Cognition as an Intermediate, Maintaining Factor of PTSD Following Sexual Assault: A Systematic Review

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PSB3E-BT15: Bachelor Thesis

Group number 07

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June 29, 2022

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Abstract

Over half of sexually assaulted women develop Post-Traumatic Stress Disorder. Cognitive appraisal is one of the factors that has been investigated in the context of PTSD onset and maintenance following sexual abuse. While the state of research in the area of psychopathology is currently torn between dimensional, categorical, and network models, a newer model called the Stress Response Network Model aims to integrate 50 years of stress research into one universal model. In the current study, we aimed to assess whether the evidence is in line with the model, which postulates that stress leads to a stress response involved in the emergence and maintenance of psychopathology. We hypothesized that (1) cognition serves as an intermediate variable between sexual abuse and PTSD and that (2) cognition is a maintaining factor of PTSD. We conducted a systematic review of the literature found in the databases PsycINFO and MEDLINE. Results showed that the included studies support both hypotheses. We concluded that various conceptualisations of cognition contribute to PTSD symptom severity following sexual abuse, and serve as a maintaining factor in the circular relationship between the stress response and psychopathology. The Stress Response Network Model is thus in line with current evidence.

Keywords: Stress Response Network Model, PTSD, cognition, cognitive appraisal, sexual abuse, sexual assault.

The effects of cognitive appraisal on the onset and maintenance of Post-Traumatic Stress Disorder following sexual abuse: A systematic review

Sexual assault is one of the most perpetrated forms of violence against women (UN Women, 2010). With anti-sexual violence movements like “Me too” gaining momentum every day, it is clear that an alarming number of women struggle with traumatic experiences related to sexual abuse. Grim statistics state that one in four women have been subjected to rape or other forms of sexual assault during their lifetime (Me too, 2022). Studies investigating the psychological aftermath of survivors of rape indicate that 94% of victims meet some of the symptomatic criteria for trauma-related disorders immediately after the traumatic event (Rothbaum et al., 1992). While some women progress towards a healthy level of functioning several months after the incident, one in three women will be diagnosed with Post-Traumatic Stress Disorder (PTSD) after being sexually assaulted (Tiihonen Möller et al., 2014), and the lifetime prevalence of PTSD in sexual assault victims is around 50% (Chivers-Wilson, 2006; Resick & Schnike, 1993).

PTSD is a mental health disorder triggered by experiencing or witnessing a traumatic event (American Psychiatric Association, 2013). Its symptomatology includes re-experiencing the traumatic event, exaggerated negative beliefs about the world, avoidance of the stimuli associated with the event, and hypervigilance toward potential threats. These symptoms indicate the negative impact of life-threatening stressors on cognitive functioning (Hayes et al., 1996; Sumner et al., 2017). Since a PTSD diagnosis is most likely following sexual assault as opposed to other kinds of stressors (Chivers-Wilson, 2006), researchers investigated the processes involved in the onset and maintenance of psychopathology following sexual violence.

Cognitive appraisal has been one of the factors investigated in the context of PTSD onset and maintenance following sexual abuse. Lazarus and Folkman (1984) proposed one of

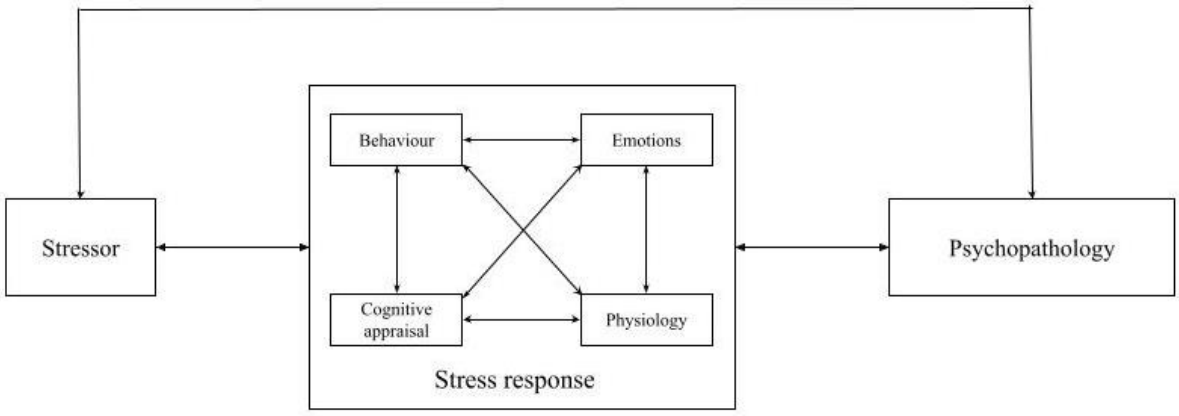
the most influential theories of stress, allocating cognitive appraisal as the main factor in their model. According to their theory, cognitive appraisal pertains to the way in which an individual responds to and interprets the stimuli in their environment. They distinguished between two types of cognitive appraisal. The primary type of appraisal involves an analysis of whether the information the individual receives is personally relevant. During the secondary type of appraisal, the individual evaluates whether they have adequate resources to deal with the stressor. According to this theory, stress occurs when the individual perceives a personally-relevant situation as overwhelming their available resources. Thus, in the context of an unforeseeable event, an individual will become stressed when they negatively appraise their capacity to deal with the situation. The model proposed by Lazarus and Folkman inspired much of the research focused on trauma-related disorders, with researchers now agreeing on the importance of cognitive appraisal in the persistence of PTSD symptoms, particularly through negative cognitions (Bennett et al., 2009; Ozer et al., 2003; Resick & Schnicke, 1992).

