Cognitive Appraisal as a Mediator of the Relations between War Experiences and PTSD in the Formerly-abducted Youth in northern Uganda: Findings from the WAYS Study

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ABSTRACT

Objective: Exploring risk factors for Post-Traumatic Stress Disorder (PTSD) in war-affected populations is critical for the refinement and adaptation of therapies for this condition. However, few studies have examined this link, particularly the roles that cognitive appraisal processes play. **Method:** We explored the degree to which various types of cognitive appraisal mediate the connections between prior war experiences and PTSD symptoms in formerly abducted youths. A sample of 476 ($\mathbf{M}_{age}$ = 23.83; ± 9.58; Range: 19–27 years) formerly abducted youths in northern Uganda were included in the study. The post-war screening survey, the revised Impact of Events Scale (IES-R), and the Trauma Appraisal Questionnaire (TAQ) were used to obtain information on war experiences, PTSD symptoms, and trauma appraisal, respectively. **Results:** War experiences significantly predicted PTSD symptoms (**β** = 0.47, 95% CI: (0.37, 0.57). The coefficients for the link between war experiences and PTSD symptoms decreased by between 44.7% [95% CI 29.7%, 59.7%] and 57.4% [95% CI 33.4%, 71.4%] for all trauma appraisal subscales, indicating partial mediation. The associations between war experiences and PTSD symptoms were attenuated but remained significant. **Conclusion:** Each trauma appraisal subscale partially mediated the association between war experiences and PTSD symptoms. The level of mediation by the various subscales of trauma appraisal was moderately large, suggesting that interventions targeted at changing maladaptive trauma cognitions may reduce the influence of war experiences on PTSD symptoms.

Keywords: War experiences; PTSD symptoms; trauma appraisal, formerly abducted youths, Northern Uganda

Clinical Impact Statement

Cognitive appraisal accounted for a considerable portion of the relationship between war experiences and PTSD symptoms. Interventions aimed at altering maladaptive trauma cognitions may reduce the negative impact of war experiences on PTSD symptoms.

INTRODUCTION

Post-traumatic stress disorder (PTSD) is one of the most reported post-war mental health problems [Amone-P'Olak et al., 2007; Betancourt et al., 2013; Charlson et al., 2016; Morina et al., 2018; Steel et al., 2009; McMullen et al., 2012]. Several systematic reviews of refugee and conflict-affected populations have consistently reported varied rates of mental health problems, including PTSD and depression among survivors of wars and natural disasters [Steel et al., 2009]. Even though disasters and violent conflicts are associated with numerous mental disorders, a range of factors may influence the ability of survivors to successfully adapt to post-war environments and their likelihood of developing PTSD [Morina et al., 2018]. Three main clusters of symptoms characterise PTSD: hyper-arousal (e.g., hypervigilance for potential threats), re-experiencing (e.g., flashbacks, trauma memories), and avoidance (e.g., avoiding places similar to where the trauma occurred or avoiding talking about the trauma). These symptoms often impact the lives of survivors and may persist for a long time (5th ed.; DSM–5; American Psychiatric Association (APA), 2013). The Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) now clearly recognizes trauma-related cognitive appraisals as diagnostic criteria critical to the onset and course of PTSD [Valdez et al., 2021]. The DSM-5 symptoms, such as intrusive memories, distressing dreams, and flashbacks, are particularly relevant for cognitive appraisals.

Several factors are known to account for individual differences in PTSD and other mental health problems among survivors of violent conflicts. Such factors include but are not limited to different types of war events experienced [Amone-P'Olak, et al., 2014a; Johnson & Thompson, 2008; Kohrt et al., 2008; McMullen et al., 2012], coping and emotional regulation [Amone-P'Olak, et al., 2007; Amone-P'Olak, et al., 2019], post-war environmental stressors [Amone-P'Olak, et al., 2014a; Amone-P'Olak, et al., 2014b; Fernando, et al., 2010; Kohrt et al., 2008; Miller & Rasmussen, 2010; Morina et al., 2018], and stigma and community relations [Amone-P'Olak et al., 2016; Cloitre et al., 2008].

Northern Uganda experienced a ruthless and horrendous two-decade war (1986 –2006) that resulted in the abduction of about 50,000 people, of whom 30,000 were children. Close to two million people were internally displaced at the height of the conflict [UNICEF, 1998]. About one in three of the abducted children were girls, 65% of whom were sexually abused, with one in three returning from rebel captivity with children by rebel soldiers and commanders [Amone-P'Olak, 2005; Amone-P'Olak et al., 2016; Amone-

P'Olak et al., 2015]. Abduction and rebel captivity were characterised by torture, injuries, war experiences, being used as a human shield, and being forced to beat, mutilate or kill fellow abductees or civilians; such experiences are correlated with more severe mental health problems, including PTSD [Amone-P'Olak, 2004, 2009; Amone-P'Olak, et al., 2013; Betancourt et al., 2010; Boothby, 1996; de Jong, 2002; Derluyn et al., 2004; Dokkedahl, et al., 2015].

