



Childhood trauma and thought action fusion: A multi-method examination

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ABSTRACT

Cognitive biases, such as Thought Action Fusion, 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 developmental factors that contribute to this theoretically important construct. Therefore, the current study examined how childhood trauma predicts TAF using a multi-method approach. Using both a self-report ($N=407$) and in vivo measure ($N=107$), results indicated that emotional abuse and physical neglect predicted the likelihood bias of TAF, whereas physical abuse predicted the moral bias. Our findings are conceptualized within a developmental psychopathology framework and cognitive intervention strategies for survivors of childhood trauma are suggested. Limitations and future directions are discussed.

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1. Introduction

The role of cognitive distortions in the cognitive-behavioral model of anxiety disorders is widely accepted. Beck's cognitive specificity theory (1976), for example, proposes that emotional disorders develop from the misinterpretation of stimuli and events. In social phobia, for instance, one might misinterpret an external stimulus (e.g., crowd's laughter) and believe him or herself to be the target of negative evaluation (Clark & Wells, 1995). Longitudinal research suggests that the presence of dysfunctional beliefs and interpretations (e.g., "bad" thoughts are equivalent to actions) prospectively increases the risk of psychopathology (e.g., Abramowitz, Khandker, Nelson, Deacon, and Rygwall, 2006). Accordingly, these cognitive processes represent psychological vulnerabilities and indicate an avenue by which at-risk individuals might be identified (e.g., Timpano, Abramowitz, Mahaffey, Mitchell, and Schmidt, 2011). Yet despite evidence for the role of cognitive distortions and biases in anxiety disorders, the factors that contribute to the development of cognitive distortions are not well understood.

The current study focuses on one cognitive distortion: Thought Action Fusion (TAF), which is implicated in a number of anxiety disorders, such as generalized anxiety disorder (Hazlett-Stevens, Zucker, & Craske, 2002), panic, social phobia, post-traumatic stress disorder (Rachman & Shafran, 1999; Rassin, Diepstraten,

Merckelbach, & Muris, 2001; Rassin, Merckelbach, Muris, & Schmidt, 2001), and most often, obsessive compulsive disorder (for a review, see Berle & Starcevic, 2005). Thought Action Fusion involves two biases that underlie the misperception of innocuous intrusive thoughts as highly significant and threatening (Shafran, Thordarson, & Rachman, 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).

Salkovskis, Shafran, Rachman, and Freeston (1999) theorized that certain early life experiences, such as exposure to rigid rules of conduct and duty, could give rise to TAF-like beliefs, specifically those involving inflated responsibility. Recent research efforts (Berman, Wheaton, & Abramowitz, in press) have empirically addressed this claim, finding strength of religiosity indeed predicted the moral bias of TAF, whereas parenting strategies such as guilt induction and psychological control predicted the likelihood TAF bias. No empirical work, however, has examined another hypothesized pathway to the development of TAF-like beliefs: the experience of childhood trauma (Salkovskis et al., 1999).

Previous research has addressed the relationship between childhood trauma and the development of cognitive distortions more generally. In Briere's self-trauma model (1996), for instance, childhood trauma is hypothesized to disrupt cognitive development and result in distortions pertaining to oneself, others, the environment, and the future (self-trauma model; Briere, 1996).

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Briere (1996) found three types of cognitive distortions associated with childhood trauma: (a) safety (e.g., preoccupied by the prospect of danger) (b) controllability (e.g., perceived helplessness) and (c) internal attribution (e.g., self-blame). These are thought to be incorporated into the child's cognitive schema (Smucker, Dancu, Foa, & Niederee, 1995) and maintained by attending to internal and external cues that support the maladaptive beliefs (Browne & Winkelman, 2007). Moreover, they have been found to continue into adolescence and adulthood (Farber & Joseph, 1985; Gold, 1986).

Some of the cognitive distortions associated with childhood trauma (e.g., a feeling of responsibility over external events and being preoccupied by the likelihood of danger) appear to overlap with the likelihood bias of TAF. This leads to the hypothesis that the experience of childhood trauma would be related to the likelihood, but not moral, bias of TAF. Accordingly, the current study employed a multi-method approach, in which participants completed self-report questionnaires that assess each construct, and a subset subsequently completed an in vivo behavioral assessment of TAF (Berman, Abramowitz, Wheaton, Pardue, & Fabricant, 2011). In doing so, the current study represents the first to examine the relationship between childhood trauma and TAF using multiple assessment modalities.

2. Methods

2.1. Participants

We elected to examine our hypotheses using an unselected student sample. Aside from the convenience of this approach, we employed such a sample because 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), as is, unfortunately, childhood trauma.

2.1.1. Self-report sample

407 undergraduate students in introductory psychology courses at a public university completed an online questionnaire battery. Participants received course credit 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. 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.