A newer model of stress aims to provide a transdiagnostic approach to psychopathology and its contributing factors. The Stress Response Network Model is based on fifty years of stress research and it aims to integrate the three main factors of interest in the field: stress, the stress response, and psychopathology. Thus, the model intends to provide a theoretical baseline for research examining the directionality of the transdiagnostic processes surrounding stress. The stress response consists of four components: cognitive appraisal, emotion, physiology, and behaviour, as illustrated in Figure 1. This paper aims to investigate the directionality between one of the stress-response factors and psychopathology by exploring the currently available research on the role that cognitive appraisal plays in the onset and maintenance of PTSD following sexual abuse. According to this model, sexual abuse represents the stressor, cognitive appraisal represents a component of the stress

response, and PTSD represents psychopathology. Thus, we hypothesize that (1) cognitive appraisal will serve as an intermediate variable between the stressor and psychopathology, and (2) cognitive appraisal will serve as a maintaining factor of PTSD, therefore confirming the circular feedback arrow between symptomatology and psychopathology.

Figure 1

The Stress Response Network Model



Note. The model illustrates the three main factors and the four sub-components of the stress response. The arrows illustrate the hypothesized directionality.

Review of the Current Literature

The circular relationship that the model suggests is in line with prior research about the network model of psychopathology. The network analysis views symptoms as constitutive of mental disorders rather than reflective of them. This means that psychopathology emerges from the causal interactions amongst symptoms (McNally, 2016) rather than from an underlying disease, which is what categorical and dimensional models of psychopathology propose (Hayes et al., 1996). Thus, symptoms can circularly activate other symptoms, and this seemingly holds for PTSD as well (McNally et al., 2014). Nonetheless, the network approach is not without its limitations, one of them being that the model is not easily translatable to clinical practice due to the complexity of the model and the limited real-life data extrapolation (Forbes et al., 2019).

Several theoretical models have emphasized the importance of cognition in the onset and maintenance of PTSD. Resick and Schnike (1996) proposed a self-sustaining cycle of psychopathology. They indicated that a failure to cognitively process trauma increases the risk of developing PTSD and gives rise to distorted beliefs such as assimilation (altering information so that it fits with our existing view of the world) and accommodation (altering our view of the world so that new, incompatible information can fit), which in turn maintain PTSD (Bennett et al., 2009). This theory was supported by empirical data, which revealed that negative beliefs about the self and the world perpetuate PTSD (Foa & Rothbaum, 1998; O'Donnell et al., 2007). Negative appraisals and dysfunctional beliefs about the trauma itself were also found to be maintaining factors of PTSD (Bennett et al., 2009).

The type of stressor was deemed an important factor in the severity of psychopathology. Victims of uncontrollable events such as sexual assault tend to attribute blame to behavioural, dispositional and vicarious causes, which leads to poorer outcomes in PTSD (Chivers-Wilson, 2006). Negative cognitive appraisals are more prominent in victims of sexual abuse who have been diagnosed with PTSD in contrast to participants who were not sexually assaulted (Ali & Dunmore, 2002; Dunmore et al., 2001). Key variables involved in the appraisal of sexual trauma are the appraisal of one's thoughts, behaviour and responses during the traumatic event. Specific cognitive factors which have been shown to play a significant role in the onset, severity, and outcome of PTSD following sexual assault are negative appraisals of emotions and symptoms, avoidance, mental defeat, and confusion (Chivers-Wilson, 2006). Moreover, mental defeat and mental planning during trauma are related to the persistence of PTSD after the assault (Dunmore et al., 1997; Dunmore et al., 1999; Ehlers et al., 1998). Appraisals of emotions as uncontrollable, frightening or unacceptable have also been presumed to correlate with more persistent PTSD following

assault, although more empirical data is needed to confirm this assumption (Dunmore et al., 1999).

Given the prevalence of PTSD in victims of sexual violence and the fact that some receive non-empirically supported care (van den Hout et al., 2011), a better understanding of the relationship between the factors involved in psychopathology is needed. This systematic review aims to investigate whether empirical evidence on the current topic supports the proposed model of psychopathology. Thus, it is expected that (1) cognitive appraisal will serve as an intermediate variable between the stressor and psychopathology and that (2) cognitive appraisal will serve as a maintaining factor of PTSD.

Methods

Eligibility Criteria

Studies were included in the analysis if they assessed a sample of adults who experienced sexual abuse past the age of 18 years old. Symptoms of PTSD had to be assessed or a formal PTSD diagnosis must have been recognised before the study. Studies were included if they had a measure of cognitive factors. These could be conceptualised either as participants' global beliefs, appraisals about the trauma or one's behaviour in relation to the trauma, and thoughts related to aspects of the trauma.

The studies comprised three main categories. One category grouped results based on associations between cognitions and PTSD severity. Another category included one study which looked at the mediating effect of cognitions on the relationship between sexual assault and a PTSD diagnosis. The last category is comprised of one study which compared a sample of sexual assault survivors who had and did not have a PTSD diagnosis, across multiple cognitive factors.