Previous studies have reported different prevalence rates for PTSD, ranging from 30 to 90 per cent [Amone-P'Olak et al., 2007; Derluyn et al., 2004; Okello et al., 2007; McMullen et al., 2012]. In previous studies with the same population, the prevalence rate of PTSD was estimated to be between 37.6 and 43.0 per cent [Amone-P'Olak et al., 2022; Amone-P'Olak et al., 2018]. Several reasons may account for these variations in PTSD prevalence, including the use of different instruments, study designs, and sampling strategies, time since the war, and the place where data were gathered (e.g., internally displaced peoples' camps vs villages). More importantly, differences in PTSD could also be due to differences in how particular survivors of violent conflicts experience feelings of guilt and shame or appraise their trauma [Derluyn et al., 2013; Annan et al., 2006; Wainryb, 2011]. Consequently, the appraisal of traumatic experiences may explain why some survivors endure persistent PTSD. Few studies have explored the extent to which cognitive appraisal mediates the relationship between war experiences and poor mental health in the war-affected population of northern Uganda.

Similarly, past studies have also demonstrated that certain personality characteristics may be linked to appraisal and coping with stress [Shewchuk et al., 1999]. The main goals of cognitive therapy for PTSD are to help the patients assess some of their appraisals and comprehend how they interpret their experiences. A person's perception of their trauma and its effects, according to the Ehlers & Clark model, may be what keeps them feeling threatened in the present. Likewise, Costa and McCrae [1990] proposed that personality traits may be infused with appraisal and coping characteristics. Thus, certain personality traits may be associated with appraisal types like fear, alienation, anger, shame, betrayal, and self-blame. For example, anger, impulsiveness, and self-blame are known to be characteristics of neuroticism, which, in turn, shapes the perception of stress [Shewchuk et al., 1999]. Maladaptive cognitive emotion regulation strategies, such as self-blame, blaming others, ruminating, and catastrophising, were found to be substantially linked to adverse mental health outcomes in a study with the same population [Amone-P'Olak & Omech, 2020]. On the contrary, reporting fewer symptoms of mental health problems was linked to adaptive cognitive emotion

regulation techniques (e.g., putting things into perspective) [Amone-P'Olak & Omech, 2020]. Consequently, appraisals may be causal risk factors for PTSD in survivors of war [McNally & Woud, 2019].

Studying specific intermediary factors such as cognitive appraisal may illuminate the mechanism through which war experiences exert their influence on PTSD. It is crucial to study the roles of appraisal types in the relationships between war experiences and PTSD for several reasons. First, understanding how people appraise extreme stressors such as war experiences might be useful since it may shed light on the link between significant life events and particular outcomes like PTSD. Second, the results of such studies can inform psychological interventions for PTSD.

Cognitive appraisal involves a person's assessment or judgment of a potential stressor in terms of its meaning and significance to their safety, as outlined by Lazarus and Folkman [1984]. Recognised as pivotal factors in evaluating traumatic experiences and influencing the course of PTSD, cognitive models play a crucial role in individual differences, as highlighted by Dunmore et al. (1997). Lazarus and Folkman's Cognitive Appraisal Theory (CAT) defines the process as a two-stage evaluation: primary and secondary appraisal [Lazarus & Folkman, 1984]. In the primary stage, individuals assess a situation as negative (stressful), positive (a challenge), or irrelevant. The subsequent secondary appraisal involves determining one's capacity and available resources to cope with stress [Lazarus & Folkman, 1984].