2.1.2. In vivo sample

107 undergraduate students (82.24% female) completed an experimental laboratory session subsequent to completing the online "screening" questionnaire battery. Participants received additional course credit for their participation in the in vivo session. Demographic characteristics for this sample are also outlined in Table 1. Akin to the self-report sample, the majority of participants were female (82.24%), Caucasian (79.40%), and Christian (77.5%).

Table 1

Demographic characteristics for the self-report ($N=407$) and in vivo ($N=107$) sample.

	Self-report sample	In vivo sample
<i>Gender</i>		
Male	129 (31.69%)	19 (17.80%)
Female	278 (68.31%)	88 (82.24%)
<i>Ethnicity</i>		
Caucasian	290 (71.25%)	85 (79.40%)
African-American	48 (11.79%)	6 (5.60%)
Hispanic	18 (4.40%)	7 (6.50%)
Asian	34 (8.35%)	2 (1.90%)
Other	17 (4.17%)	7 (6.50%)
<i>Age (years)</i>		
Mean (SD)	19.36 (1.69)	21.39 (1.46)
Range	17–27	18–25

2.2. Measures

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

2.2.1. Demographics

At the onset of the online questionnaire, participants were asked to report their gender, age, and their identified racial or ethnic group.

2.2.2. 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," $\alpha=.83$) and emotional abuse (e.g., "People in my family said hurtful or insulting things to me," $\alpha=.87$), emotional neglect (e.g., "There was someone in my family who helped me feel that I was important or special," reverse coded, $\alpha=.91$), sexual abuse (e.g., "Someone threatened to hurt me or tell lies about me unless I did something sexual with them," $\alpha=.92$), and physical neglect (e.g., "I had to wear dirty clothes growing up," $\alpha=.61$). 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.

2.2.3. 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," $\alpha=.90$), *Likelihood-other* (e.g., "If I think of a relative/friend losing their job, this increases the risk that they will lose their job," $\alpha=.92$), and *Likelihood-self* (e.g., "If I think of myself having an accident, it increases the risk that I will have an accident," $\alpha=.84$). Each item is rated on a scale from 0 (disagree strongly) to 4 (agree strongly). Items on the TAFS have good face validity and the measure shows good internal consistency (Shafran et al., 1996).

2.2.4. In vivo ratings

Participants who completed the online measures and agreed to be contacted by a research assistant, were invited to complete the following in vivo (behavioral) task: 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 analog scale on the screen. Next, he or she was 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 experimenter then placed the note card next to the desktop monitor. Participants were then presented with two sentences and were instructed to write the sentence on another note card, inserting the close relative's name into the blank. The sentences were completed one at a time and the order of the two sentences was counterbalanced:

- (1) "I hope _____ is diagnosed with cancer soon."
- (2) "I hope _____ contracts HIV soon."

After writing each sentence, the participant was asked to close his or her eyes and think about the situation for one minute. 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. What is the likelihood of the event occurring?
2. How morally wrong was it to write out the sentence?
3. How upsetting would it be if this event happened?

The experiment proceeded through these steps until this process occurred for both sentences.

2.3. 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 were collected using Qualtrics, an online web survey development tool. 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, participants were asked to provide their contact information if they were interested in being invited to participate in the

laboratory portion of the study for further course credit. 27% (107/407) of participants provided this information and were invited to participate in a psychology lab experiment ostensibly about “Thoughts and Feelings.”

For the 107 participants who also completed the in vivo ratings, testing occurred individually with the experimenter. 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. All procedures were approved by the university IRB.

3. Results

3.1. Descriptive statistics and zero-order correlations

3.1.1. Self-report

Descriptive statistics were calculated for the subscales and total score of the Childhood Trauma Questionnaire (physical and emotional abuse, emotional neglect, sexual abuse, and physical neglect), and the TAFS (moral and likelihood). Table 2 presents the mean, standard deviation, and range for each study measure. For childhood trauma ratings, the score for each type of trauma was low, with emotional neglect being reported most frequently. For the TAFS, 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).

To examine the relationship between the CTQ and TAFS, zero-order correlations were examined (see Table 3). The relationship between childhood trauma and the TAFS subscales indicated that all constructs were significantly and positively related to

Table 2
Descriptive statistics for study measures.