Information Sources

Studies were selected following a systematic search across the databases PsycINFO and MEDLINE, last consulted on the 16th of April 2022. Reference sections of relevant publications were screened to identify further relevant literature.

Search Strategy

Different search terms were used for the two databases. The search terms used for PsycINFO were: “cognitive appraisal OR cogniti* AND onset OR maintenance AND ptsd OR post traumatic stress disorder OR posttraumatic stress disorder OR post-traumatic stress disorder AND rape OR sexual assault OR sexual violence OR sexual abuse”.

The search terms used for MEDLINE were: “cognitive appraisal OR cogniti* OR coping AND onset OR maintenance AND ptsd OR post traumatic stress disorder OR posttraumatic stress disorder OR post-traumatic stress disorder AND rape OR sexual assault OR sexual violence OR sexual abuse”.

Selection Process

The screening of the available literature is illustrated through the PRISMA flow chart in Figure 2. The inclusion of the literature was first assessed based on titles and abstracts. Relevant terms such as PTSD, sexual abuse, and cognition were surveyed. The full texts of the suitable studies were then examined. One of the inclusion criteria was that the article had to report a formal method of assessment for the following two concepts: cognitions and PTSD. Other inclusion criteria were: a sample of over 18 years old, sexual abuse having occurred past the victim's age of 18 years old. Studies were excluded if they had no original data, the full text was not available, data overlapped with other articles, and if a clear delimitation between sexual abuse victims and physical abuse victims had not been made.

Data Collection Process

A manual collection of data was employed to gather the relevant data from the reports. The collection was overseen by only one reviewer, the author of this systematic review.

Data Items

Data was sought for relationships between cognitions and PTSD severity or diagnosis. The relationship under investigation could be associative, causal, mediating or moderating. Cognitions were operationalised as thoughts, appraisals, beliefs about the trauma, the victim's behaviour in relation to the trauma, and global beliefs about the world, self and others. These items were explored in relation to PTSD severity (measured across time) or diagnosis (measured in contrast to non-PTSD samples). Moreover, comparisons between PTSD and non-PTSD samples were sought in association with the aforementioned cognitive variables.

Regarding study characteristics, a sample of adult participants who experienced sexual assault was pursued. There was no gender criterion, albeit all studies had a female-only sample. Studies which included samples of participants who experienced childhood sexual abuse were excluded. Nonetheless, some studies were unclear about whether they included samples of participants who experienced assault both in childhood and adulthood. In this case, a decision was made based on the mean sample age reported at the time of the assault. Studies that contained samples whose mean age at the time of the assault was over 20 years old were included.

Study Risk of Bias Assessment

No formal methods of bias assessment were applied. The guideline was that no more than half of the studies included should be based on hand-search.

Effect Measures

The effect measures used in the presentation of results are correlations (*r*), partial-correlations (*pr*), means, effect sizes (*d*), and betas (β).

Synthesis Methods

A manual assessment of each study resulted in an indication of which syntheses were required to conduct a systematic review of the effects. This resulted in the decision to group

data based on cross-sectional and prospective designs, and into cognition groups. Three cognition groups were created: negative cognitions about the self, negative cognitions about the world, and self-blame. All results were converted to Cohen's d effect sizes for the presentation of the results in the forest plots.

Tables and figures were created in Microsoft Office Word and Microsoft Office Excel to tabulate and visually display the results. Three forest plots were used to summarise the information gathered from the studies, at the recommendation of this thesis project's supervisor. No sensitivity analysis was performed.

Reporting Bias Assessment

No formal method of assessing reporting bias was employed.

Certainty Assessment

No formal method of certainty assessment was employed.