In situations where an individual possesses the ability and sufficient resources, adverse outcomes are minimized, and effective or adaptive coping occurs. Conversely, those with limited coping abilities and resources are more likely to experience negative psychological outcomes [Lazarus & Folkman, 1984]. According to Lazarus and Folkman's transactional model of stress and coping [1987], the interplay of cognitive appraisal processes, a person's coping ability, and available resources shape an individual's subsequent appraisal of an event [Lazarus, 1990]. Consequently, if an individual perceives an event (e.g., a war event) as stressful and recognizes a lack of ability or resources to cope, they are likely to experience psychological distress, such as PTSD. Previous studies have demonstrated that appraisals of traumatic events play a key role in the persistence of PTSD [Ehlers & Clark 2000]. Negative appraisals may reinforce avoidance, thus impeding cognitive processing of trauma [Dalgleish et al. 2005]. Similarly, studies of PTSD in child accident and assault victims have shown a deleterious influence of negative appraisals on emotional well-being in the aftermath of a traumatic event [Meiser-Stedman et al. 2009; Meiser-Stedman et al. 20019]. Equally, Salmon and colleagues [2007] have also demonstrated that negative appraisals of personal

susceptibility and possible future impairment explained differences in PTSD after traumatic events. However, this literature is largely in high-income countries and involves participants who had been exposed to single-incident traumas, rather than the repeated traumas associated with war like in Africa.

The present study

The **W**ar-**A**ffected **Y**outh **S**urvey (WAYS) study is an ongoing longitudinal study of mental health problems in formerly abducted youth in Northern Uganda. In particular, the WAYS study aims to identify factors that contribute to the persistence of mental health problems. Based on the literature highlighted above, we hypothesized that cognitive appraisal would mediate the relationship between war experiences and PTSD symptoms in formerly abducted youth in Northern Uganda. Specifically, the objectives of the current study were threefold: 1) to assess the prevalence of PTSD, 2) to assess whether previous war experiences predict present PTSD, and 3) to examine whether the associations between previous war experiences and current PTSD are mediated by different types of trauma appraisal. Based on the literature on war experiences and PTSD in war-affected youth [Amone-P'Olak et al., 2017; Betancourt et al., 2013; Charlson et al., 2016; Steel et al., 2009], we hypothesised that war experiences would be significantly associated with PTSD.

Method

Design

The WAYS study employed a longitudinal cohort study design. War experiences, socio-demographic characteristics and psychosocial outcomes such as depression, anxiety, conduct problems, somatic complaints, and psychotic symptoms, among others, were assessed at baseline (T1), four years after cessation of the war. At T2, over a year later, participants completed measures of PTSD symptoms and cognitive appraisals.

Participants and study setting

Participants were selected from a longitudinal cohort study of formerly abducted youths in the WAYS study described above and in a cohort profile elsewhere [Amone-P'Olak et al., 2013]. The formerly abducted youths were sampled using a cluster sampling method based on a list previously put together during the war by UNICEF to aid district local governments in the conflict zone. The list was used to

distribute relief items to the formerly abducted youth who returned from rebel captivity as a resettlement package during community reintegration. The criteria applied to recruit the formerly abducted included: a) a history of abduction by rebels, (2) having lived in rebel captivity for at least six months, and (3) being aged between 18 and 25 years. Those who met the above inclusion criteria were invited through their local council leaders to participate in the study. At baseline (T1), 529 youth participated (61% male, $n = 329$), and at follow-up (T2), 476 (90.0% of baseline; 62% male, $n = 285$) supplied data for the study. Baseline differences between participants who completed follow-up assessments and those who did not were found for a few socio-demographic variables. Those who completed the follow-up assessments were older and more likely to be married. There were no significant differences regarding war experiences and mental health outcomes (e.g., depression, anxiety or PTSD).

Procedure

Research assistants who conducted the data collection were university graduates who had received extensive training in data collection and were fluent in the spoken and written native language of the participants. The research assistants were from the humanities and social sciences (e.g., history, political science, sociology, social work, etc.) and had participated in various previous UNICEF surveys. The training included data collection methods, interview techniques, ethical considerations, mental health first aid, etc. The research assistants visited the participants at their residences, local community or trading centres to administer questionnaires covering a wide range of topics. The questionnaire sought information on sociodemographic characteristics (e.g., age, sex, marital status, etc.), experiences before, during and after the war, appraisal and coping styles, and mental health outcomes (such as PTSD). A Clinical Psychiatric Officer was on standby to manage any mental health emergencies and refer participants to the Regional Referral Hospital in the event of severe depression or potentially harmful behaviour. All participants provided written informed consent in compliance with ethical standards and authorisations. Written informed consent was sought before data gathering. The Institutional Review Board (IRB) of Gulu University and Uganda National Council for Science and Technology granted ethics approval for the study.

Measures

Data were collected using instruments that were translated into Luo, the native language of the respondents, by experts fluent in both the English language and Luo, and back-translated to English by a different set of experts from Gulu University's Department of Languages. The back-translated version was then compared to the original version in English to minimize the chance of loss of meaning frequently related to challenges associated with translation. To ensure that the instruments were culturally germane and sensitive, they were pilot-tested with 64 participants and later adjusted. Those who participated in the pilot study were not included in the study. Gender, age at both abduction and at the time of data collection, and duration in captivity with the rebel forces were all assessed through self-reporting.

