/neglect) were found to predict inflated estimates of responsibility over the occurrence of external events. The unique constellation of childhood experiences in the prediction of each TAF bias aligns well with Salkovskis et al.'s (1999) proposed pathways for the development of cognitive distortions.

Within Salkovskis et al.'s (1999) framework, the moral bias stems from rigid rules of conduct that are set forth by authority members within religious institutions. The strict moral principles, in concert with the possibility of worldly or divine retribution for thinking "bad" thoughts, could lead to the development of beliefs involving the moral equivalence of thoughts and actions. For instance, a child who is raised Christian and possesses a strong sense of intrinsic motivation for his/her religion might be taught the phenomenon of "sin by thought," which he/she internalizes as a youth. Consequently, as the child ages, he/she might feel morally responsible for controlling his/her thought processes, thus leading to a paradoxical preoccupation with immoral thoughts and the emergence of clinically interfering moral TAF.

The likelihood bias might also develop as a result of rigid rules of conduct and duty; however, this bias seems to be affected by a different form of authority - the

parents. Through certain types of parental communication, children might be taught that certain thoughts can lead to dangerous outcomes. For instance, a psychologically controlling parent might respond to a child's distasteful or catastrophic thoughts by reprimanding him/her (e.g., "Don't think that thought! What if it happened!"). Consequently, the child might become fearful of having dirty or dangerous thoughts due to the possibility of punishment, or worse, an increased likelihood of occurrence. Moreover, if unwarranted blame and responsibility are placed upon a young child, he/she might not possess the cognitive capabilities to differentiate between problems that he/she caused and those that resulted from circumstances beyond his/her control (Rakow et al., 2009). As a result, in difficult to control situations, the child might blame him/herself and assume responsibility for the outcome (Bybee, Zigler, Berliner, & Merisca, 1996). These examples typify how behavioral codes within the home can lead to both the development and reinforcement of responsibility over one's thought processes.

In addition to psychological control and guilt induction, childhood traumas, especially emotional abuse and neglect, contribute to the likelihood bias. By again examining the parental communication style, it might be that parents treat the child as a "scapegoat" (i.e., emotional abuse) and blame him/her for negative outcomes for which the child had no control over (e.g., financial difficulties; Salkovskis et al., 1999). In this environment, the child's feelings of responsibility for the occurrence of unfortunate events is repeatedly reinforced and can lead to cognitive distortions of inflated responsibility. Thus, as the child ages, he/she might not understand his/her role in causing negative events to occur and depending on other factors (e.g., psychological

control), he/she might misinterpret the powerfulness of his/her thoughts on the outside world.

More generally, trauma has been shown to disrupt typical cognitive development and lead to distortions of safety, controllability, and internal attribution (Briere, 1996; Browne & Winkelman, 2007). These cognitive errors mirror those seen in the likelihood bias (i.e., feelings of responsibility over the occurrence of external events and being preoccupied with the threat of danger). Moreover, in trauma victims, their tendency to avoid thinking about the event (Criterion C for Post-Traumatic Stress Disorder; APA, 2002) might be an indicator of TAF, such that victims might fear that thinking about the event will increase the likelihood of recurrence (Rachman & Shafran, 1999).

As the current results and Salkovskis et al.'s (1999) pathways suggest, a variety of factors can contribute to TAF. Their complex interplay can be understood through the lens of developmental psychopathology (i.e., a number of interactional processes underlie an individual's normative or maladaptive development; Cicchetti & Toth, 2009). Although the current study focused exclusively on psychological and socio-cultural components, in developmental psychopathology, it is important to also address how these factors interact with biological processes, thus, the potential contribution of biological systems in individual pathways will be addressed.

Throughout the life course, research has demonstrated that brain function is affected by experiences and it is most shaped in times of neural plasticity (Cicchetti & Tucker, 1994). Black, Jones, Nelson, & Greenough (1998) noted that experience-dependent synaptogenesis (i.e., brain's adaptation to and alteration from information that is unique to the individual) plays an important role in a child's neurobiological

development. If, for instance, a child is sexually abused at an early age, the experience-dependent synaptogenesis might trigger the development of abnormal neural circuitry. Consequently, this pathology in the brain can interfere with and distort the typical neurological development, leading to a number of maladaptive social and cognitive processes, such as TAF (Black et al, 1998; Cicchetti & Toth, 2009).

In addition to experience-dependent synaptogenesis, other biological factors can influence the development of cognitive biases. Research suggests that early child maltreatment is associated with dysregulation in both the autonomic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis (Ellis, Essex, & Joyce, 2005; Loman & Gunnar, 2010; McLaughlin et al., 2010). An indicator of this biological response is an atypical flattening of cortisol production (Cicchetti, Rogosch, Gunnar, & Toth, 2010). Similar to experience-dependent synaptogenesis, dysregulation of these systems can lead to maladaptive emotional, cognitive, and social processes (McLaughlin et al., 2010). In integrating biological factors into the current study, we can hypothesize that for children who experience abuse at an early age, the dysregulation of cortisol production might interact with certain parenting strategies, such as psychological control (Alink, Cicchetti, Kim, & Rogosch, 2009). As a result, the victim might develop emotional dysregulation and subsequently struggle with maladaptive cognitive processes (i.e., TAF; Repetti, Taylor, & Seeman, 2002).

Understanding how psychological, socio-cultural, and biological factors interact is crucial to developing and refining intervention and prevention efforts. Researchers argue that it is important to not only identify risk factors that, when changed, alter the developmental trajectory, but also to determine when prevention efforts are most

efficacious (Kraemer et al., 2001). Both biological and psychosocial prevention efforts have been examined as potential avenues for change. Molecular geneticists are working to create preventions that alter gene expression and are creating new strategies to modify brain abnormalities (Kandel, 1999; Cicchetti & Toth, 2009). Research suggests that these strategies are most effective when neural systems possess plasticity (Cicchetti & Toth, 2009); however, the temporal "windows" at which neural plasticity is greatest is still under consideration (Cicchetti & Toth, 2009).

Psychosocial prevention efforts often target vulnerable populations to avert the development of psychopathology. For instance, Cicchetti, Rogosch, Toth, and Sturge-Apple (2011) recently conducted an intervention for maltreated infants, in which families were given a psychosocial intervention (parent-child psychotherapy or parent training) or standard community services (control group). As one outcome measure, investigators systematically measured children's cortisol levels over two-years. Results demonstrated that children in the psychosocial intervention developed normalized cortisol levels at the completion of the study, whereas children receiving standard community services evidenced a continual decline in cortisol levels. The success of this prevention program underscores the power of psychosocial interventions in regulating biological processes following childhood trauma (Cicchetti et al., 2011).

Timpano et al. (2011) similarly utilized a prevention program; however, this intervention was designed to target a vulnerable population *prior* to a stressor. Their prevention involved a psychoeducation program for prenatal women with obsessive beliefs, but not OCD. Thus, these women possessed a subsyndromal risk factor for the development of OCD (Abramowitz et al., 2003; 2006). Following the child's birth (i.e.,

the stressor), women in the prevention program experienced significantly less obsessive beliefs and obsessive-compulsive symptoms compared to women in a control group. As demonstrated by these recent studies, effective prevention of psychopathology can be done in vulnerable pediatric and adult populations, before or after stressful life events.

Undoubtedly, it is important to identify risk factors in the hopes of creating effective prevention programs; however, increasing protective or resilience factors can also function to alter developmental trajectories by preventing harm and "initiating a positive cascade of consequences" (Masten, 2011, p. 497). A variety of resilience factors have been identified, such as racial socialization (Neblett, Phillip, Cogburn, & Sellers, 2006) or a secure attachment with a caregiver (Alink et al., 2009). Moreover, competence, or satisfactory performance in age-appropriate developmental tasks (e.g., academic achievement and respectful relationships with others for 10-year-olds) has consistently emerged as an important protective factor (Masten & Coatsworth, 1998; Masten, 2011). Thus, increasing children's competence and exposure to positive influences might promote healthy development to a similar degree as prevention programs that target risk factors.

Given our significant predictors, we can draw upon risk and resilience research to inform a systematic prevention of TAF. Although, we cannot refute children's or families' religious beliefs, certain family factors or parenting strategies that are predictive of TAF can be therapeutically addressed. Given that childhood trauma consistently emerged as a significant predictor, one approach could involve obtaining access to files at Child Protective Services (Cicchetti et al., 2011), and contacting families to assess the child's current psychological functioning. If maltreated children have not yet developed

TAF or other forms of psychopathology, families could be offered an empirically supported psychoeducational intervention for TAF (Zucker et al., 2002) as well as trauma-focused CBT (Foa, Keane, & Friedman, 2000). Another approach that has received empirical support in prevention research involves screening children and adolescents in primary care (Jellinek, Murphy, Little, Pagano, Comer, & Kelleher, 1999) or school-based settings (Gail, Pagano, Desmond, Perrin, & Murphy, 2000). Broad measures of psychological functioning, parenting, and child safety could be administered, and youth who score highly on measures of parental psychological control, guilt induction, or maltreatment could be identified as "vulnerable." If the child has experienced trauma, the family could be offered trauma-focused CBT, but if parenting style is a significant concern, then family-based therapy approaches could be employed to increase effective communication strategies between parents and children (Dattilio & Epstein, 2004).

Lastly, for children and adolescents at risk of developing cognitive biases, a resilience framework could direct approaches for promoting healthy functioning. One such method is strength-based school counseling (Akos & Galassi, 2008), in which critical members of school staff (i.e., administrators, teachers, guidance counselors) work to proactively build a nurturing academic community that promotes personal and social competence, while paying special attention to cultural considerations. Within this environment, staff members are instructed to focus upon students' assets. Resiliency efforts, like strength-based school counseling, and preventative approaches, like screening for maltreatment and offering trauma-focused CBT, would first need to be rigorously tested through randomized preventive trials to determine whether these

interventions can avert the development of cognitive biases in at-risk youth (Kraemer et al., 2001).

For a number of reasons, caution is warranted regarding the conclusions of the present study. First, the measurement and construct validity of the in vivo TAF measure was a significant limitation. In regards to the negative event (cancer and HIV), some participants might have more or less personal experience with these diseases, which might have influenced their ratings of likelihood or moral wrongness. Moreover, since previous research (Holmes & Mathews, 2010) suggests that recall of past emotional episodes can influence the degree of mental imagery, it might be that some participants generated more vivid images than others. In order to control for this potential confound, future research could assess the vividness of the image and degree of similarity of the image to a memory. Additionally, future research should provide greater specificity for the negative event (e.g., skin or pancreatic cancer). The lack of specificity might have led to individual variability in the imagined event.

Further, the relationship between our in vivo ratings and the self-report measure was surprisingly weak. The strength of this relationship might have been an artifact of methodological differences across these two measures. For the self-report assessment, participants responded to hypothetical TAF situations, whereas the in vivo induction involved writing down and contemplating a personally relevant negative thought and providing ratings. Although both the in vivo and self-report measures have been empirically validated (Berman et al., 2011; Shafran et al., 1996, respectively), it seems as though these assessments are measuring different forms of TAF. The in vivo measure might be assessing "in the moment" or "state" TAF. With this assessment, the negative

63

thought is very salient and individuals' responses might differ depending on their experience with the negative event (i.e., having a relative die of cancer or HIV). The self-report measure, on the other hand, might be assessing a more stable "trait-like" TAF. Laboring under this interpretation, we can conclude that the developmental experiences assessed in the current study were more predictive of trait TAF, compared to state TAF.