Results

Study Selection

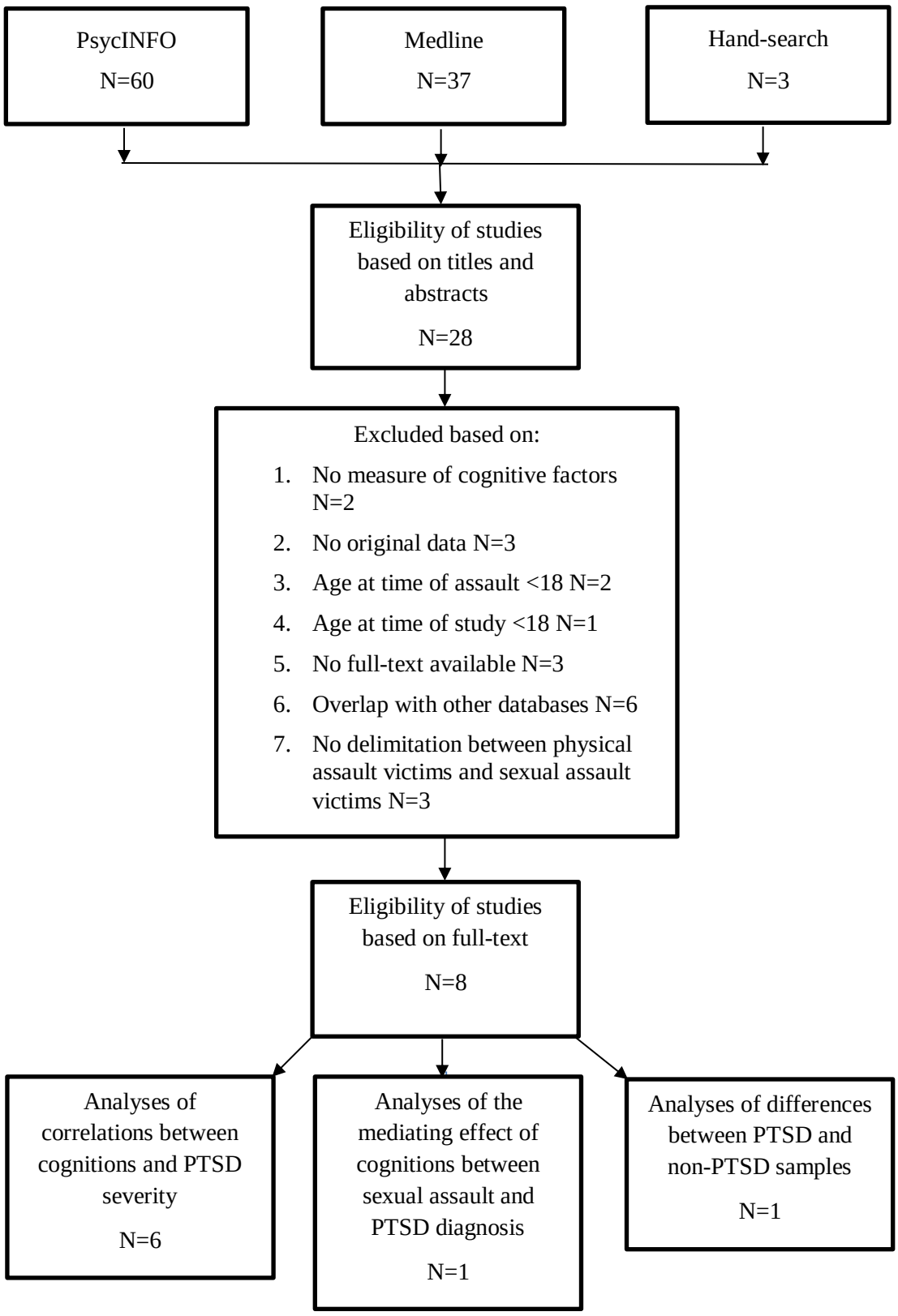
Overall, 100 studies were identified and eight met the inclusion criteria. Figure 2 illustrates the decision-making process of inclusion and exclusion of the relevant literature. The main reasons for excluding studies were the unavailability of full text and the study presenting no original data. Studies were also excluded because there was no formal assessment of cognitive factors. Three studies were excluded because (part of) the sample was underage at the time of assessment and/or because the age of the participants at the time of the assault was below 18 years old.

Risk of Bias in Studies

No formal assessment of the risk of bias in each study was performed. Only published, peer-reviewed studies were included in the data analysis.

Figure 2

Flow Chart



Note. Exclusion and inclusion decision-making diagram.

Study Characteristics

Table 1 summarises the characteristics of all the studies included in the systematic review. Of eight studies, 29 separate effect sizes were extracted. A total of 948 participants were included in the review.

Table 1

Study characteristics

Study	Patients	(n)	Mean Age	Country of origin	PTSD Measure	Cognitive Measure
Fairbrother and Rachman, 2006	PTSD vs non-PTSD	50	24.5	Canada	CAPS	semi-structured appraisals interview
Scher et al., 2017	PTSD	171	32	USA	CAPS	PMBS
Shipherd and Beck, 1999	PTSD vs non-PTSD	36	28.6	USA	PSS-I	Thought-listing data
Kline et al., 2018	PTSD	126	33	USA	PCL-C	RAQ
Shin et al., 2020	PTSD	94	24.7	Korea	PSS-SR	PTCI
Shin et al., 2014	PTSD	37	29	Korea	CAPS	PTCI
Mahoney et al., 2019	PTSD	375	22.7	USA	PCL-5	CSE-T
Koss and Figueredo, 2004	PTSD	59	29.5	USA	Posttraumatic Diagnostic Scale	RAQ, MBS-RD

Note. PTSD = posttraumatic stress disorder; CAPS = Clinician Administered PTSD Scale; PSS-I = PTSD Symptom Scale Interview; PCL-C = PTSD Checklist–Civilian version; PSS-SR = PTSD symptoms scale self-report; PCL-5 = PTSD Checklist for DSM-5; PMBS = Posttraumatic Maladaptive Beliefs Scale; RAQ = Rape Attribution Questionnaire; PTCI = post-traumatic cognitions inventory; CSE-T = Trauma Coping Self-Efficacy Scale; MBS-RD = McPearl Belief Scale-Revision.