War experiences. Items from the UNICEF B&H (Bosnia and Herzegovina) Post-war Screening Survey [UNICEF, 2010] were used to measure exposure to various war experiences. To reflect the reality and character of the war in Northern Uganda, the UNICEF B&H questionnaire was modified by including items on knowledge of, witnessing, and being sexually assaulted and/or abused. Altogether, 52 items on diverse war experiences were included. The war events included sexual abuse (one item), involvement in hostilities (two items, e.g., did you fight in the army or warring faction?), and personal harm (six items, e.g., serious injuries). Other war experiences include separation (two items), harm to loved ones (four items), deaths (seven items, e.g., deaths of parents, siblings or extended family members), material loss (four items), and physical threat to self (five items), physical threat to relatives or loved ones (four items), displacement (five items), and forced to use drug and substances (one item). The war experiences items were dichotomously coded for occurrence (1) and absence (0).

PTSD Symptoms: The revised version of the Impact of Events Scale (IES-R) developed by Weiss and Marmar (1997) was used to assess PTSD symptoms. The IES-R is a 22-item Likert-type scale with ratings ranging from 0 (*not at all*) to 4 (*extremely*) about what the respondents experienced in the past week concerning their past traumatic event. The IES-R comprises three subscales: Intrusion (7 items), Avoidance (8 items), and Hyper-arousal (7 items), altogether 22 items for the IES-R total scale [Weiss & Marmar, 1997]. The internal consistency for the IES-R scale measured by Cronbach alphas was reported to be acceptable, ranging from .87 to .92 [Weiss & Marmar, 1997; Wilson & Keane, 1997]. Based on the current study, the Cronbach alphas ranged from $\alpha = 0.81$ to 0.89. A score of 33 or more denotes likely PTSD [Horowitz et al., 1979; Weiss & Marmar, 1997].

Trauma Appraisal Questionnaire (TAQ): The 54-item self-report TAQ was developed by DePrince and colleagues (2010) to assess negative trauma appraisals. The TAQ has six subscales: betrayal, self-blame, fear, alienation, anger, and shame. Some of the items include "I felt ashamed" (shame), "I must have done something awful to make this happen" (self-blame), "I cut myself off from other people" (alienation), "I wanted revenge" (anger), "I felt betrayed" (betrayal), and "I was always on alert for danger" (fear). The items were rated from strongly disagree (1) to strongly agree (5). All the items were specifically linked to war experiences (e.g., having been abducted, being held in captivity, participating in battles, escaping from captivity, etc.). For example, "I was always on alert for danger as a result of the war (e.g., having been abducted, being held in captivity, participating in battle, escaping from captivity, etc)" (fear).

Scores indicated the mean of respondents' ratings on each of the items. Participants' scores for each subscale were added and divided by the number of items in each subscale to obtain the average score for each respondent, with higher scores indicative of stronger appraisals. The reliability, validity, and internal consistency of the subscales in the TAQ have all been shown to be very good across varied ethnicities, ages, and different types of trauma events [DePrince et al., 2010]. In this study, the internal consistency measures by Cronbach's alpha ranged from $\alpha = 0.81$ to $\alpha = 0.92$. To address measurement invariance, we performed principal component analyses (PCAs) using the direct oblimin rotation method for the 54-item Trauma Appraisal Questionnaire (TAQ) based on scores of the entire sample (N = 476). The number of factors in the TAQ scale was determined by examining the eigenvalues in the scree plot (Cattell, 1966) and using the eigenvalue rule (Kaiser, 1960). A Kaiser– Meyer–Olkin (KMO) of 0.703 was obtained (the recommended value is 0.6). When the analyses were stratified by sex, the differences were insignificant.

Statistical analyses

The socio-demographic characteristics of the study population are presented in Table 1. Gender differences regarding PTSD and cognitive appraisal were computed using t-tests. The indirect influence of war experiences on PTSD via the different subscales of the trauma appraisal (*betrayal, self-blame, fear, alienation, anger,* and *shame*) was examined. Given the correlation between each of the TAQ scales, the presence of multicollinearity was a concern. To address this concern, we used the Variance Inflation Factor (VIF) [Glantz & Slinker, 1990] to quantify the threat posed by multicollinearity. A VIF of < 10 is deemed to indicate substantial multicollinearity, and values of 4.0 may be cause for concern. To ensure that all the