An additional limitation involves participant recruitment. Although a significant relationship between religiosity and the moral bias was observed, we only examined religious group differences between Christians and Atheists/Agnostics. Consequently, the relationship between strength of religiosity and religious motivation was only relevant for individuals in these groups and we cannot draw broad conclusions about how religiosity or motivational orientation predicts TAF in other faiths. Recruiting more participants from different religious groups and accounting for the heterogeneity that exists within the Christian faith (i.e., differences between Christians and Protestants) would allow for a more nuanced understanding of this relationship.

Moreover, as demonstrated by power analyses, our sample size was not large enough to detect small effect sizes. In order to achieve adequate power to detect small effect sizes, we would need 155 more participants to complete self-report measures and 355 more participants for the in vivo paradigm. Although recruiting this many participants is not feasible for the current study, future researchers should strive to include this critical number of participants in order to identify pathways with small effect sizes.

Other limitations of the study involve the methodology and accuracy of the self-report measures, specifically the measure of childhood trauma. Although, the majority of

research on childhood trauma tends to involve adult retrospective report, this type of methodology has been associated with recall bias (Senn, Carey, & Vanable, 2008). By using this approach, the memory of the abuse might be recalled with less accuracy than recent events (Noll, Horowitz, Bonanno, Trickett, & Putnam, 2003). Moreover, it has been suggested that events following the abuse might influence subjective perceptions of the trauma (Senn et al., 2008). In order to avoid retrospective report, future research could longitudinally follow individuals whose abuse is documented and substantiated in childhood (Noll et al., 2003; Widom & Ames, 1994) or assess for trauma in childhood/adolescence (Howard & Wang, 2005) and longitudinally track these individuals into adulthood. Moreover, it would benefit researchers to gather more information on the traumatic incident (Masten & Osofsky, 2010). By identifying the age at which the abuse occurred, the victim's relationship with the perpetrator, or cultural beliefs regarding the trauma, we could accurately determine whether certain characteristics of trauma (e.g., parent as the perpetrator) are uniquely associated with the development of TAF.

More research is also needed to understand the relationship between psychological control and emotional abuse or neglect. These constructs purportedly assess varied forms of parental or caregiver behavior. Psychological control taps into parents' attempts to control a child's emotional and thought processes, whereas emotional abuse refers to instances in which the child is intentionally made to feel bad about him/herself or words and actions are used to humiliate the child. Although these constructs differentially predicted TAF, it might be that these variables exist along a continuum and emotional abuse is a more severe form of psychological control. By

examining this relationship through methodologically varied self-report and behavioral measures (coding parent-child interactions), a better understanding of their communality could be obtained.

In regards to statistical limitations, the multicollinearity among study measures might have compromised the significance of specific indirect effects. Preacher and Hayes (2008) indicated that when mediating variables are correlated, like guilt induction and psychological control, the effects of the mediators on the endogenous variable are weakened. To avoid this limitation in future research, multiple measures of a construct (e.g., maladaptive parenting tactics) should be used and a latent variable assessing the underlying construct should be created (Kline, 1991).

Another statistical factor that might have influenced results is the smaller sample size for the in vivo measure. Research has suggested that in path analyses, a smaller sample size (and reduced power) is preferred for the chi square test, as it more accurately tests the reasonable fit of the model (Bollen, 1989). The self-report sample, on the other hand, was so large that the chi square test would most likely be significant, regardless of the model's fit (Bollen, 1989). Although these limitations suggest that we should examine other fit indices (e.g., CFI), other research states that fit indices are misleading and permit investigators to argue that a misspecified model (as evidenced by the chi-square test) is not actually a poor fit (Hayduk, Cummings, Boadu, Pazderka-Robinson, & Boulianne, 2007). These limitations highlight that there was no clear statistical method to test the fit of our comprehensive model, as each technique has its strengths and limitations.

66

As demonstrated by the effect of multicollinearity in path analysis, it is evident that the current study's correlational design weakened the power of statistical analyses. Moreover, the correlational design limits conclusions of causality. Longitudinal designs are necessary next steps to better understand how the experiences that we examined contribute to TAF. Furthermore, in future research, the comprehensive model needs to be refined. The amount of variance explained in TAF by the predicted variables in our regression models, clearly leaves open the possibility that additional factors contribute to TAF. Moreover, it is clear from our regression models that the included constructs better predict moral TAF (23-29%), when compared to likelihood TAF (9-14%). This prediction pattern indicates that the moral and likelihood bias might not possess the same developmental correlates and aligns with Rassin, Merkelbach, et al. (2001) and Shafran et al.'s (1996) findings that these cognitive biases are unique factors. To better understand the development of these cognitive biases, future research should: (1) be longitudinal, (2) include both self-report and behavioral assessments of psychological control and guilt induction that can be measured repeatedly throughout the longitudinal study, (3) include measures of competence (e.g., grades, achievement, IQ), (4) include a biological measure of dysregulation (e.g., cortisol) and (5) includes measure for other well-known risk factors (e.g., parent psychopathology).

Table 1

Demographic Characteristics for the Self-Report Sample (N = 407)

Gender	
Male	129 (31.69%)
Female	278 (68.31%)
Ethnicity	
Caucasian	290 (71.25%)
African-American	48 (11.79%)
Hispanic	18 (4.40%)
Asian	34 (8.35%)
Other	17 (4.17%)
Religion	
Protestant	176 (43.24%)
Catholic	89 (21.87%)
Atheist or Agnostic	64 (15.72%)
Hindu	8 (1.90%)
Jewish	6 (1.40%)
Islam	5 (1.20%)
Buddhist	3 (.70%)
Quaker	2 (.50%)
Other	54 (13.27%)
Age (years)	
Mean (*SD*)	19.36 (1.69)
Range	17 - 27

Table 2

Demographic Characteristics for the In Vivo Sample (N = 107)

Gender	
Male	19 (17.80%)
Female	88 (82.24%)
Ethnicity	
Caucasian	85 (79.40%)
African-American	6 (5.60%)
Hispanic	7 (6.50%)
Asian	2 (1.90%)
Other	7 (6.50%)
Religion	
Protestant	56 (52.40%)
Catholic	29 (27.10%)
Atheist or Agnostic	19 (17.70%)
Other	3 (3.70%)
Age (years)	
Mean (*SD*)	21.39 (1.46)
Range	18 – 25

Table 3

Descriptive Statistics for the Self-Report Sample (N = 407)

Measure	*M*	*SD*	*Range*
*Religiosity (*SCRFS)[1]			
Christians (*n* = 160)	29.68	7.85	10-40
Atheists/Agnostics (*n* = 47)	13.91	5.59	10-33
Total sample (*N* = 260)	26.27	9.69	10-40
Motivational Orientation			
Intrinsic			
Christians (*n* = 160)	26.03	6.40	12-40
Atheists/Agnostics (*n* = 47)	18.63	2.44	14-25
Total sample (*N* = 260)	24.51	6.45	12-40
Extrinsic – Social			
Christians (*n* = 160)	7.48	2.77	3-15
Atheists/Agnostics (*n* = 47)	5.62	3.42	3-9
Total sample (*N* = 260)	6.71	2.92	3-15
Extrinsic – Personal			
Christians (*n* = 160)	10.20	2.56	3-15
Atheists/Agnostics (*n* = 47)	5.62	3.41	3-13
Total sample (*N* = 260)	9.21	3.24	3-15
Guilt Induction (*n* = 390)			
Disparagement	10.86	7.37	6-42
Self-Serving Elicitation	12.19	7.97	6-42
Total	23.04	14.88	12-84
Parental Psychological Control (*n* = 397)			
Youth Self-Report (PPC-YSR)	11.50	2.91	8-22
Childhood Trauma (*n* = 374)			
Emotional Abuse	.48	.69	0–4
Physical Abuse	.31	.54	0–3
Sexual Abuse	.16	.56	0–4
Emotional Neglect	1.52	1.26	0–4
Physical Neglect	.29	.53	0–4
Thought Action Fusion (*n* = 401)			
Moral	9.41	8.69	0-36
Likelihood	1.98	3.52	0-18

[1] Descriptive analyses include participants whose religion has <u>not</u> changed in the past 5 years.

Table 4

Zero-Order Correlations in Self-Report Sample (Shaded = no change in religious strength; n = 260; Unshaded = All; n= 374 - 401)

Variable	Int M	Ext-S	Ext-P	MGI-D	MGI-SS	PSY-C	CTQ-EA	CTQ-PA	CTQ-SA	CTQ-EN	CTQ-PN	TAF-M	TAF-L
SCRFS	.86***	.44**	.60***	-.16**	-.14*	-.02	-.16*	.09	-.02	-.26***	-.10	.40***	.01
Int M	-	.27***	.33***	-.14*	-.15*	-.06	-.12*	.07	.05	-.18**	-.06	.38***	-.02
Ext S	-	-	.51***	.04	.08	.17**	.01	.21***	.04	-.009	.15**	.32***	.17**
Ext-P	-	-	-	-.10	-.02	.11	-.12*	.02	-.06	-.23**	-.13*	.31***	.15**
MGI-D	-	-	-	-	.87***	.61***	.64***	.44***	.33***	.49***	.45***	.05	.23***
MGI-SS	-	-	-	-	-	.57***	.59***	.39***	.31***	.43***	.40***	.05	.18***
PSY-C	-	-	-	-	-	-	.41***	.32***	.26***	.31***	.26***	.07	.20***
CTQ-EA	-	-	-	-	-	-	-	.68***	.47***	.57***	.53***	.13**	.28***
CTQ-PA	-	-	-	-	-	-	-	-	.60***	.38***	.56***	.20***	.31***
CTQ-SA	-	-	-	-	-	-	-	-	-	.25**	.47***	.08	.22***
CTQ-EN	-	-	-	-	-	-	-	-	-	-	.61***	-.05	.12*
CTQ-PN	-	-	-	-	-	-	-	-	-	-	-	.01	.26***
TAF-M	-	-	-	-	-	-	-	-	-	-	-	-	.26***

Note. ***$p < .001$; **$p < .01$; *$p < .05$; Int M = Intrinsic Motivation, Ext-S = Extrinsic Social, Ext-P = Extrinsic Personal, MGI-D = Guilt Induction-Disparagement, MGI-SS = Guilt Induction, Self Serving, PSY-C = Psychological Control, CTQ-EA = Emotional Abuse, CTQ-PA = Physical Abuse, CTQ=SA = Sexual Abuse, CTQ-EN = Emotional Neglect, CTQ-PN = Physical Neglect, TAF-M = Thought Action Fusion Scale Moral, TAF-L = Thought Action Fusion Scale Likelihood.