Table 2

Data characteristics and effect sizes

Study	Assessment	Design	Cognitions	Results
Fairbrother and Rachman, 2006	cognitions in PTSD vs non-PTSD	cross-sectional	self, world, future	*d*=1.26*, *d*=.72*, *d*=1.84*
Scher et al., 2017	cognitions and PTSD severity	prospective	threat of harm, self-worth and judgement, others	*pr*=.82*, *pr*=.86*, *pr*=.82*
Shipherd and Beck, 1999	cognitions in PTSD vs non-PTSD	cross-sectional	controllability of thoughts during suppression phase	mean=43.59 vs. mean=75.9
Kline et al., 2018	cognitions and PTSD severity	prospective	self-blame	*r*=.29**, *r*=.38**, *r*=.41**, *r*=.33**, *r*=.24**, *r*=.04, *r*=.04, *r*=.10, r=.19**, r=.20**
Shin et al., 2020	cognitions and PTSD severity	prospective	negative self, negative world, self-blame	*r*=.38**, *r*=.50**, *r*=.08, *β* =.307***
Shin et al., 2014	cognitions and PTSD severity	prospective	negative self, negative world, self-blame	*r*=.53**, *r*=.54**, *r*=.62**, *r*=.40***, *r*=.17
Mahoney et al., 2019	cognitions and PTSD severity	cross-sectional	coping self-efficacy	*β*=.20***
Koss and Figueredo, 2004	cognitions and PTSD severity	prospective	maladaptive beliefs	*β*=.52**

Note. *$p < .001$. **$p < .01$. ***$p < .05$.; *d* = Cohen's d; *pr* = partial correlation; *r* = correlation; *β* = beta.

Cross-sectional designs

The studies assessing the difference between PTSD and non-PTSD patients in terms of cognitions following sexual assault had cross-sectional designs. Compared to the non-PTSD sample, participants diagnosed with PTSD rated their appraisals about themselves (*d* = 1.26, *p*

< .001), the world (d = .72, p < .001) and their future (d = 1.84, p < .001) significantly more negatively (Fairbrother & Rachman, 2006). In the study by Shipherd and Beck (1999), there were significant differences between the PTSD sample and the non-PTSD sample in their perceived controllability of thoughts during the suppression phase. The PTSD sample had a significantly reduced perception of controllability of thoughts (mean = 43.59) compared to the non-PTSD sample (mean = 75.90).

Mahoney et al. (2019) also employed a cross-sectional design. Coping self-efficacy was found to be a significant mediator between non-consensual sexual experiences and PTSD symptoms (β = .20, p < .05).

Prospective designs

The majority of the studies included in this systematic review were prospective designs that investigated the relationship between cognitions and PTSD severity following sexual assault. Scher et al. (2017) found that different levels of maladaptive beliefs were highly associated with PTSD severity across different measurement times. Cognitions about threat of harm (pr = .82, p < .001), self-worth and judgement (pr = .86, p < .001), and reliability and trustworthiness of others (pr = .78, p < .001) were all significantly correlated with PTSD symptom severity.

Kline et al. (2018) explored the temporal associations between self-blame and PTSD symptoms. The associations between behavioural self-blame and PTSD symptom severity were significant at all four times of assessments (r=.29, r=.38, r=.41, r=.33; p < .01). However, there was an inconsistent pattern of whether behavioural self-blame predicts PTSD symptom severity at the subsequent time of assessment (r = .24, r = .04, r = .04; p < .01). Moreover, there was also an inconsistent pattern of whether PTSD symptom severity predicts behavioural self-blame at subsequent times of assessment (r=.10, r=.19, r=.20; p < .01).

Shin et al. (2020) investigated the correlations between various subscales of the Post-Traumatic Cognitions Inventory (PTCI) and Posttraumatic Stress Disorder Symptoms Scale (PSS-SR) scores at a one-month follow-up. The negative self subscale ($r = .38$, $p < .01$) and the negative world subscale ($r = .51$, $p < .01$) showed a statistically significant correlation with PSS-SR scores in the high-distress group, while the self-blame subscale did not ($r = .08$). The negative world score of PTCI also contributed to the PTSD symptom severity at the one-month follow-up in the high distress group ($\beta = .307$, $p < .05$).

Shin et al. (2014) prospectively examined the relationship between cognitive factors and PTSD symptom severity after sexual assault. At the initial assessment, the negative self subscale of the PTCI was significantly associated with PTSD severity ($r = .53$, $p < .01$), as was the negative world subscale ($r = .54$, $p < .01$). At the second time of assessment, both the negative world subscale ($r = .62$, $p < .01$) and the negative self subscale ($r = .40$, $p < .05$) were significantly associated with the Clinician-Administered PTSD Scale (CAPS) scores, while self-blame was not ($r = .17$).

Koss and Figueredo (2004) examined the impact of the cognitive mediators of rape on psychosocial health across two years. They converged the factors of Psychopathology, Social Maladjustment and Posttraumatic Stress Symptoms into one general factor called Psychosocial Distress. They found Maladaptive Beliefs to be the only significant predictor of Psychosocial Distress ($\beta = .52$, $p < .01$).