Measure	M	SD	Range
<i>Childhood trauma questionnaire</i>			
Emotional abuse	.48 (.50)	.69 (.70)	0–4 (0–3)
Physical abuse	.31 (.26)	.54 (.41)	0–3 (0–3)
Sexual abuse	.16 (.12)	.56 (.55)	0–4 (0–4)
Emotional neglect	1.52 (1.51)	1.26 (1.15)	0–4 (0–4)
Physical neglect	.29 (.23)	.53 (.41)	0–4 (0–4)
<i>Thought action fusion scale</i>			
TAFS-moral	9.41	8.69	0–36
TAFS-likelihood	1.98	3.52	0–18
<i>Averaged in vivo ratings</i>			
Moral	36.40	34.81	0–100
Likelihood	9.55	18.69	0–100

Note. For the Childhood Trauma Questionnaire, descriptive statistics for the self-report sample are presented in normal font and in vivo sample statistics are presented **bolded** and in parentheses.

Table 3
Zero-order correlations in self-report sample.

Variable	CTQ-PA	CTQ-SA	CTQ-EN	CTQ-PN	TAF-M	TAF-L
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. 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.

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

TAFS-Likelihood (r 's range from .11 to .31); however, only emotional and physical abuse possessed a significant and positive relationship with TAFS-Moral (significant r 's range from .13 to .20, p 's $< .05$). The associations between these constructs and TAF are further evaluated in regression analyses.

3.1.2. In vivo ratings

Prior to simply averaging in vivo ratings for the two different negative scenarios, it was necessary to ensure that each one was perceived to be similarly upsetting/severe (“how upsetting would it be if the event actually occurred”). If ratings of severity were not significantly different, then participants’ ratings would be averaged across sentences (e.g., each participant would end up with one score for his/her rating of likelihood).

To determine whether the sentences significantly differed on ratings of severity, paired samples t -tests were conducted. Results indicated that participants considered thinking about a relative being diagnosed with cancer ($M=92.29$, $SD=17.38$) or with HIV ($M=92.03$, $SD=18.73$) as similarly upsetting or severe ($t(106)=-.07$, $p > .05$); therefore the in vivo ratings for these two sentences were averaged.

The mean in vivo ratings of moral wrongness and estimated likelihood appear in Table 2.

Zero-order correlations between the CTQ and in vivo ratings are presented in Table 4. As can be seen, the correlations obtained in this sample were very similar to those obtained with the self-report measures. Minor differences between the self-report and in vivo ratings include the in vivo moral wrongness rating being

Table 4
Zero-order correlations for in vivo sample.

Variable	CTQ-PA	CTQ-SA	CTQ-EN	CTQ-PN	In Vivo-M	In Vivo-L
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. CTQ-EA=Emotional Abuse, CTQ-PA=Physical Abuse, CTQ-SA=Sexual Abuse, CTQ-EN=Emotional Neglect, CTQ-PN=Physical Neglect, In Vivo-M=In Vivo Thought Action Fusion Moral, In Vivo-L=In Vivo Thought Action Fusion Likelihood.

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

Table 5
Regression analyses predicting TAF.

Predictors	R ²	β	t	p
<i>Thought action fusion—likelihood</i>				
Childhood trauma	.11 (.03)			.00 (.79)
Emotional abuse		.15 (.13)	1.96 (.67)	.05 (.50)
Physical abuse		.11 (.04)	1.39 (.30)	.16 (.76)
Sexual abuse		.06 (–.08)	.91 (–.65)	.36 (.52)
Emotional neglect		–.13 (–.07)	–1.78 (–.38)	.08 (.70)
Physical neglect		.17 (–.16)	2.28 (1.06)	.02 (.29)
<i>Thought action fusion—moral</i>				
Childhood trauma	.07 (.10)			.00 (.15)
Emotional abuse		.01 (–.05)	.16 (–.26)	.87 (.80)
Physical abuse		.30 (.23)	3.77 (1.69)	.00 (.09)
Sexual abuse		–.02 (–.12)	–.30 (–.96)	.76 (.34)
Emotional neglect		–.09 (–.29)	–1.23 (–1.79)	.22 (.08)
Physical neglect		–.10 (.05)	–1.37 (.32)	.17 (.75)

Note. For the prediction of TAFS, the results are presented in normal font and for the prediction of the in vivo rating of TAF, results are presented **bolded** and in parentheses.

significantly correlated with emotional neglect ($r = -.23, p < .05$). This relationship was stronger than the correlation observed in the self-report sample between emotional neglect and TAFS-Moral ($r = -.05, p > .05$).

3.2. Regression analyses

To test our hypothesis that childhood trauma would significantly and positively predict the likelihood, but not moral, TAF bias, the CTQ subscales were simultaneously entered into separate regression models that differentially predicted each bias of TAF.

3.2.1. Thought action fusion likelihood

For the TAFS (Table 5), childhood trauma was overall a significant and positive predictor, $F(5, 347) = 8.71, p < .001$. Of the CTQ subscales, emotional abuse and physical neglect emerged as unique predictors. For the in vivo ratings of perceived likelihood, childhood trauma ($F(5, 73) = .48, p > .05$) was not found to be a significant predictor.