71

Table 5

Paired and Independent Sample t-tests Evaluating the Severity of Each Induction

	Mean $(SD)_a$	Mean $(SD)_b$	t-value	p-value
Sentence$_a$ – Sentence$_b$				
Cancer – HIV	92.29 (17.38)	92.03 (18.73)	-.07	.94
Blind – HIV	87.46 (19.61)	92.03 (18.73)	-2.50	.01
Deaf – HIV	80.12 (25.49)	92.03 (18.73)	2.74	.007
Cancer - Blind	92.29 (17.38)	87.46 (19.61)	2.01	.04
Deaf - Blind	80.12 (25.49)	87.46 (19.61)	-.17	.10

Table 6

Descriptive statistics (M (SD)) for In Vivo TAF induction (N = 107)

Outcome Variables	HIV-Cancer
Anxiety	32.65 (*23.38*)
Guilt	31.61 (*31.17*)
Likelihood	9.54 (*18.68*)
Control	.84 (*3.60*)
Responsibility	15.72 (*23.93*)
Moral	36.40 (*34.81*)
Upsetting	92.17 (*17.96*)
Neutralize Urge	29.73 (*32.68*)

Table 7

Correlation between TAFS and In Vivo TAF Measure (N = 107)

	Guilt	Likelihood	Control	Responsible	Moral	Upset	Urge	TAFS-M	TAFS-L
Anxiety	.70***	.36***	.05	.55***	.49***	.26*	.62***	.05	-.02
Guilt	--	.37***	.06	.56***	.76***	.24**	.71***	.14	.13
Likelihood	--	--	.14	.16	.17	.07	.22	.07	.18*
Control	--	--	--	.29**	-.04	.006	.004	.01	-.06
Responsible	--	--	--	--	.48***	.14	.55***	-.04	-.008
Moral	--	--	--	--	--	.12	.52***	.18*	.20*
Upset	--	--	--	--	--	--	.19*	.24**	.04
Urge	--	--	--	--	--	--	--	.03	.02
TAFS-M	--	--	--	--	--	--	--	--	.25**

Note. *p< .05; **p < .01; ***p< .001

Table 8

Descriptive Measures for the In Vivo Sample (N = 107)

Measure	M	SD	Range
Religiosity (SCRFS)[2]			
Christians (*n* = 62)	30.11	8.20	10-40
Atheists/Agnostics (*n* = 17)	12.82	3.96	10-24
Total sample (*N* = 79)	26.77	10.34	10-40
Motivational Orientation			
Intrinsic			
Christians (*n* = 62)	26.64	6.44	14-38
Atheists/Agnostics (*n* = 17)	18.06	2.33	14-23
Total sample (*N* = 79)	25.06	6.84	14-38
Extrinsic-Social			
Christians (*n* = 62)	6.63	2.39	3-12
Atheists/Agnostics (*n* = 17)	4.65	1.80	3-8
Total sample (*N* = 79)	6.22	2.37	3-12
Extrinsic-Personal			
Christians (*n* = 62)	10.13	2.80	3-15
Atheists/Agnostics (*n* = 17)	5.88	3.42	3-12
Total sample (*N* = 79)	9.27	3.37	3-15
Guilt Induction (*n* = 107)			
Disparagement	10.33	7.08	6-38
Self-Serving Elicitation	11.88	7.80	6-40
Total	22.21	14.30	12-77
Parental Psychological Control (*n* = 104)			
Youth Self-Report (PPC-YSR)	11.33	2.71	8-20
Childhood Trauma (*n* = 83)			
Emotional Abuse	.50	.70	0-3
Physical Abuse	.26	.41	0-3
Sexual Abuse	.12	.55	0–4
Emotional Neglect	1.51	1.15	0–4
Physical Neglect	.23	.41	0–4
In Vivo Thought Action Fusion (*n* = 107)			
Moral	36.40	34.81	0–100
Likelihood	9.55	18.69	0–100

[1] Descriptive analyses include participants whose religion has <u>not</u> changed in the past 5 years.

Table 9

Zero-Order Correlations for In Vivo Sample (Shaded = no change in religious strength; n = 79; Unshaded = All; n= 83 - 107)

Variable	Int M	Ext-S	Ext-P	MGI-D	MGI-SS	PSY-C	CTQ-EA	CTQ-PA	CTQ-SA	CTQ-EN	CTQ-PN	TAF-M	TAF-L
SCRFS	.85***	.41***	.56***	-.36***	-.38***	-.06	-.31**	-.01	-.07	-.22	-.23	-.07	.09
Int M	-	.30**	.30**	-.27**	-.32**	-.06	-.19	.02	.08	-.03	-.12	-.13	.01
Ext S	-	-	.30**	-.26*	-.26*	-.009	-.19	-.02	-.19	-.09	-.02	-.07	.09
Ext-P	-	-	-	-.28*	-.26*	-.05	-.35**	-.24	-.24	-.39**	-.37**	.09	.16
MGI-D	-	-	-	-	.84***	.52***	.57***	.44***	.39***	.53***	.54***	.03	.04
MGI-SS	-	-	-	-	-	.48***	.51***	.34***	.23*	.37***	.42***	.12	.09
PSY-C	-	-	-	-	-	-	.44***	.38***	.33***	.28**	.38***	.03	-.02
CTQ-EA	-	-	-	-	-	-	-	.58***	.41***	.70***	.57***	-.11	-.02
CTQ-PA	-	-	-	-	-	-	-	-	.24*	.44***	.41***	.08	.003
CTQ-SA	-	-	-	-	-	-	-	-	-	.29**	.29**	-.15	-.08
CTQ-EN	-	-	-	-	-	-	-	-	-	-	.58***	-.23*	-.08
CTQ-PN	-	-	-	-	-	-	-	-	-	-	-	-.03	-.14
TAF-M	-	-	-	-	-	-	-	-	-	-	-	-	.17

Note. ***$p < .001$; **$p < .01$; *$p < .05$; Int M = Intrinsic Motivation, Ext-S = Extrinsic Social, Ext-P = Extrinsic Personal, MGI-D = Guilt Induction-Disparagement, MGI-SS = Guilt Induction, Self Serving, PSY-C = Psychological Control, CTQ-EA = Emotional Abuse, CTQ-PA = Physical Abuse, CTQ=SA = Sexual Abuse, CTQ-EN = Emotional Neglect, CTQ-PN = Physical Neglect, TAF-M = In Vivo Thought Action Fusion Moral, TAF-L = In Vivo Thought Action Fusion Likelihood

Table 10

Separate Regression Analyses Predicting TAFS-Likelihood

Model	Predictors	R^2	ß	t	p
1a	Religiosity[3]	**.006** (.08)	**-.08** (.28)	**-.97** (1.93)	**.33** (.06)
2a	Intrinsic Motivation[3]	**.001** (.00)	**-.04** (.02)	**-.47** (.14)	**.64** (.89)
3a	Extrinsic[3]	**.03** (.19)			**.09** (.01)
	Extrinsic – Social		**.13** (-.27)	**1.48** (-1.69)	**.14** (.09)
	Extrinsic – Personal		**.08** (.51)	**.91** (3.19)	**.36** (.003)
4a	Psychological Control	.04	.20	4.12	.000
5a	Guilt Induction	.05	.21	4.27	.000
6a	Childhood Trauma	.11			.000
	Emotional Abuse		.15	1.96	.05
	Physical Abuse		.11	1.39	.16
	Sexual Abuse		.06	.91	.36
	Emotional Neglect		-.13	-1.78	.07
	Physical Neglect		.17	2.28	.02

[3] For regressions involving religion, only those (1) affiliating with either Christianity ($n = 159$) or Atheism/Agnosticism ($n = 47$) and (2) reported that their strength of religiosity had not changed in the past 5 years were included. Given the potential moderation effect of religious affiliation (which is explored in the comprehensive model), regressions were run separately for Christians and Atheists/Agnostics. For these analyses, parameter estimates for Christians will be **bolded** and estimates for Atheists/Agnostics will be (in parentheses).

Table 11

Separate Regression Analyses Predicting TAFS-Moral

Model	Predictors	R^2	ß	t	p
1b	Religiosity[4]	**.09** (.23)	**.29** (.48)	**3.82** (3.64)	**.000** (.001)
2b	Intrinsic Motivation[4]	**.10** (.13)	**.31** (.36)	**4.04** (2.55)	**.000** (.01)
3b	Extrinsic[4]	**.05** (.32)			**.01** (.000)
	Extrinsic – Social		**.18** (.49)	**2.17** (3.38)	**.03** (.002)
	Extrinsic – Personal		**.08** (.12)	**.98** (.85)	**.33** (.40)
4b	Psychological Control	.006	.07	1.50	.13
5b	Guilt Induction	.003	.05	.97	.32
6b	Childhood Trauma	.06			.000
	Emotional Abuse		.01	.16	.87
	Physical Abuse		.30	3.77	.000
	Sexual Abuse		-.02	-.30	.76
	Emotional Neglect		-09	-1.23	.22
	Physical Neglect		-.10	-1.37	.17

[4] For regressions involving religion, only those (1) affiliating with either Christianity ($n = 159$) or Atheism/Agnosticism ($n = 47$) and (2) reported that their strength of religiosity had not changed in the past 5 years were included. Given the potential moderation effect of religious affiliation (which is explored in the comprehensive model), regressions were run separately for Christians and Atheists/Agnostics. For these analyses, parameter estimates for Christians will be **bolded** and estimates for Atheists/Agnostics will be (in parentheses).

Table 12

Separate Regression Analyses Predicting In Vivo TAF-Likelihood

Model	Predictors	R^2	ß	*t*	*p*
1c	Religiosity[5]	**.02** (.00)	**-.12** (.003)	**-.97** (.01)	**.33** (.99)
2c	Intrinsic Motivation[5]	**.02** (.16)	**-.17** (-.40)	**-1.30** (-1.63)	**.19** (.12)
3c	Extrinsic[5]	**.02** (.15)			**.59** (.35)
	Extrinsic – Social		**-.12** (-.03)	**-.96** (-.09)	**.34** (.93)
	Extrinsic – Personal		**.06** (.39)	**.46** (.39)	**.65** (.16)
4c	Psychological Control	.001	-.03	-.26	.79
5c	Guilt Induction	.005	.07	.71	.48
6c	Childhood Trauma	.03			.79
	Emotional Abuse		.13	.67	.50
	Physical Abuse		.04	.30	.76
	Sexual Abuse		-.08	-.65	.52
	Emotional Neglect		-.07	-.38	.70
	Physical Neglect		-.16	1.06	.29

[5] For regressions involving religion, only those (1) affiliating with either Christianity (*n* = 62) or Atheism/Agnosticism (*n* = 17) and (2) reported that their strength of religiosity had not changed in the past 5 years were included. Given the potential moderation effect of religious affiliation (which is explored in the comprehensive model), regressions were run separately for Christians and Atheists/Agnostics. For these analyses, parameter estimates for Christians will be **bolded** and estimates for Atheists/Agnostics will be (in parentheses).

Table 13

Separate Regression Analyses Predicting In Vivo TAF-Moral

Model	Predictors	R^2	ß	t	p
1d	Religiosity[6]	**.001** (.02)	**.004** (.14)	**.03** (.54)	**.97** (.60)
2d	Intrinsic Motivation[6]	**.008** (.02)	**-.09** (.15)	**-.70** (.59)	**.49** (.57)
3d	Extrinsic[6]	**.03** (.01)			**.44** (.92)
	Extrinsic – Social		**.05** (-.07)	**.38** (-.24)	**.70** (.81)
	Extrinsic – Personal		**.15** (.10)	**1.18** (.36)	**.24** (.73)
4d	Psychological Control	.001	.03	.32	.75
5d	Guilt Induction	.007	.08	.83	.41
6d	Childhood Trauma	.10			.15
	Emotional Abuse		-.05	-.26	.80
	Physical Abuse		.23	1.69	.09
	Sexual Abuse		-.12	-.96	.34
	Emotional Neglect		-.29	-1.76	.08
	Physical Neglect		.05	.32	.75

[6] For regressions involving religion, only those (1) affiliating with either Christianity ($n = 62$) or Atheism/Agnosticism ($n = 17$) and (2) reported that their strength of religiosity had not changed in the past 5 years were included. Given the potential moderation effect of religious affiliation (which is explored in the comprehensive model), regressions were run separately for Christians and Atheists/Agnostics. For these analyses, parameter estimates for Christians will be **bolded** and estimates for Atheists/Agnostics will be (in parentheses).