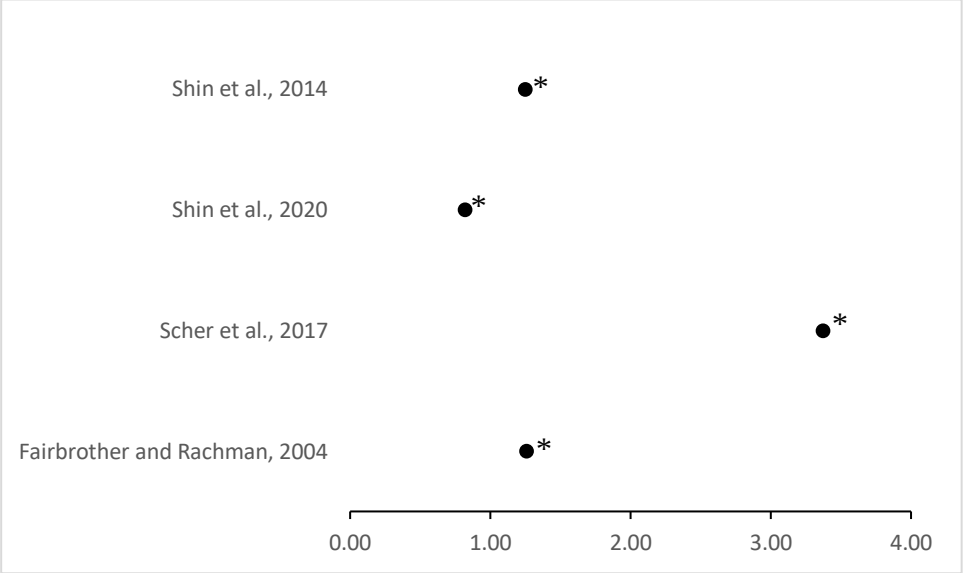
Data Synthesis

Figures 3, 4 and 5 illustrate forest plots aimed at integrating some of the results. The data were synthesized into three separate forest plots, each representing effect sizes for correlations between one of the three conceptualisations of cognitions: negative cognitions about the self, negative cognitions about the world, self-blame and PTSD severity.

Figure 3 presents converted effect sizes of the correlations between negative cognitions about the self and PTSD severity. Figure 4 presents converted effect sizes of the correlations between negative cognitions about the world and PTSD severity. Lastly, Figure 5 illustrates the converted effect sizes of the correlations between self-blame and PTSD severity.

Figure 3

Forest Plot - Negative Cognitions about the Self

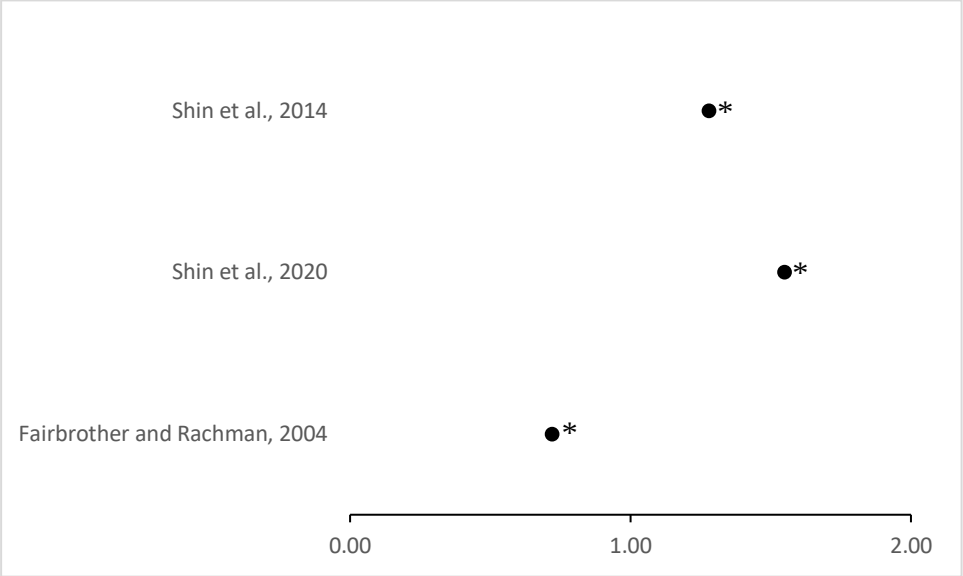


Note. The figure presents the effect sizes of the correlations between negative cognitions about the self and PTSD severity. The asterisk denotes that a confidence interval could not be computed for the reported effect size.

The values illustrating correlations between negative cognitions about the self and PTSD severity ranged from $d = 0.82$ to $d = 3.37$. According to Cohen's guidelines, a value of above $d = 0.8$ can be interpreted as large. Across four different studies, there are very large effect sizes indicating that negative cognitions about the self predict an increased PTSD symptom severity. These results are in line with the first hypothesis regarding the role of cognition in PTSD symptom severity.