variables were comparable, all the variables in the mediation model were standardized to a mean of zero and SD of 1 (z scores). The SPSS PROCESS v.3.2 macro was used to carry out the mediation analyses according to the updated methods proposed by Hayes and his colleagues [Hayes, 2013; Hayes and Rockwood, 2017; Hayes and Preacher, 2010]. In this method, the indirect effect, the product of "a" and "b," instead of each path individually, was used. For this reason, we performed mediation analyses using the PROCESS application in SPSS [Hayes, 2013]. Following Hayes' generic model, we set war experiences as the independent variable, PTSD symptoms as the dependent variable, and various types of trauma appraisal as mediators. We used separate models to assess the influence of each appraisal type. We utilised bootstrapping methods to get 95% confidence limits (95% Confidence Interval [CI]) in all the mediation model fits [Preacher & Hayes, 2008]. CI based on the bias-corrected bootstrapping method is recognised as more dependable for calculating mediated effects [MacKinnon et al., 2004]. War experiences, trauma appraisal subscales, and PTSD were all fitted into the model as continuous variables. We considered gender to be a potential confounder and adjusted for its effect in all analyses. The level of significance was chosen at 0.05 (two-sided) and 95% confidence intervals (95% CI) were provided with the odds ratios. All analyses were conducted using IBM SPSS (v29).

RESULTS

Socio-demographic characteristics of the study population

Table 1 provides a summary of the study population's demographic characteristics. In total, 539 and 476 formerly abducted children took part in the study at baseline (T1) and follow-up (T2), respectively. The youth were abducted when they were, on average, 14.0 years old (***SD*** = 4.2; range = 7 – 25 years). At T1 and T2, the participants were 22.4 years old (***SD*** = 2.2; range = 18 – 25 years) and 23.8 years old (***SD*** = 2.3; range = 19 – 27 years), respectively [Amone-P'Olak et al., 2017]. The formerly abducted children spent a mean of 3.1 years in captivity (***SD*** = 3.0; range = 0.5 – 17.0 years). Table 1 includes descriptive statistics for war experiences and several trauma appraisal subscales. The youth experienced a high number of war events (Table 1). There were 295 (62.0%) male respondents at follow-up (T2), and the mean (***SD***) age of the respondents was 25.3 (***SD*** = 9.3) years. The overall Cronbach's alpha reliability of the IES-R scale was **α** = 0.81, while the Cronbach alpha reliabilities for the subscales ranged from **α = 0**.76 to **α** = 0.82.

According to the global IES-R score and to answer our first question regarding the prevalence of PTSD, 37.6 per cent met the threshold for PTSD at T2 (IES-R score ≥ 33, range 0-88) [Amone-P'Olak et al., 2022].

Table 1

Mean, SD, range for continuous variables, and bivariate correlations among independent variables

	Total (*N*=539, 100%)			**Male (T1: *n*=329, 69%; T2: n=295, 62%)**			**Female (T1: *n*=210, 31%; T2: n=181, 38%)**			**T-test**
	Mean	**SD**	**Range**	**Mean**	**SD**	**Range**	**Mean**	**SD**	**Range**	
Age at abduction	14.14	±4.21	07 - 28	14.96	±4.30	07 - 28	12.86	±3.72	07 - 28	$t = 4.80$, $df = 535$, $p < 0.001$
Age at T1	22.39	±2.03	18 - 25	22.86	±1.79	18 - 25	21.92	±2.83	18 - 25	$t = 2.43$, $df = 537$, $p < 0.05$
Age at T2	23.87	±1.89	20 - 27	24.32	±2.16	20 - 27	23.41	±2.13	20 - 27	$t = 2.31$, $df = 475$, $p < 0.05$
Duration in captivity	3.13	±2.99	0.5 - 15	2.91	±2.69	0.5 - 15	3.84	±3.40	0.5 - 15	$t = -2.16$, $df = 537$, $p < 0.05$
War experiences	41.70	±4.20	00 - 52	42.01	±3.47	00 - 52	41.27	±5.05	00 - 52	ns
PTSD	54.4	±6.10	00 - 88	51.3	±5.7	00 - 88	57.5	±6.5	00 - 88	$t = -3.42$, $df = 475$, $p < 0.01$
Betrayal	2.63	1.07	1.00 - 4.90	2.60	1.03	1.00 - 4.90	2.66	1.17	1.00 - 4.90	ns
Self-blame	1.72	0.87	1.00 - 4.64	1.59	0.71	1.00 - 4.64	1.85	0.97	1.00 - 4.64	$t = -4.23$, $df = 473$, $p < 0.001$
Fear	1.80	0.72	1.00 - 4.73	1.64	0.66	1.00 - 4.73	1.96	0.81	1.00 - 4.73	$t = -4.43$, $df = 473$, $p < 0.001$
Alienation	2.53	0.97	1.00 - 4.68	2.49	0.89	1.00 - 4.68	2.57	1.01	1.00 - 4.68	ns
Anger	2.23	0.95	1.00 - 5.00	2.44	0.98	1.00 - 5.00	2.02	0.88	1.00 - 5.00	$t = 5.07$, $df = 472$, $p < 0.001$
Shame	2.19	1.03	1.00 - 4.88	2.03	1.03	1.00 - 4.88	2.35	1.03	1.00 - 4.88	$t = -4.62$, $df = 471$, $p < 0.001$