Figure 1

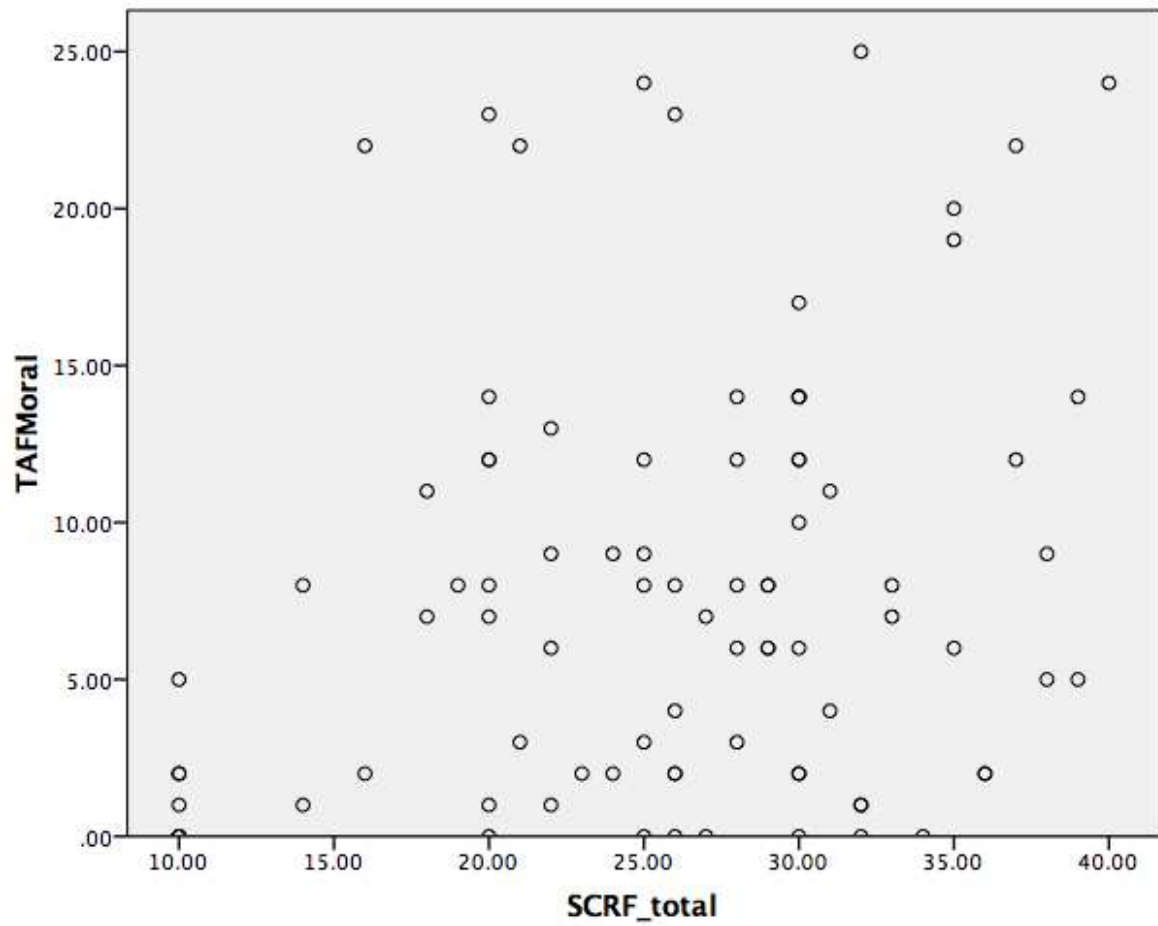*Scatterplot Between TAFS-Moral and Religiosity in Christians*

Figure 2

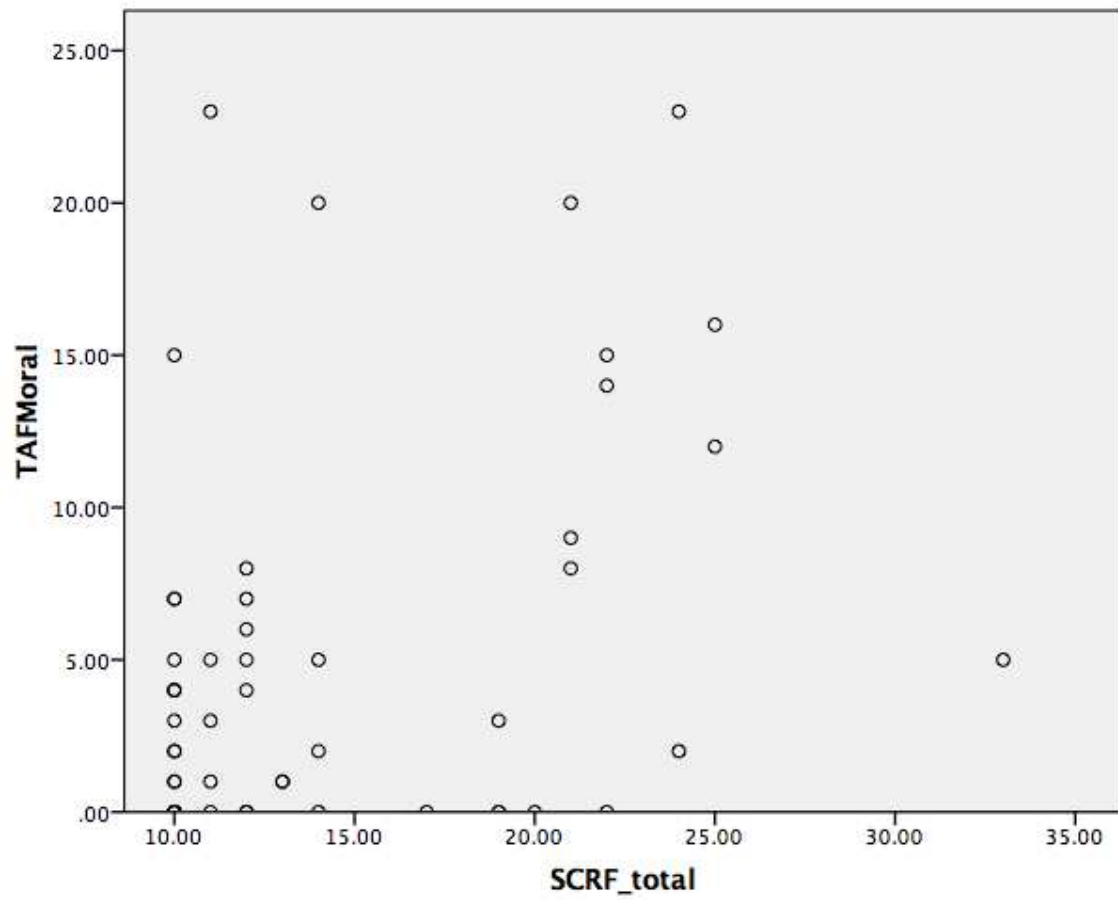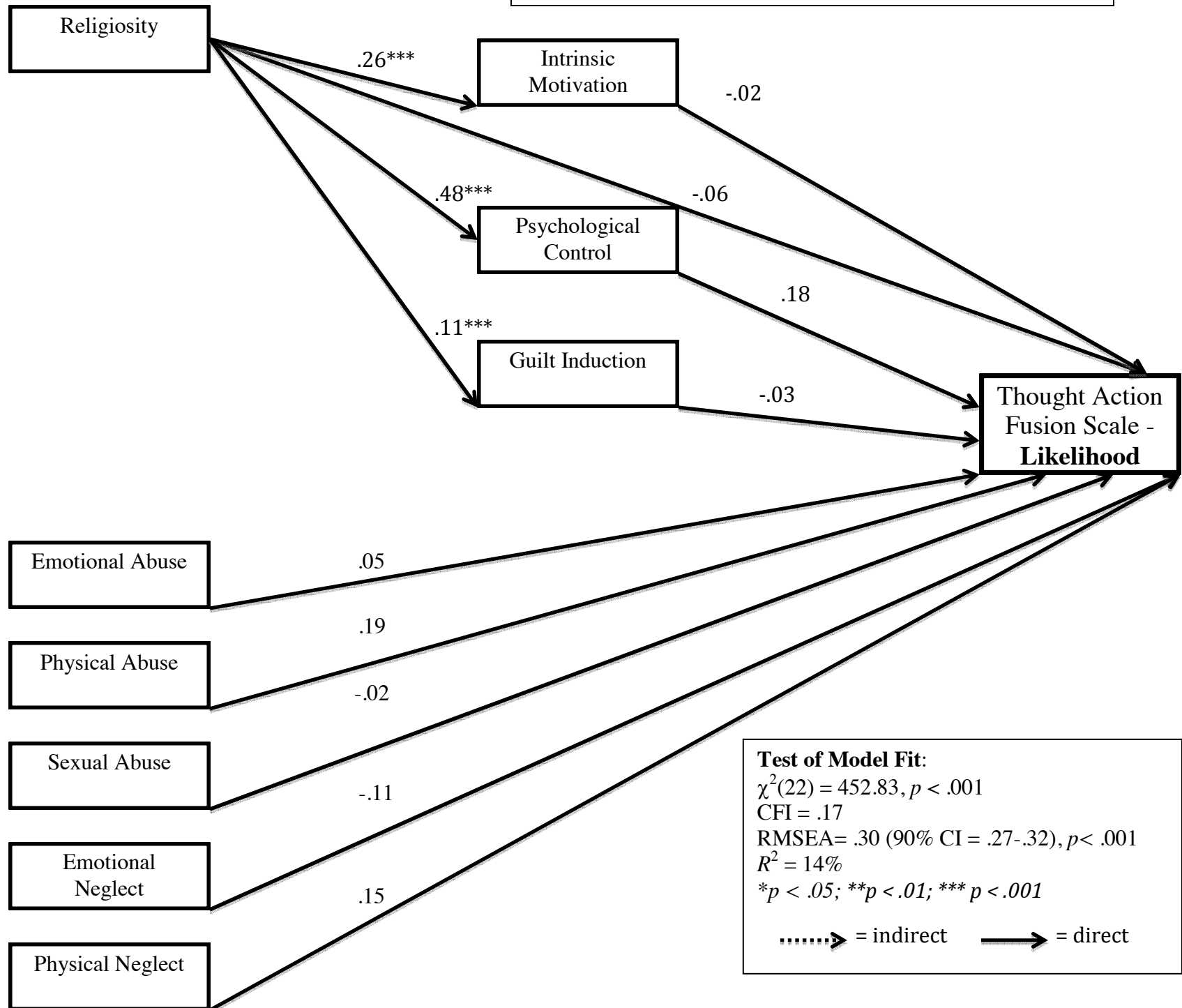*Scatterplot Between TAFS-Moral and Religiosity in Atheists/Agnostics*
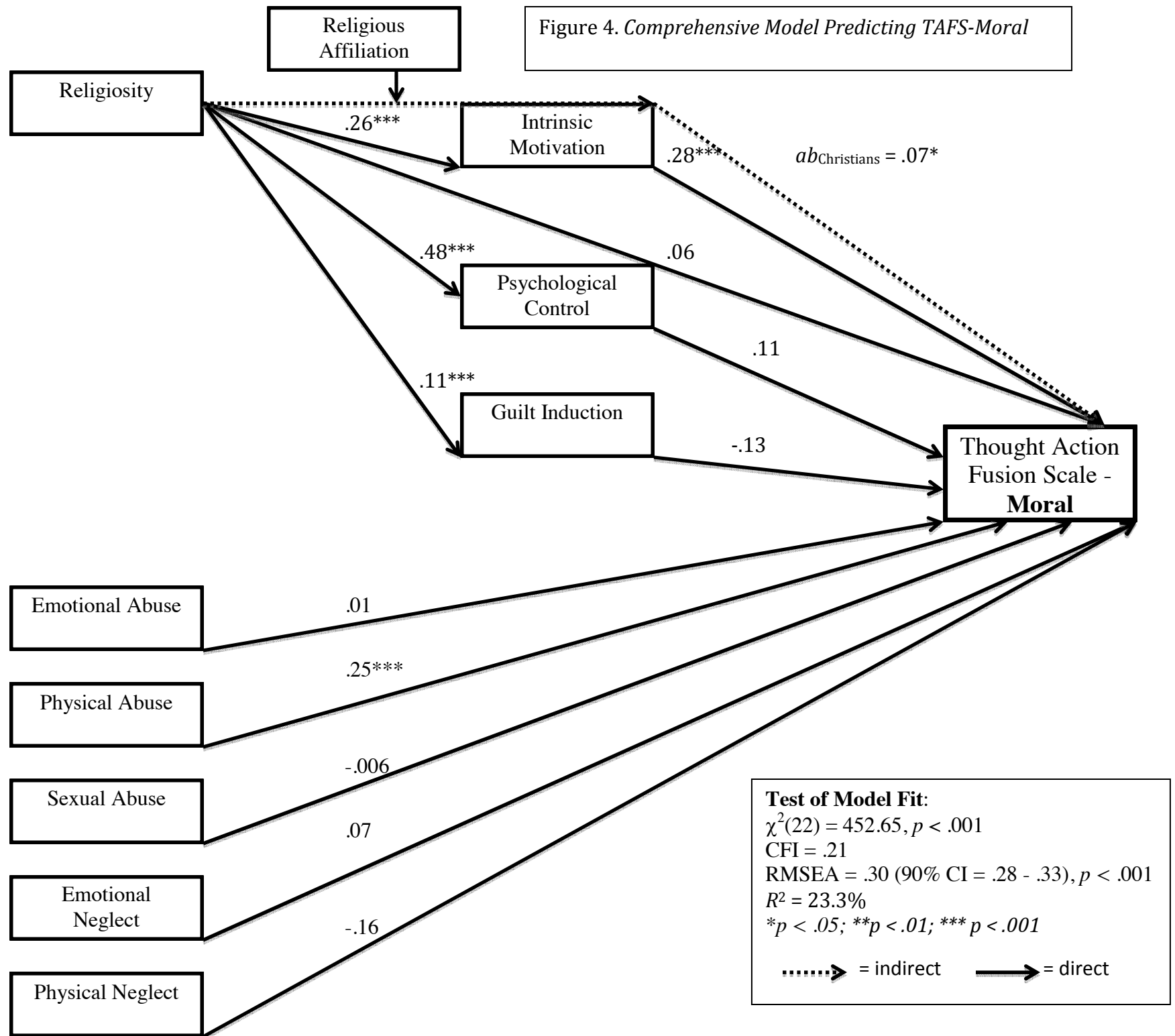
Figure 3. *Comprehensive Model Predicting TAFS-Likelihood*