Figure 4

Forest Plot - Negative Cognitions about the World

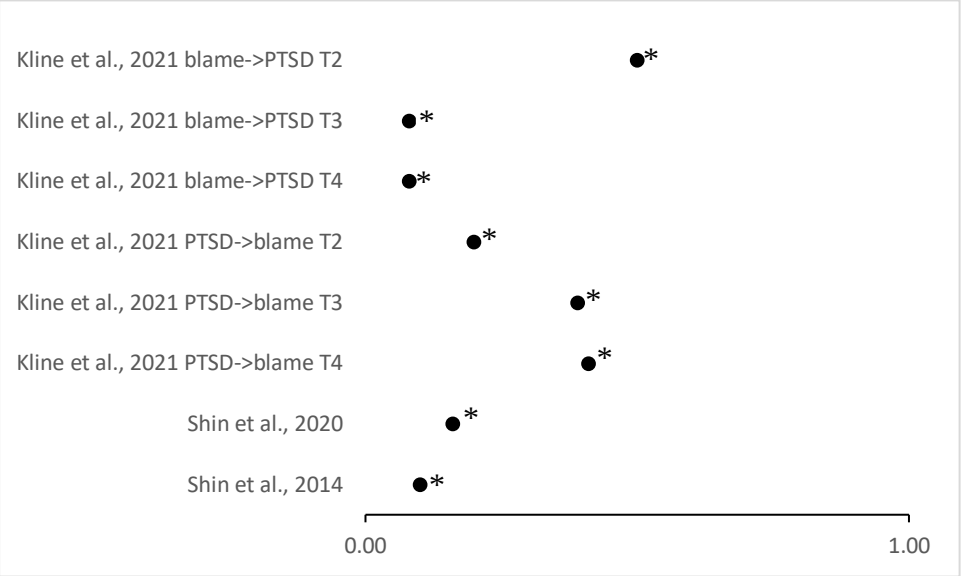


Note. The table presents the effect sizes of the correlations between negative cognitions about the world and PTSD severity. The asterisk denotes that a confidence interval could not be computed for the reported effect size.

Figure 4 displays the effect sizes of three studies that looked at the relationship between negative cognitions about the world and PTSD severity. The values ranged from d = 0.72 to d = 1.55, thus indicating a moderate to large association between the variables. These results are confirmatory of the first hypothesis regarding the role of cognition in PTSD symptom severity.

Figure 5

Forest Plot - Self-Blame



Note. The table presents the effect sizes of the correlations between self-blame and PTSD severity. The studies by Kline et al., 2021 look at the predictive relationship between blame and PTSD, and PTSD and blame. T2 = second time of assessment, T3 = third time of assessment, T4 = fourth time of assessment. The asterisk denotes that a confidence interval could not be computed for the reported effect size.

The third forest plot indicates a variety of results ranging from non-significant d = 0.08 to moderate d = 0.5. The data synthesis corresponding to self-blame illustrates lower values overall compared to the previous conceptualisations (negative cognitions about the self and negative cognitions about the world). The third data synthesis neither confirms nor disconfirms the first hypothesis regarding the role of cognition in PTSD symptom severity.

Reporting Biases

No formal assessment of the risk of bias due to missing results for each synthesis was employed.

Certainty of Evidence

No formal assessment of the certainty of the evidence was performed.

Discussion

The overarching aim of this systematic review was to investigate the state of the current research in order to explore whether enough evidence can be found to provisionally confirm the Stress Response Network Model. I investigated the link between cognitive appraisal and psychopathology, more specifically in terms of cognitions and PTSD severity following sexual assault. Hypothesis one stated that cognitive appraisal would serve as an intermediate variable between sexual assault and PTSD severity. The second hypothesis proposed that cognitive appraisal is a maintaining factor of PTSD, thus confirming the circular feedback arrow between cognition and psychopathology. The hypotheses were generally in line with prior research which established that negative cognitions perpetuate PTSD symptomatology in victims of sexual abuse (Dunmore et al., 1997; Dunmore et al., 1998; Foa & Rothbaum, 1998; O'Donnel et al., 2007; Resick & Schnike, 1996).

The cross-sectional designs were all in line with hypothesis one. Fairbrother and Rachman (2006) and Shipherd and Beck (2009) found that participants who had been sexually abused and had a PTSD diagnosis reported more negative cognitions and lower controllability of thoughts compared to participants who were sexually abused but had not developed PTSD. Mahoney et al. (2019) found coping self-efficacy to be a mediator between sexual abuse and PTSD severity.

Prospective designs allow for the investigation of the relationship between cognitive appraisal and PTSD severity across time. Five studies found various conceptualisations of cognition to be maintaining factors of PTSD and to contribute towards PTSD symptom severity, thus confirming hypothesis two. Overall, the largest effect size was found by Scher et al. (2017). After conversion to Cohen's d, their analysis regarding the association between self-worth and PTSD symptom severity was $d = 3.371$, an extremely large effect size according to Cohen's guidelines.

Three studies investigated self-blame amongst other variables and found mixed results. While the study by Kline et al. (2018) found self-blame to be associated with PTSD symptom severity across four different measurement times, they could not establish a clear pattern of whether behavioural self-blame predicted PTSD symptom severity at a subsequent time of assessment. This is a complex finding because although they found behavioural self-blame to be predictive of PTSD severity at Time 2, the reason they did not find behavioural self-blame to be predictive of PTSD severity at other subsequent times was that PTSD symptom severity became predictive of behavioural self-blame instead. This result reflects a complex bidirectional relationship between the stress response and psychopathology. Other studies that found inconsistent results in terms of cognition were the ones conducted by Shin et al. (2014) and Shin et al. (2020). While they found negative cognitions about the self and the world to be highly associated with PTSD severity at follow-ups, they did not find significant associations between self-blame and PTSD severity.