PTSD = posttraumatic stress disorder; SD Standard deviation; ns not significant

* $p < 0.05$; ** $p < 0.05$; *** $p < 0.001$

Table 2 shows the results of our second objective. The number of war experiences significantly predicted PTSD (i.e. the total effect; $\boldsymbol{\beta} = 0.47, 95\%\ \mathbf{CI} 0.37, 0.57)$). The proportion of explained variance for the model demonstrated adequate fit ($\boldsymbol{R}^2 = 0.22$; $\boldsymbol{F}_{(3,473)} = 68.23$, $\boldsymbol{p} < .001$).

Results for the third objective, understanding the mediating roles of the different subscales of the trauma appraisal questionnaire (assessed at T2) on the relationship between previous war experiences (retrospectively assessed at T1) and PTSD (assessed at T2) are presented in Table 2. The number of ***SD*** changes in the dependent variable (PTSD) for each ***SD*** change in the independent variable (war experiences) is represented by a regression coefficient. For instance, a change of one ***SD*** in war experiences is correlated with a change of 0.47 SD in PTSD, according to the regression of PTSD on war experiences.

Overall, the model indicated adequate fit and improved from $\boldsymbol{R}^2 = 0.22$ ($\boldsymbol{F}_{(3,473)} = 68.23, \boldsymbol{p} < .001$) to $\boldsymbol{R}^2 = 0.38$ ($\boldsymbol{F}_{(3,473)} = 88.19, \boldsymbol{p} < .001$) for the different subscales. To appreciate this more, we examined the reduction in coefficients of the relations between war experiences and PTSD. For all the different subscales of trauma appraisal, the coefficients were reduced by between 44.7% [95% CI of 29.7% to 59.7%] and 57.4% [95% CI of 33.4% to 71.4%] (see Table 2). Nevertheless, for all the subscales of the trauma questionnaire, the direct effect of war experiences on PTSD attenuated but remained statistically significant, indicating partial mediation for all the subscales. Given that all the VIF statistics in the current study were below 3.0, multicollinearity did not pose a significant problem to the results.

Table 2

Mediation results

Mediator	a path β (95% CI)	b path β (95% CI)	Indirect effect (c) β (95% CI)	Direct effect (c') β (95% CI)	The proportion of total effect accounted for by mediation (%)
Betrayal	.57 (.46, .65)	.44 (.30, .48)	.25 (.11, .39)	.22 (.11, .33)	53.2 (41.2, 68.2)
Self-blame	.51 (.38, .64)	.47 (.32 .62)	.24 (.10, .34)	.23 (.11, .35)	51.1 (33.1, 69.1)
Fear	.58 (.40, .76)	.44 (.33 .55)	.26 (.12, .40)	.21 (.11, .31)	55.3 (33.3, 77.3)
Alienation	.58 (.47, .69)	.36 (.27, .45)	.21 (.08, .34)	.26 (.12, .40)	44.7 (29.7, 59.7)
Anger	.61 (.48, .74)	.37 (.27, .47)	.23 (.11, .35)	.24 (.11, .37)	48.9 (36.9, 60.9)
Shame	.62 (.40, .84)	.44 (.33 .55)	.27 (.12, .42)	.20 (.10, .30)	57.4 (33.4, 71.4)

Notes: CI = confidence interval; PTSD = posttraumatic stress disorder; **β** = Beta; CI = Confidence Interval; % = per cent.

NB. Total effect of War experiences on PTSD: β=0.47, 95% CI: (0.37, 0.57).