Figure 4. *Comprehensive Model Predicting TAFS-Moral*

Figure 5. *Comprehensive Model Predicting In Vivo TAF-Likelihood*
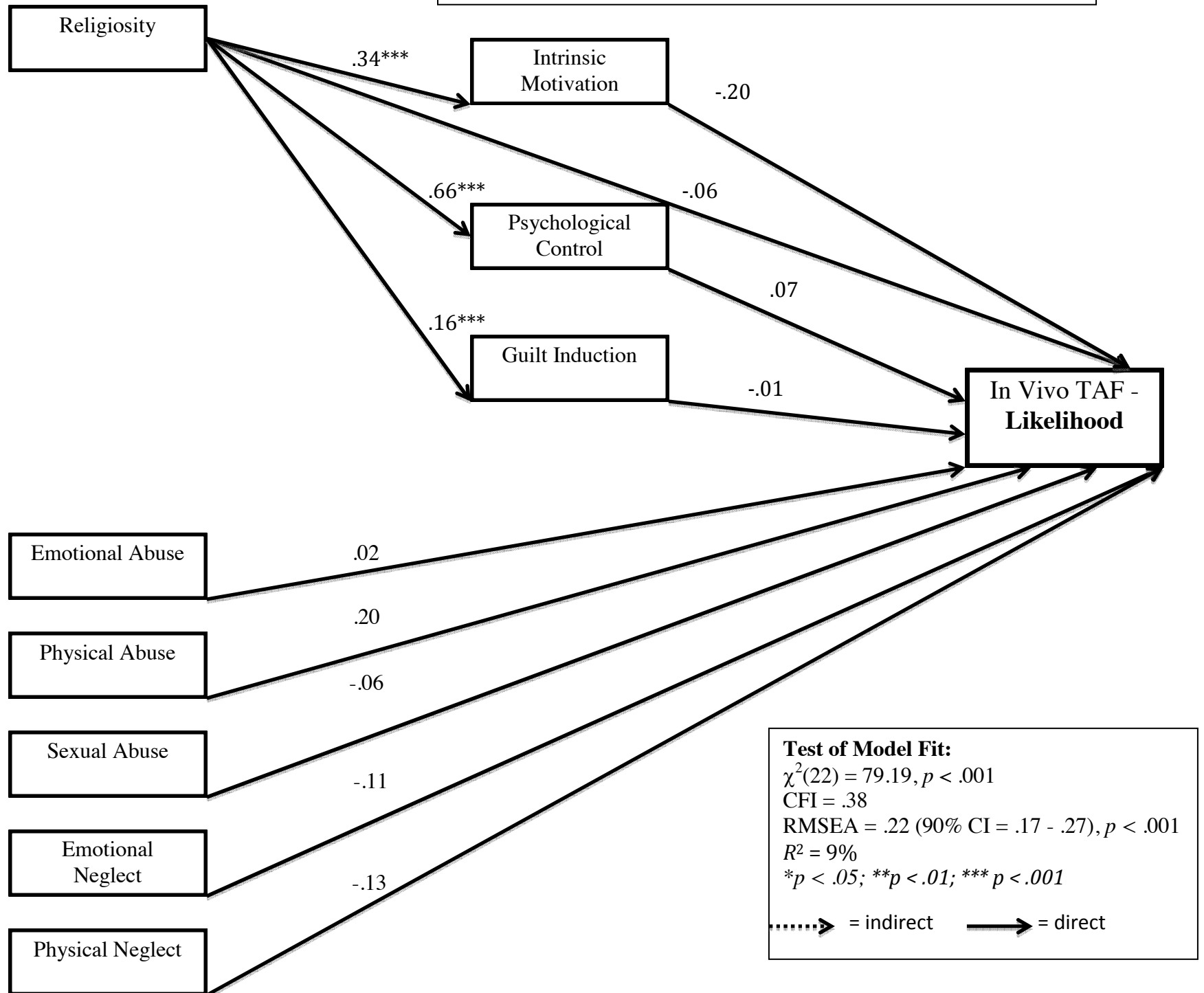
Figure 6. *Comprehensive Model Predicting In Vivo TAF-Moral*

Religiosity

Intrinsic Motivation

.35***

-.19

Psychological Control

.68***

.12

Guilt Induction

.16***

.09

.16

In Vivo TAF-**Moral**

Emotional Abuse

-.17

Physical Abuse

.15

Sexual Abuse

-.08

Emotional Neglect

-.30

Physical Neglect

-.10

Test of Model Fit:
$\chi^2(22) = 84.40, p < .001$
CFI = .41
RMSEA = .23 (90% CI = .17 - .28), $p < .001$
$R^2 = 29\%$
*p < .05; **p < .01; *** p < .001*

┈┈┈▷ = indirect ━━━▶ = direct

98
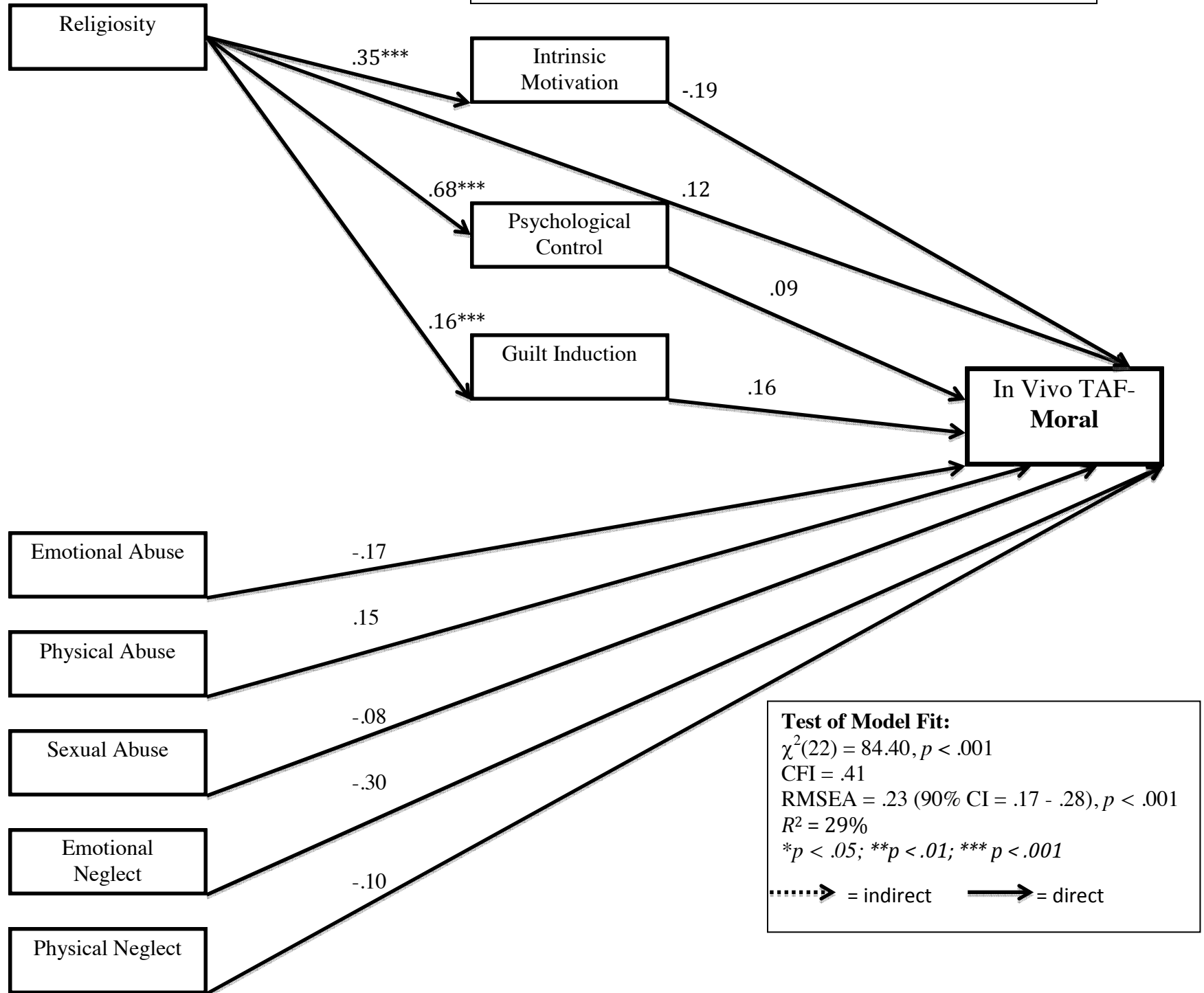
Appendix A

Additional Exploratory Analyses

Inclusion of all participants. To determine how the comprehensive model was affected by excluding participants whose religiosity had changed over the past 5 years, the following analyses examined how: (1) goodness of fit indices, (2) significance of direct or indirect effects, and (3) magnitude or direction of pathway coefficients, changed when all participants were included. In the following analysis, participants who affiliated with Christianity or Atheism/Agnosticism and completed all study questionnaires ($N =$ 336) were included.