3.2.2. Thought action fusion—moral

Scores on the CTQ also accounted for a significant amount of variance in TAFS-Moral scores, $F(5, 346) = 4.79, p < .001$, with physical abuse emerging as the only unique predictor (see Table 5). Scores on the CTQ, however, did not explain significant variance in in vivo ratings of moral wrongness, $F(5, 74) = .67, p > .05$.

4. Discussion

The current study used a multi-method approach to examine how one specific developmental experience, childhood trauma, predicted TAF beliefs. Consistent with our hypothesis, the experience of trauma as a child was associated with the likelihood bias of TAF as measured by the TAFS. More specifically, traumatic experiences involving emotional abuse and physical neglect were unique predictors of the tendency to believe that thinking about a negative event can increase this event's probability. An unexpected finding, however, was that experiencing physical abuse as a child also predicted the moral bias of TAF—the belief that thinking about a negative event is the moral equivalent of the event itself. Taken together, this pattern of results suggests that specific types of childhood trauma possess unique relationships with each TAF bias.

On the other hand, the individual types of childhood trauma were not predictive of the in vivo ratings of likelihood and morality. While this does not support our hypothesis, there are possible explanations for these null findings. First, it might be that childhood trauma predicts the tendency to misinterpret the significance of negative thoughts in general, yet not necessarily every negative thought. Indeed, the TAFS assesses this bias in a more general and hypothetical way than does the in vivo induction that we used as part of the present study. Second, although the in vivo ratings pertained to personally relevant negative thoughts about family members, childhood trauma might only be associated with exaggerated beliefs about negative thoughts that occur more spontaneously or are more highly personally relevant than we could provoke in our study.

To explain how childhood trauma, especially emotional abuse and physical neglect, contribute to the TAF likelihood bias, it is important to consider 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 are 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., parental psychological control), he/she might misinterpret the powerfulness of his/her thoughts on the outside world. It is important to note the potentially spurious nature of the physical neglect finding, given the subscale's relatively weak internal consistency.

The relationship between physical abuse and the moral bias of TAF, on the other hand, could stem from past instances in which the child was physically beaten (or feared being beaten) for having immoral thoughts (e.g., “God is dead”). It is also possible that once a child is beaten for engaging in certain behaviors, he or she begins to believe that it is wrong even to think of engaging in the previously punished behavior; that is thinking becomes, equivalent to engaging in the behavior itself. The divergent findings for likelihood and moral TAF are consistent with other studies (e.g., Berman et al. (2011)) and suggest that there are different psychological mechanisms driving these two biases.

More generally, childhood trauma has been shown to disrupt typical cognitive development and consequently 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, the tendency to avoid thinking about the event (Criterion C for Post-Traumatic Stress Disorder; American Psychiatric Association (2000)) 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).

The findings of this study can inform cognitive intervention strategies for child or adult survivors of trauma. Clinicians may opt to measure trauma patients' TAF beliefs. If this cognitive distortion is endorsed (e.g., just thinking about the abuse will increase the likelihood of its recurrence), a therapist can help patients confront these fears through behavioral experiments (i.e., empirical tests of particular dysfunctional beliefs; Rachman, 2003) or through hierarchy-based exposures (McLean et al., 2001).

For a number of reasons, caution is warranted regarding the conclusions of the present study. First, as mentioned, the validity and representativeness of the in vivo ratings is a 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. Future research might also provide greater specificity for the negative event (e.g., liver or colon cancer). The lack of specificity might have led to individual variability in the imagined event. Additionally, our illness-related thought induction might not have been as relevant to the study of childhood trauma as an aggressive-related thought induction (e.g., thinking and writing about hitting a beloved relative). Inducing a personally relevant aggressive intrusion might better access participants' TAF biases related to feelings of guilt and moral wrongness.

A second limitation involves the methodology and accuracy of the childhood trauma self-report measure. 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.

Lastly, the correlational design of the study limits conclusions of causality. Longitudinal designs are necessary next steps to better understand how the experiences that we examined contribute to TAF. Furthermore, although the combination of CTQ subscales predicted a statistically significant amount of variance in TAF scores, the actual amount of variability explained was quite small, and the clinical significance of this relationship is in need of further evaluation. Future studies should also examine childhood trauma along with other factors shown to be associated with TAF (e.g., religiosity) to test the relative strength of various predictors. Moreover, it is clear from our prediction patterns that childhood trauma better predicts the likelihood bias. Therefore, it might be that the moral and likelihood bias possess significantly different relationships with childhood trauma, which aligns with Rassin, Merkelbach, et al. (2001) and Shafran et al.'s (1996) findings that these cognitive biases are unique.

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