DISCUSSION

We investigated the relationships between PTSD and six types of post-trauma appraisal in young people who had been abducted in northern Uganda. Results of the descriptive analyses showed that participants had been exposed to multiple severe traumatic war events and that 37.5% of them still had clinically significant PTSD symptomology. This result is consistent with the prevalence of PTSD in earlier research [Amone-P'Olak et al., 2007a; Amone-P'Olak et al., 2007b; McMullen et al., 2012]. For instance, Okello and colleagues [2007] reported that 26.8% of the adolescents who had previously been abducted fulfilled the criterion for PTSD symptomology. War experiences significantly predicted PTSD symptomology. Moreover, post-war trauma appraisals explained between 44.7 and 57.4 per cent of the effects of war experiences on PTSD symptomologies. Although post-war trauma appraisals accounted for much of the relationship between war experiences and PTSD symptomology, the direct influence of war experiences was still statistically significant, indicating that other factors contributed to the persistence of PTSD in former abducted children.

These results imply that, in addition to the typical focus on factors like trauma exposure and individual differences, post-trauma appraisals may be a significant mechanism underpinning war-related mental health issues among young people who have been abducted. Notably, this sample did find that exposure to wartime events significantly affected the prevalence of PTSD. Our results support earlier findings on the relationship between appraisal and PTSD symptomology in youth and adult literature on traumatic experiences. As described in previous studies [Beck et al., 2011; DePrince et al., 2011; Ehlers, La Bash & Papa, 2013], all the trauma appraisal processes that were assessed (betrayal, self-blame, fear, alienation, anger, and shame) strongly explained variance in PTSD symptomology. As a result, the findings offer more proof of the connections between appraisal-distress links for survivors of traumatic events [Gomez de La Cuesta et al., 2019], and in particular extend this literature to include a low-income country and survivors with severe multiple trauma exposure.

The degree to which cognitive appraisals mediated the pathway from war experiences to PTSD symptoms was evident in our study, however, this also suggests that there may be other intermediate risk factors for PTSD symptoms severity. Individual traits, including personality factors, peri-traumatic processing such as mental defeat during traumatic events, disjointed memories, and dissociation, among

others, may be potential proximal risk factors among survivors of war [Beierl et al., 2019]. These factors will be considered in upcoming studies.

As highlighted in the background, previous studies have demonstrated that certain personality characteristics may be linked to appraisal and coping with stress [Shewchuk et al., 1999]. The formerly abducted youth in this study faced additional postwar environmental stressors like stigma/discrimination, poverty, unemployment, etc., that could amplify feelings of exclusion, alienation, fear, anger, shame, and guilt [Amone-P'Olak et al., 2014; 2015; Murphy et al., 2017]. For example, shame is recognised as an extremely harmful condition that provokes an urge to retreat into oneself and hide or disappear from others [Feiring & Taska, 2005; Feiring et al., 1998]. Maladaptive cognitive emotion regulation strategies, such as self-blame, blaming others, ruminating, and catastrophising, were found to be substantially linked to adverse mental health outcomes in a study with the same population [Amone-P'Olak & Omech, 2020]. Also, reporting fewer symptoms of mental health problems was linked to adaptive cognitive emotion regulation techniques (e.g., putting things into perspective) [Amone-P'Olak & Omech, 2020].

Similarly, Costa and McCrae (1990) proposed that personality traits may be infused with appraisal and coping characteristics. Thus, certain personality traits may be associated with appraisal types like fear, alienation, anger, shame, betrayal, and self-blame. For example, anger, impulsiveness, and self-blame are known to be characteristics of neuroticism, which, in turn, shapes the perception of stress [Shewchuk et al., 1999]. Although these may be considered maladaptive ways of coping in many contexts, they may also have an adaptive function (e.g., distancing oneself from others prevents anguish if those relationships are further damaged). Because our results do not support causal assertions, an alternative explanation is that specific and overlapping cognitive appraisals implicated in PTSD symptomology may lead to a sense of isolation from oneself or others.

Implications for Practice

The role of trauma evaluation among former abducted youths in the post-war setting has significant implications for the practice. Intrapersonal (e.g., cognitive appraisals) [Gomez de La Cuesta et al., 2019; Murphy et al., 2017] and interpersonal (e.g., interpersonal sensitivity) factors that contribute to the persistence of PTSD symptoms [Amone-P'Olak & Elklit, 2018] are important targets for intervention [Srinivas, DePrince, & Chu, 2015].