TAFS. Results indicated a poor fit for TAFS-Likelihood ($\chi^2(22) = 659.74, p <$ .001; CFI = .18; RMSEA = .29; 90% CI RMSEA = 0.27 - 0.31) with 14% of variance accounted for by the predictors. However, for the *Mediator Model*, religiosity significantly predicted psychological control ($\beta = .44, SE = .06, p < .001$), guilt induction ($\beta = .10, SE = .02, p < .001$), and intrinsic motivation ($\beta = .25, SE = .04, p < .001$) and for the *Dependent Variable Model*, psychological control ($\beta = .21, SE = .07, p < .01$) and emotional neglect ($\beta = -.17, SE = .07, p < .05$) significantly predicted TAFS-Likelihood. No indirect effects were found for TAFS-Likelihood.

For TAFS-Moral, results similarly indicated a misfit model ($\chi^2(22) = 659.07, p <$ .001; CFI = .23; RMSEA = .29; 90% CI RMSEA = 0.27 - 0.32) with 23% of variance (p < .001) accounted for by the predictors. In addition to the results described above for the *Mediator Model*, for the *Dependent Variable Model*, intrinsic motivation ($\beta = .33, SE =$ .08, $p < .001$) and physical abuse ($\beta = .15, SE = .07, p < .05$) significantly predicted TAFS-Moral. Additionally, a significant total ($c' = .22, SE = .09, p < .05$) effect was

found. The indirect effect of religiosity on TAF-Moral was also found to be significant for Christians ($ab_{total\_Christians}$ = .11, 95% BCI = .00 - .22, SE = .04, p < .01) and for this religious group the only significant mediator was intrinsic motivation ($ab_{intrin\_Christians}$ = .08, 95% BCI = .01- .13, SE = .02, p < .001). Specifically, the relationship between strength of religiosity and TAFS-Moral was mediated by intrinsic motivation, but this mediational effect was conditional upon affiliation with Christianity.

In vivo ratings. A path analysis testing the comprehensive model was conducted with Christian or Atheist/Agnostic participants who completed all questionnaires and participated in the in vivo paradigm (N = 77). Results indicated a poor fit for in vivo TAF-Moral ($\chi^2(22)$ = 150.15, p < .001; CFI = .27; RMSEA = .27; 90% CI RMSEA = 0.23 - 0.32) with 26% of variance accounted for by the predictors (p < .05). For the *Mediator Model*, strength of religiosity predicted psychological control (β = .62, SE = .11, p < .001), guilt induction (β = .15, SE = .04, p < .01), and intrinsic motivation (β = .34, SE = .09, p < .001). For the *Dependent Variable Model*, no indicators significantly predicted in vivo ratings of TAF-Moral. Moreover, no direct, indirect, or moderation effects were observed.

A similarly poor fit was obtained for in vivo TAF-Likelihood ($\chi^2(22)$ = 146.17, p < .001; CFI = .24; RMSEA = .27; 90% CI RMSEA = 0.23 - 0.31) with 11% of the variance accounted for by the predictors (p > .05). Beyond those identified in the *Mediator Model* above, no indicators significantly predicted in vivo ratings of TAF-Likelihood. Therefore, no significant mediation or moderation effects were detected in the prediction of in vivo TAF-Likelihood.

Summary. Comparing the goodness of fit indices for the current models to those obtained when testing hypothesis 5, it can be seen that excluding participants based on changes in religiosity does not impact the fit of the model for either TAF bias, nor does it affect the amount of variance explained in the respective dependent variables. Moreover, the same direct, indirect, and moderation effects were observed.

Extrinsic motivation as a mediating variable.

TAFS. In the testing of hypothesis 3, the social subscale of extrinsic motivation was unexpectedly found to significantly predict TAFS-Moral (Table 11; Model 3b). Therefore, a path analysis was conducted to examine whether this subscale mediated the relationship between strength of religiosity and TAFS-Moral in Christians. Results indicated that no significant indirect effect was found. Therefore, the social subscale of extrinsic motivation does not mediate the relationship between strength of religiosity and TAFS-Moral.

In vivo ratings. Given that neither the social or personal subscale of extrinsic motivation was found to significantly predict in vivo ratings of TAF-Moral or TAF-Likelihood, no mediation analyses were conducted to examine whether extrinsic motivation mediated the relationship between strength of religiosity and in vivo TAF ratings.

Summary. Although the social subscale of extrinsic motivation was significantly related to strength of religiosity and uniquely predicted TAFS-Moral scores, extrinsic motivation was not found to mediate the relationship between strength of religiosity and TAFS-Moral.

Parenting strategies as a mediator. After a trauma, research has demonstrated that the parent-child relationship can influence the child's development of psychopathology (Alink, et al., 2009) and correlational analyses demonstrated positive associations between parenting strategies (i.e., psychological control and guilt induction), childhood trauma, and TAFS (Tables 4, 10, and 11), additional analyses explored mediation pathways. More specifically, path analyses tested whether psychological control (M_1) or guilt induction (M_2) mediated the relationship between the five different types of childhood trauma - emotional abuse (X_1), physical abuse (X_2), sexual abuse (X_3), emotional neglect (X_4), and physical neglect (X_5) – and TAF-Moral (Y_1) or TAF-Likelihood (Y_2). It is important to note that participants who reported that their religiosity changed in the past 5 years were *not* excluded from the following analyses since the variables of interest are not related to developmental experiences with religion.

TAFS. For the *Mediator Models*, emotional abuse predicted psychological control ($\beta = .29$, $SE = .07$, $p < .001$) and guilt induction ($\beta = .50$, $SE = .06$, $p < .001$). Emotional neglect similarly predicted both psychological control ($\beta = .21$, $SE = .07$, $p < .01$) and guilt induction ($\beta = .18$, $SE = .06$, $p < .01$). For the *Dependent Variable Models*, emotional neglect ($\beta = -.18$, $SE = .07$, $p < .01$), physical neglect ($\beta = .20$, $SE = .07$, $p < .001$), and psychological control ($\beta = .17$, $SE = .06$, $p < .01$) significantly predicted TAFS-Likelihood, while only physical abuse ($\beta = .28$, $SE = .08$, $p < .001$) significantly predicted TAFS-Moral.

Next, the indirect, direct, and total effects were examined. For TAFS-Likelihood, significant direct effects were found for emotional neglect ($c'_{EA} = -.19$, $SE = .07$, $p < .01$) and physical neglect ($c'_{PN} = .20$, $SE = .06$, $p < .01$). Moreover, significant total effects

90

were found for emotional abuse (c_{EA} = .16, SE = .08, p < .05), emotional neglect (c_{EN} = -.15, SE = .07, p < .05), and physical neglect (c_{PN} = .19, SE = .07, p < .01). The indirect effect of emotional neglect on TAF-Likelihood was significant (ab_{EN} = .04, 95% BCI = .01 - .07, SE = .01, p < .05), with psychological control emerging as the only significant mediator (ab_{EN_Psyc} = .04, 95% BCI = .01 - .07, SE = .01, p < .05). Psychological control was similarly found to mediate the relationship between emotional abuse and TAFS-Likelihood (ab_{EA_Psyc} = .05, 95% BCI = .00 - .08, SE = .02, p < .05). For TAFS-Moral, no indirect effects were found. However, both a significant total effect (c_{PA} = .28, SE = .08, p < .001) and a direct effect (c'_{PA} = .27, SE = .08, p < .001) were found for physical abuse.

In vivo ratings. For the *Mediator Models*, only sexual abuse was found to predict psychological control (β = .21, SE = .11, p < .05). No other types of childhood trauma predicted psychological control or guilt induction. For the *Dependent Variable Model*, only emotional neglect significantly predicted in vivo TAF-Moral (β = -.34, SE = .15, p < .05). No significant predictors were found for in vivo TAF-Likelihood. Moreover, no indirect or total effects were found for in vivo ratings of TAF-Moral or TAF-Likelihood.

Summary. Path analyses indicated that, in the self-report sample, both emotional abuse and neglect significantly predicted psychological control and guilt induction and in the in vivo sample, sexual abuse significantly predicted psychological control. For TAF-Likelihood, emotional and physical neglect, as well as psychological control significantly predicted TAFS-Likelihood. Additionally, psychological control was found to significantly mediate the relationship between (1) emotional abuse and TAFS-Likelihood, as well as (2) emotional neglect and TAFS-Likelihood. These relationships were not

replicated with the in vivo rating of TAF-Likelihood; rather, no significant direct or indirect relationships were observed with this DV. For TAF-Moral, physical abuse significantly predicted TAFS-Moral and emotional neglect significantly predicted in vivo ratings of TAF-Moral. No other relationships were observed with TAF-Moral.

Specificity of predictors to TAF. To determine the specificity of our variables in the prediction of TAF, the comprehensive model was tested with the DASS-Anxiety subscale, DASS-Depression subscale, and DOCS-Total score (OCD symptom severity) substituting TAF as the outcome variable.

TAFS. Akin to the comprehensive model, religiosity significantly predicted psychological control (β = .46, SE = .08, p < .001), guilt induction (β = .11, SE = .02, p < .01), and intrinsic motivation (β = .26, SE = .06, p < .01). With DASS-Anxiety as the outcome variable, results indicated that the model was poorly fit (χ^2(22) = 441.94, p < .001; CFI = .19; RMSEA = .30; 90% CI RMSEA = 0.28 - 0.33) and accounted for 19% of the variance in the DV (p < .001). Moreover, no direct or indirect effects were found in the prediction of DASS-Anxiety. With DASS-Depression as the outcome variable, results indicated that the model was poorly fit (χ^2(22) = 443.97, p < .001; CFI = .18; RMSEA = .30; 90% CI RMSEA = 0.28 - 0.33) and accounted for 15% of the variance in the DV (p < .01). No direct or indirect effects were found. Finally, with the DOCS total score as the outcome variable, results again indicated that the model was poorly fit (χ^2(22) = 427.22, p < .001; CFI = .20; RMSEA = .30; 90% CI RMSEA = 0.27 - 0.32) and accounted for 17% in the DV (p < .01). Similar to the other symptom severity measures, no direct or indirect effects were found in the prediction of DOCS total scores.

In vivo ratings. Similar to the comprehensive model, religiosity significantly predicted psychological control (β = .56, *SE* = .13, *p* < .001), guilt induction (β = .11, *SE* = .03, *p* < .01), and intrinsic motivation (β = .28, *SE* = .09, *p* < .01). With DASS-Anxiety as the outcome variable, results indicated that the model was poorly fit ($\chi^2(22)$ = 84.41, *p* < .001; CFI = .40; RMSEA = .22; 90% CI RMSEA = 0.17 - 0.28) and accounted for 26% of the variance in the DV (*p* < .05). Moreover, no direct or indirect effects were found in the prediction of DASS-Anxiety. With DASS-Depression as the outcome variable, results indicated that the model was poorly fit ($\chi^2(22)$ = 84.40, *p* < .001; CFI = .42; RMSEA = .23; 90% CI RMSEA = 0.18 - 0.28) and accounted for 28% of the variance in the DV (*p* < .05). No direct or indirect effects were found. Finally, with DOCS total score as the outcome variable, results indicated that the model was poorly fit ($\chi^2(22)$ = 84.40, *p* < .001; CFI = .41; RMSEA = .22; 90% CI RMSEA = 0.17 - 0.28) and accounted for 19% in the DV (*p* < .05). Similar to the other symptom severity measures, no direct or indirect effects were found in the prediction of DOCS total scores.

Summary. As demonstrated by these analyses, the significant direct and indirect effects found for TAF-Likelihood and TAF–Moral were specific to these cognitive bias, and were not found with other measures of psychological distress or symptom severity. Moreover, of all the dependent variables, the study's predictors accounted for more variance in TAF-Moral than in any of the other outcome variable.