Data syntheses were performed for three separate clusters of cognitions: negative cognitions about the self, negative cognitions about the world, and self-blame. The original data was converted to Cohen's d effect sizes for interpretation reasons. The first data synthesis, corresponding to the relationship between negative cognitions about the self and PTSD symptom severity yielded the largest effect sizes. The second synthesis, corresponding to the relationship between negative cognitions about the world and PTSD symptom severity also yielded moderate to very large results, but overall smaller effect sizes than the previous data synthesis. Both syntheses led to the confirmation of hypothesis one. The forest plot corresponding to the relationship between self-blame and PTSD severity indicates a more complex situation. While the studies by Shin et al. (2014) and Shin et al. (2020) showed non-significant values (d = 0.10 and d = 0.16), the values presented by Kline et al. (2018) across different time-points ranged from non-significant (d = 0.08) to moderate (d = 0.50). The latter

study found that self-blame predicted PTSD symptom severity at Time 2, but that PTSD symptom severity predicted self-blame at Time 3 and Time 4. As previously stated, this result, in particular, supports the second hypothesis, while the overall plot neither confirms nor disconfirms the first hypothesis. One possible explanation for the discrepancy between studies in terms of self-blame could be that Shin et al. (2014) and Shin et al. (2020) both used the PTCI Blame subscale, which has previously been reported to be indiscriminate between behavioural and character self-blame (Beck et al., 2004; Startup et al., 2007). In contrast, the study by Kline et al. (2018) used the Rape Attribution Questionnaire as a direct assessment of behavioural self-blame.

One conclusion that can be drawn from this systematic review is that the data is indeed in line with the Stress Response Network Model. The difference between sexually assaulted women who had been given a PTSD diagnosis and those who had not developed psychopathology is that the first group endorsed significantly more negative cognitions across different studies, while the second group did not (Fairbrother & Rachman, 2006; Shipherd & Beck, 1999). As such, cognition serves as an intermediate variable between a stressor and psychopathology. Moreover, prospective studies showed that the relationship between various conceptualisations of cognitions and PTSD symptom severity is bidirectional. In other words, cognitions serve as a maintaining factor of psychopathology.

Limitations and Future Directions

Limitations of the Systematic Review

This systematic review has some limitations. Amongst the most important ones is the fact that there was no second reviewer involved in the study selection and/or data collection. As such, the probability of reporting bias cannot be excluded. Nonetheless, a description of the step-by-step selection process is offered, making replication possible. One other limitation is that due to the tremendously different methodology used within each study, the data

synthesis may present misleading results. While the data was separated into cross-sectional designs and prospective designs, the methodology of the studies within each of these categories was still disparate. In the same line of reasoning, the different conceptualisations of cognition make it so that a clear grasp of whether the studies measured the same construct cannot easily be made. Moreover, confidence intervals could not be calculated and thus, an accurate understanding of the limitations of the reported estimations cannot be established.

Limitations of the Included Studies

A limitation of the studies included in this systematic review is that most cannot prove causation. Thereby, claims of whether negative cognitions determine PTSD or whether PTSD generates negative cognitions cannot be established. Another characteristic of the studies involved which may be interpreted as a limitation is the fact that the samples consisted solely of women. Since the majority of sexual assault perpetrated against men is not reported (Doherty & Anderson, 2004), it is also reasonable to believe that studies focusing on sexual assault of a mixed-gender sample are less common. Nonetheless, some of the few studies conducted on male samples show that male victims of sexual abuse have more psychiatric symptoms, a higher degree of distress, and more psychiatric hospitalisations than female victims (Kimerling et al., 2002; Tewksbury, 2007). Thus, future researchers should try to collect data from a mixed-gender sample and not gather data solely from female-only centres for victims.

Due to the discordant nature of results on self-blame, future experimental studies can focus on this variable in order to bring more clarity to the current body of research. One implication of the limited number of studies included in this systematic review is also that more research is needed in this area altogether. Given the mostly large significant associations between cognitions and PTSD symptom severity following sexual assault, the scientific world would benefit from more research being conducted on this topic. Moreover, since the Stress

Response Network Model was provisionally confirmed, future research could explore the relationship between cognition and PTSD following other stressors as well, such as military combat or sudden death.

Theoretical and Practical Implications

Clear implications follow from this systematic review. A key difference between sexually assaulted women who develop PTSD and those who do not partly lies in the type of cognitions they endorse. Perceived uncontrollability of thoughts, negative cognitions about the self, the world and the future, reduced coping self-efficacy, maladaptive beliefs, decreased self-worth, and to some extent, behavioural self-blame all contribute to the development and maintenance of PTSD following sexual assault. These findings suggest that some women may still preserve a baseline level of functioning even after such a horrific event, as long as they do not endorse negative cognitions (Fairbrother & Rachman, 2006; Shipherd & Beck, 2009). A way to decrease the likelihood of victims developing PTSD is to make mental health relief available to sexually assaulted survivors as soon as possible (Bragesjö et al., 2020). One form of psychotherapy directly aimed at cognitions is cognitive therapy. Researchers have also developed cognitive therapy for PTSD patients (CT- PTSD), which shows robust results in terms of effectiveness (Ehlers et al., 2013). Nonetheless, these steps can only follow a chronological sequence. In order to make sure that victims receive the help they need, we have to hope that law enforcement procedures and justice systems across the globe make it more likely for sexual assault victims to come forward in the first place, regardless of gender.

Conclusions

Taken together, the results are in line with previous research, which deemed cognition an important factor in the development and maintenance of PTSD (Resick & Schnike, 1996; Foa & Rothbaum, 1998; O'Donnell et al., 2007). Moreover, the data is confirmative of the Stress Response Network Model, more specifically of the directionality of the model, which

proposes that stress is followed by a stress response which determines and is in turn determined by psychopathology. Future research could examine other parts of the model, as well as various combinations of stressors, stress responses and psychopathology.

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