The findings of this study show that a more thorough understanding of the impact of traumatic events on youths requires a better understanding of how survivors of traumatic experiences make sense of their trauma experiences [Srinivas, DePrince, & Chu, 2015]. The current evidence-based treatment options, such as Trauma-Focused Cognitive Behavioural Therapy (TF-CBT), are only possible if we understand what the traumatic events mean to survivors [Amone-P'Olak & Elklit, 2018; Gomez de La Cuesta et al., 2019; Meiser-Stedman, 2002; Murphy et al., 2017; Srinivas, DePrince, & Chu, 2015]. TF-CBT includes crucial components that target negative cognitions and might be tailored to address appraisals such as alienation and shame. Furthermore, mindfulness-based programmes linked to mental health, skills training, self-care, education, and other youth-serving occupations are recommended to reduce negative cognitive appraisals associated with PTSD symptoms. Mindfulness training, for example, has been demonstrated to improve PTSD symptoms in those who experienced stressful events [Grupe et al., 2021; Liu et al., 2022]. Furthermore, the lingering PTSD symptoms after many years demonstrate how profound the war's effects were on survivors.

Strengths and limitations

The current study had several strengths. First, in comparison to other similar research [Amone-P'Olak, 2009; Amone-P'Olak et al., 2007a; Derluyn et al., 2004; Kohrt et al., 2008], our sample size was relatively large. Second, we studied a large sample of hard-to-reach war-affected groups of youth that UNICEF had carefully enumerated [UNICEF, 1998]. Our findings broadened the knowledge on an important but understudied pathway by which PTSD symptoms are mediated, moving beyond the traditional emphasis on trauma experiences to incorporate post-trauma cognitive appraisals. We investigated links between six specific indicators of post-trauma appraisals (betrayal, self-blame, dread, alienation, rage, and humiliation) and PTSD symptomology, permitting us to examine a wide range of appraisal-distress links via different cognitive appraisal dimensions.

There are several limitations worth mentioning in this study. To begin with, all our study variables were self-reported, which made them susceptible to both over-reporting and under-reporting. Similarly, war experiences were assessed retrospectively, rendering them to recall bias [Mollica, Caridad, & Massagli, 2007]. Nonetheless, previous research on the links between cognitive evaluation and psychopathology lends support to our findings. Second, our data did not include other common indications of distress, such as

behavioural dysregulation, personality traits, and so on. Thus, other mediating and moderating variables not included in the current study may explain the correlations reported in this study between war experiences and PTSD symptoms. Third, it can be argued that PTSD symptoms may mediate the link between war exposure and appraisal types, as both PTSD symptoms and appraisal types were assessed simultaneously. However, previous studies showed that certain personality characteristics may be linked to appraisal and coping with stress [Shewchuk et al., 1999]. Similarly, it has also been suggested that personality traits permeate appraisal and coping styles [Costa & McCrae, 1990] and that coping might be personality in action under stress [Bolger, 1990]. In addition, several previous studies have demonstrated that negative cognitive appraisals such as anger, self-blame, and shame are linked to and often precede the onset of PTSD [Bryant & Guthrie, 2005; 2007; Ehring et al., 2008]. Consequently, the choice of appraisal or coping styles closely linked to personality traits can be regarded as a mediator. Fourthly, the PTSD scale used in this study focused on DSM-IV symptoms when this study was conceived in 2010. The current DSM-5 symptoms, released in 2013, have symptoms particularly relevant for cognitive appraisals. Fifth, this was a general explanatory study aimed at charting the development and trajectory of mental health problems in war-affected youth. Finally, we cannot rule out the likelihood that the cognitive evaluation style existed before the war.

Future trends

Addressing the pathways from trauma experiences to psychopathology is critical in developing interventions to reduce the harmful influence of trauma on war-affected populations. Future research should focus on potential mediators and moderators such as emotional regulation, personality traits, disjointed memories, trauma memories, and dissociation, among others. Similarly, using a longitudinal design with many time points would allow us to evaluate the roles of potential moderators and mediators in trauma-related distress. Finally, future studies could test the efficacy of training in changing cognitive appraisal mental processes to evaluate its efficacy in lowering PTSD symptoms.

CONCLUSION

All the trauma appraisal sub-scales partially mediated the link between war experiences and PTSD symptoms. The level of mediation by the various sub-scales of trauma appraisal was moderately large,

indicating that interventions targeted at changing maladaptive trauma cognitions may reduce the influence of war experiences on PTSD symptoms.

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Author contributions

KAP made a significant contribution to the conception, design, collection, analysis, interpretation, and writing of the manuscript. **JN, NM, CCN, HK, BO, JS,** and **RMS** all made contributions by carefully reviewing the manuscript for significant intellectual content. All authors reviewed and approved the article's submission.

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Competing interests

None.

Participants' consent:

Obtained.

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Institutional Review Board, Gulu University and Uganda National Council for Science and Technology.

Data sharing statement

Data requests and collaborations are reviewed and assessed by the WAYS Management Committee.

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