References

Abramowitz, J. S., Deacon, B., Olatunji, B. O., Wheaton, M. G., Berman, N. C., Losardo, D. L., et al. (2010). Assessment of obsessive-compulsive symptoms: Development and evaluation of the dimensional obsessive-compulsive scale. *Psychological Assessment, 22*, 180-198.

Abramowitz, J. S., Deacon, B., Woods, C., & Tolin, D. (2004). Association between protestant religiosity and obsessive compulsive symptoms and cognitions. *Depression and Anxiety, 20*(2), 70-76.

Abramowitz J. S., Huppert J., Cohen A., Tolin, D., & Cahill, S. (2002). Religious obsessions and compulsions in a non-clinical sample: The Penn Inventory of Scrupulosity (PIOS). *Behavior Research and Therapy, 40*, 825–838.

Abramowitz, J. S., Khandker, M., Nelson, C. A., Deacon, B. J., Rygwall, R. (2006). The role of cognitive factors in the pathogenesis of obsessive-compulsive symptoms: A prospective study. *Behavior Research and Therapy*, *44*, 1361-1374.

Abramowitz, J. S., Schwartz, S.A., & Moore, K.M. (2003). Obsessional thoughts in postpartum females and their partners: Content, severity and relationship with depression. *Journal of Clinical Psychology in Medical Settings*, *10*, 157-164.

Abramowitz, J. S., Storch, E. A., Keeley, M., & Cordell, E. (2007). Obsessive-compulsive disorder with comorbid major depressive disorder: What is the role of cognitive factors? *Behavior Research and Therapy, 45*, 2257-2267.

Abramowitz, J. S., Whiteside, S., Lynam, D., & Kalsy, S. (2003). Is thought–action fusion specific to obsessive-compulsive disorder? A mediating role of negative affect. *Behavior Research and Therapy, 41*, 1069–1079.

Akos, P., & Galassi, J. P. (2008). Special issue: Strengths-based school counseling. *Professional School Counseling*, *12*, 66–181.

Al-Issa, I., & Qudji, S. (1998). Culture and anxiety disorders. In: S. Kazarin & D. Evans (Eds.), *Cultural clinical psychology: Theory, research and practice*. New York: Oxford University Press.

Albertsen, E., O'Connor, L., & Berry, J. (2006). Religion and interpersonal guilt: Variations across ethnicity and spirituality. *Mental Health, Religion, and Culture, 9*(1), 67-84.

Albrecht, A., Galambos, N., Jansson, S. M. (2007). Adolescents' internalizing and aggressive behaviors and perceptions of parents' psychological control: A panel study examining direction of effects. *Journal of Youth and Adolescence, 36*, 673-684.

Alink, L. R., Cicchetti, D., Kim, J., & Rogosch, F. A. (2009). Mediating and moderation processes in the relation between maltreatment and psychopathology: Mother-child relationship quality and emotion regulation. *Journal of Abnormal Child Psychology, 37*, 831-843.

Allison, D. B., Gorman, B. S., & Primavera, L. H. (1993). Some of the most commonly asked questions of statistical consultants: Our favorite responses and recommended readings. *Genetic, Social and General Psychology Monographs, 119*(2), 153–185.

Allport, G., & Ross, J. (1967). Personal religious orientation and prejudice. *Journal of Personality and Social Psychology, 5*, 424-443.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington DC: Author.

Barber, B. K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development*, *67*, 3296-3319.

Barber, B. K., & Harmon, E. L. (2002). Violating the self: Parental psychological control of early adolescents and adolescents. In B. K. Barber (Ed.), *Intrusive parenting: How psychological control affects children and adolescents* (pp. 15-52). Washington, DC: American Psychological Association Press.

Barber, B. K., Stolz, H. E., & Olsen, J. A. (2005). Parental support, psychological control, and behavioral control: Assessing relevance across time, culture, and method. *Monographs of the Society for Research in Child Development*, *70*(4).

Baumrind, D. (1967). Child-care practices anteceding three patterns of preschool behavior. *Genetic Psychology Monographs, 75*, 43-88.

Beck, A. T. (1976). *Cognitive therapy of the emotional disorders*. New York: International Universities Press.

Berle, D., & Starcevic, V. (2005). Thought action fusion: Review of the literature and future directions. *Clinical Psychology Review, 25*, 263-284.

Berman, N. C., Abramowitz, J., Pardue, C., & Wheaton, M. (2010). The relationship between religion and thought action fusion: Use of an in vivo paradigm. *Behavior Research and Therapy, 48*, 670-674.

Berman, N. C., Abramowitz, J., Wheaton, M., Pardue, C., & Fabricant, L. (2011). Evaluation of an in vivo measure of thought action fusion. *Journal of Cognitive Psychotherapy, 25*(2), 155-164.

Berman, N. C., Wheaton, M. G., Fabricant, L., Jacobson, S., & Abramowitz, J. (2011). The effect of familiarity on thought action fusion. *Behavior Research and Therapy*, *49*, 695-699.

Bernstein, D., Stein, J., Newcomb, M., Walker, E., Pogge, D., Ahluvalia, T., et al. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse and Neglect, 27*, 169-190.

Black, J. E., Jones, T. A., Nelson, C. A., & Greenough, W. T. (1998). Neuronal plasticity and the developing brain. In N.E. Alessi, J.F. Coyle, S.I. Harrison, & S. Eth (Eds.), *Handbook of child and adolescent psychiatry* (pp. 31–53). New York: Wiley.

Bocci, L., & Gordon, P. K. (2007). Does magical thinking produce neutralizing behavior? An experimental investigation. *Behavior Research and Therapy, 45*, 1823-1833.

Bollen, K. A. (1989). *Structural equations with latent variables*. Wiley Series in Probability and Mathematical Statistics: New York.

Briere, J. (1996). A self-trauma model for treating adult survivors of severe child abuse. In J. Briere, L. Berliner, J. A. Bulkley, C. Jenny, & T. Reid (Eds.), *The APSAC handbook on child maltreatment* (pp. 140-157). Thousand Oaks, CA: Sage.

Browne, C., & Winkelman, C. (2007). The effect of childhood trauma on later psychological adjustment. *Journal of Interpersonal Violence, 22*, 684-697.

Burns, G. L., Keortge, S., Formea, G. M., & Sternberger, L.G. (1996). Revision of the Padua Inventory of obsessive-compulsive disorder symptoms: Distinctions between worry, obsessions, and compulsions. *Behavior Research and Therapy, 34*(2), 163-173.

Bybee, J., Zigler, E., Berliner, D., & Merisca, R. (1996). Guilt, guilt-evoking events, depression, and eating disorders. *Current Psychology, 15,* 113–127.

Cicchetti, D., Rogosch, F. A., Gunnar, M. R., & Toth, S. L. (2010). The differential impacts of early physical and sexual abuse and internalizing problems on daytime cortisol rhythm in school-aged children. *Child Development, 81*(1), 252-269.

Cicchetti, D., Rogosch, F. A., Toth, S. L., & Sturge-Apple, M. L. (2011). Normalizing the development of cortisol regulation in maltreated infants through preventive interventions. *Development and Psychopathology, 23*, 789-800.

Cicchetti, D., & Toth, S. L. (2009). The past achievements and future promises of developmental psychopathology: The coming of age of a discipline. *The Journal of Child Psychology and Psychiatry, 50*(1), 16-25.

Cicchetti, D., & Tucker, D. (1994). Development and self-regulatory structures of the mind. *Development and Psychopathology, 6*, 533–549.

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In: R. G. Heimberg, M. Liebowitz, D. Hope, & F. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). New York: Guilford Press.

Cohen, A. B., & Rozin, P. (2001). Religion and the morality of mentality. *Journal of Personality and Social Psychology, 81*, 697–710.

Coles, M. E., Cook, L., & Blake, T. (2007). Assessing obsessive compulsive symptoms and cognitions on the internet: Evidence for the comparability of paper and internet administration. *Behavior Research and Therapy, 45*, 2232–2240.

Dattilio, F., & Epstein, N. (2004). Cognitive behavioral couple and family therapy. In: T.L. Sexton, G.R. Weeks, and M.S. Robbins (Eds.), *The Family Therapy Handbook*. New York: Routledge.

Dew, R., Daniel, S., Armstrong, T., Goldstron, D., Triplett, M., & Koenig, H. (2008). Religion/Spirituality and adolescent psychiatric symptoms: A review. *Child Psychiatry Human Development, 39*, 381-398.

Donahue, M. (1985). Intrinsic and extrinsic religiousness: Review and meta-analysis. *Journal of Personality and Social Psychology, 48*, 400-419.

Donatelli, J., Bybee, & Buka, S. (2007). What do mothers make adolescents feel guilty about? Incidents, reactions, and relation to depression. *Journal of Child and Family Studies, 16*, 859-875.

Ellis, A. (1980). Psychotherapy and atheistic values: A response to A. E. Bergin's "Psychotherapy and religious values." *Journal of Consulting and Clinical Psychology, 48*, 635–639.

Ellis, B. J., Essex, M. J., & Joyce, W. T. (2005). Biological sensitivity to context: II. Empirical explorations of an evolutionary-developmental theory. *Developmental Psychopathology, 17*, 303–328.

Ellison, L. (2008). Identifying overguilt: An investigation of the relationship between guilt, religious motivation, and adaptation to college in religious college students. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 68*, 7A.

Faiver, C., O'Brien, E., & Ingersoll, R. E. (2000). Religion, guilt, and mental health. *Journal of Counseling and Development, 78*, 155-161.

Fehr, L. A., & Stamps, L. E. (1979). The Mosher Guilt Scales: A construct validity extension. *Journal of Personality Assessment, 43*, 257–260.

Finlay-Jones, R., & Brown, G. W. (1981). Types of stressful life events and the onset of anxiety and depressive disorders. *Psychological Medicine, 11*, 803-815.

Foa, E. B., Keane, T. M., & Friedman, M. J. (2000). *Effective Treatments for PTSD: Practice Guidelines from the International Society for Traumatic Stress Studies.* Guilford Press: New York.

Gail, G., Pagano, M. E., Desmond, S., Perrin, J. M., & Murphy, M. (2000). Utility of psychosocial screening at a school-based health center. *Journal of School Health, 70*(7), 292-298.

Ghassemzadeh, H., Mojtabai, R., Khamseh, A., Ebrahimkhani, N., Issazadegan, A., & Saif-Nobakht, Z. (2002). Symptoms of obsessive-compulsive disorder in a sample of Iranian patients. *International Journal of Social Psychiatry, 48*, 20–28.

Gorsuch, R., & McPherson, S. (1989). Intrinsic/extrinsic measurement: I/E-revised and single-item scales. *Journal for the Scientific Study of Religion, 28*, 348-254.

Gwilliam, P., Wells, A., & Cartwright-Hatton, S. (2004). Does metacognition or responsibility predict obsessive-compulsive symptoms: A test of the metacognitive model. *Clinical Psychology and Psychotherapy, 11*, 137–144.

Hazlett-Stevens, H., Zucker, B. G., & Craske, M. G. (2002). The relationship of thought–action fusion to pathological worry and generalized anxiety disorder. *Behavior Research and Therapy, 40*, 1199–1204.

Heim, C., & Nemeroff, C. (2001). The role of childhood trauma in the neurobiology of mood and anxiety disorders: Preclinical and clinical studies. *Biological Psychiatry, 49*, 1023-1039.

Henry, J. D., & Crawford, J. R., (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 44*, 227-239.

Hayduk, L., Cummings, G. G., Boadu, K., Pazderka-Robinson, H., & Boulianne, S. (2007). Testing! Testing! One, two three – Testing the theory in structural equation models! *Personality and Individual Differences, 42*, 841-50.

Hodgson, R. J., & Rachman, S. (1977). Obsessional-compulsive complaints. *Behavior Research and Therapy, 15*, 389–395.

Holmes, E. A., & Mathews, A. (2010). Mental imagery in emotion and emotional disorders. *Clinical Psychology Review, 30*, 349-362.

Howard, D. E., & Wang, M. Q. (2005). Psychosocial correlates of U.S. adolescents who report a history of forced sexual intercourse. *Journal of Adolescent Health, 36*, 372–379.

Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling, 6*(1), 1-55.

Jellinek, M.S., Murphy, M., Little, M., Pagano, M. E., Comer, D. M., & Kelleher, K. J. (1999). Use of the pediatric symptom checklist to screen for psychosocial problems in pediatric primary care. A national feasibility study. *Archives of Pediatric Adolescent Medicine, 153*, 254-260.

Judd, C. M., & Kenny, D. A. (1981). Process analysis: Estimating mediation in treatment evaluations. *Evaluation Review, 5*, 602–619.

Kandel, E.R. (1999). Biology and the future of psychoanalysis: A new intellectual framework for psychiatry revisited. *American Journal of Psychiatry, 156*, 505–524.

Kazdin, A. (2002). *Research Design in Clinical Psychology* (4th ed.). Boston: Allyn and Bacon.

Klass, E. T. (1987). Situational approach to the assessment of guilt: Development and validation of a self-report measure. *Journal of Psychopathology and Behavioral Assessment, 9,* 35-48.

Kline, R. B., (1991). Latent variable path analysis in clinical research: A beginner's tour guide. *Journal of Clinical Psychology, 47*(4), 471-484.

Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry, 158*, 848-856.

Loman, M. M., & Gunnar, M. R. (2010). Early experience and the development of stress reactivity and regulation in children. *Neuroscience and Biobehavior Review, 34*, 867–876.

Luyten, P., Corveleyn, J., & Fontaine, J. R. (1998). The relationship between religiosity and mental health: Distinguishing between shame and guilt. *Mental Health, Religion and Culture, 1*, 165–184.

MacCallum, R., Zhang, S., Preacher, K., & Rucker, D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods, 7*, 19-40.

Maina, G., Albert, U., Bogetto, F., Vaschetto, P., & Ravizza, L. (1999). Recent life events and obsessive-compulsive disorder (OCD): The role of pregnancy/delivery. *Psychiatry Research, 89*, 49-58.

Marcks, B., & Woods, D. (2007). Role of thought-related beliefs and coping strategies in the escalation of intrusive thoughts: An analogue to obsessive compulsive disorder. *Behavior Research and Therapy, 45,* 2640-2651.

Marino, T. L., Lunt, R., A., & Negy, C. (2008). Thought action fusion: A comprehensive analysis using structural equation modeling. *Behavior Research and Therapy, 46*, 845-853.

Masten, A. S. (2011). Resilience in children threatened by extreme adversity: Frameworks for research, practice, and translational synergy. *Development and Psychopathology, 23*, 493-506.

Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments: Lessons from successful children. *American Psychologist, 53*, 205–220.

Masten, A. S., & Osofsky, J. (2010). Disasters and their impact on child development: Introduction to the special section. *Child Development, 81*, 1029–1039.

McLaughlin, K. A., Kubzansky, L. D., Dunn, E. C., Waldinger, R., Vaillant, G., & Koenan, K. C., (2010). Childhood social environment, emotional reactivity to stress, and mood and anxiety disorders across the life course. *Depression and Anxiety, 27*, 1087-1094.

Meek, K., Albright, J., & McMinn, M. (1995). Religious orientation, guilt, confession, and forgiveness. *Journal of Psychology and Theology, 23*(3), 190-197.

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behavior Research and Therapy, 28*, 487–495.

Neblett, E. W., Phillip, C. L., Cogburn, C.D., & Sellers, R. M. (2006). African-american adolescents' discrimination experiences and academic achievement: Racial socialization as a cultural compensatory and protective factor. *Journal of Black Psychology, 32*(2), 199-218.

Noll, J. G., Horowitz, L. A., Bonanno, G. A., Trickett, P. K., & Putnam, F. W. (2003). Revictimization and self-harm in females who experienced childhood sexual abuse: Results from a prospective study. *Journal of Interpersonal Violence, 18,* 1452–1471.

Pettit, G. S., Laird, R. D., Dodge, K. A., Bates, J. E., & Criss, M. M. (2001). Antecedents and behavior-problem outcomes of parental monitoring and psychological control in early adolescence. *Child Development, 72*, 583–598.

Plante, T. G., & Boccaccini, M. (1997). The santa clara strength of religious faith questionnaire. *Pastoral Psychology*, *45*(5), 375-387.

Preacher, K. J. & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891.

Rachman, S. (1997). A cognitive theory of obsessions. *Behavior Research and Therapy, 35*, 793–802.

Rachman, S. (1998). A cognitive theory of obsessions: Elaborations. *Behavior Research and Therapy, 36*(4), 385.

Rachman, S., & de Silva, P. (1978). Abnormal and normal obsessions. *Behavior Research and Therapy, 16*, 233–248.

Rachman, S., & Shafran, R. (1999). Cognitive distortions: Thought–action fusion. *Clinical Psychology and Psychotherapy, 6*, 80–85.

Rachman, S., Shafran, R. R., Mitchell, D., Trant, J., & Teachman, B. (1996). How to remain neutral: An experimental analysis of neutralization. *Behavior Research and Therapy, 34*, 889–898.

Rakow, A., Forehand, R., McKee, L., Coffelt, N., Champion, J., Fear, J., et al. (2009). The relation of parental guilt induction to child internalizing problems when a caregiver has a history of depression. *Journal of Child and Family Studies, 18*, 367-377.

Rassin, E., Diepstraten, P., Merckelbach, H., & Muris, P. (2001). Thought–action fusion and thought suppression in obsessive compulsive disorder. *Behavior Research and Therapy, 39*, 757–764.

Rassin, E., & Koster, E. (2003). The correlation between thought–action fusion and religiosity in a normal sample. *Behavior Research and Therapy, 41*, 361–368.

Rassin, E., Merkelbach, H., Muris, P., & Schmidt, H. (2001). The thought–action fusion scale: Further evidence for its reliability and validity. *Behavior Research and Therapy, 39*, 537–544.

Rassin, E., Merckelbach, H., Muris, P., & Spaan, V. (1999). Thought action fusion as a causal factor in the development of intrusions. *Behavior Research and Therapy, 37*, 231–237.

Rassin, E., Muris, P., Schmidt, H., & Merckelbach, H. (2000). Relationships between thought action fusion, thought suppression and obsessive-compulsive symptoms: A structural equation modeling approach. *Behavior Research and Therapy, 38*, 889–897.

Repetti, R.L., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin, 128*, 330–336.

Rogers, K. N., Buchanan, C. M., & Winchell, M. E. (2003). Psychological control during early adolescence: Links to adjustment in differing parent/adolescent dyads. *Journal of Early Adolescence, 23*, 349–383.

Salkovskis, P. (1985). Obsessional compulsive problems: A cognitive–behavioral analysis. *Behavior Research and Therapy, 23*, 571–583.

Salkovskis, P., Shafran, R., Rachman, S., & Freeston, M. H. (1999). Multiple pathways to inflated responsibility beliefs in obsessional problems: Possible origins and implications for therapy and research. *Behavior Research and Therapy, 37*, 1055–1072.

Senn, T. E., Carey, M. P., & Vanable, P. A. (2008). Childhood and adolescent sexual abuse and subsequent sexual risk behavior: Evidence from controlled studies, methodological critique, and suggestions for research. *Clinical Psychology Review, 28*, 711-735.

Shafran, R., Thordarson, D. S., & Rachman, S. (1996). Thought action fusion in obsessive-compulsive disorder. *Journal of Anxiety Disorders, 10*, 379–391.

Shreve-Neiger, A., & Edelstein, B. (2004). Religion and anxiety: A critical review of the literature. *Clinical Psychology Review, 24*, 379-397.

Sheldon, K. M. (2006). Catholic guilt? Comparing catholics' and protestants' religious motivations. *International Journal for the Psychology of Religion, 16*(3), 209-223.

Sica, C., Norvara, C., & Sanavio, E. (2002). Religiousness and obsessive-compulsive cognitions and symptoms in an italian population. *Behavior Research and Therapy, 40*, 813–823.

Siev, J., Chambless, D., & Huppert, J. (2010). Moral thought action fusion and OCD symptoms: The moderating role of religious affiliation. *Journal of Anxiety Disorders, 24*, 309-312.

Siev, J., & Cohen, A. B. (2007). Is thought action fusion related to religiosity? Differences between christians and jews. *Behavior Research and Therapy, 45*, 829–837.

Smari, J., & Holmsteinsson, H. E. (2001). Intrusive thoughts, responsibility attitudes, thought action fusion and chronic thought suppression in relation to obsessive-compulsive symptoms. *Behavioral and Cognitive Psychotherapy, 29*, 13–20.

Steketee, G., Quay, S., & White, K. (1991). Religion and guilt in OCD patients. *Journal of Anxiety Disorders*, *5*, 359–367.

Striegel-Moore, R. H., Silberstein, L. R., Frensch, P., & Rodin, J. (1988). A prospective study of disordered eating among college students. *International Journal of Eating Disorders, 8*(5), 499-509.

Timpano, K. R., Abramowitz, J. S., Mahaffey, B. L., Mitchell, M. A., & Schmidt, N. B. (2011). Efficacy of a prevention program for postpartum obsessive-compulsive symptoms. *Journal of Psychiatric Research, 45*, 1511-1517.

van den Hout, M., Kindt, M., Weiland, T., & Peters, M. (2002). Instructed neutralization, spontaneous neutralization and prevented neutralization after an obsession-like thought. *Journal of Behavior Therapy and Experimental Psychiatry, 33*, 177–189.

van den Hout, M., van Pol, M., & Peters, M. (2001). On becoming neutral: Effects of experimental neutralizing reconsidered. *Behavior Research and Therapy, 39*, 1439–1448.

Van Oppen, P., Hoekstra, R. J., & Emmelkamp, P. M. G. (1995). The structure of obsessive-compulsive symptoms. *Behavior Research and Therapy, 33*, 15–23.

Widom, C. S., & Ames, M. A. (1994). Criminal consequences of childhood sexual victimization. *Child Abuse and Neglect, 18*, 303–318.

Yorulmaz, O., Yilmaz, A. E., & Gencoz, T. (2004). Psychometric properties of the thought–action fusion scale in a Turkish sample. *Behavior Research and Therapy, 42*, 1203–1214.

Yorulmaz, O., Karancı, A. N., Bastug, B., Kısa, C., & Goka E. (2007). Responsibility, thought–action fusion and thought suppression in Turkish patients with obsessive-compulsive disorder. *Journal of Clinical Psychology, 64*, 308–317.

Yorulmaz, O., Gencoz, T., & Woody, S. (2009). OCD cognitions and symptoms in different religious contexts. *Journal of Anxiety Disorders, 23*, 401-406.

Zahn-Waxler, C., Kochanska, G., Krupnick, J., & McKnew, D. (1990). Patterns of guilt in children of depressed and well mothers. *Developmental Psychology, 26*, 51–59.

Zucker, B. G., Craske, M. G., Barrios, V., & Holguin, M. (2002). Thought action fusion: Can it be corrected? *Behavior Research and Therapy, 40*, 653–664.