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Specific Trauma Subtypes Improve the Predictive Validity of the Harvard Trauma Questionnaire in Iraqi Refugees

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Abstract

Background—Trauma exposure contributes to poor mental health among refugees, and exposure often is measured using a cumulative index of items from the Harvard Trauma Questionnaire (HTQ). Few studies, however, have asked whether trauma subtypes derived from the HTQ could be superior to this cumulative index in predicting mental health outcomes.

Methods—A community sample of recently arrived Iraqi refugees (N = 298) completed the HTQ and measures of posttraumatic stress disorder (PTSD) and depression symptoms.

Results—Principal components analysis of HTQ items revealed a 5-component subtype model of trauma that accounted for more item variance than a 1-component solution. These trauma subtypes also accounted for more variance in PTSD and depression symptoms (12% and 10%, respectively) than did the cumulative trauma index (7% and 3%, respectively).

Discussion—Trauma subtypes provided more information than cumulative trauma in the prediction of negative mental health outcomes. Therefore, use of these subtypes may enhance the utility of the HTQ when assessing at-risk populations.

Keywords

refugees; posttraumatic stress disorder; depression; trauma

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BACKGROUND

In recent years, there has been an influx of Iraqi refugees in the U.S. (approximately 28,000 in fiscal years 2008 & 2009 and 40,000 in 2010–2012; 1–2). Given the large number of refugees immigrating to the U.S. it is important that we understand the difficulties these individuals face. Many of these individuals have experienced a number of potentially traumatic events as a result of residing in Iraq during multiple wars (i.e., the Iran-Iraq War, the Gulf War, and the Iraq War). These potentially traumatic events range from discrimination and persecution to physical and psychological torture, among others (3). Research suggests that Iraqi refugees are at an increased risk of anxiety and mood disorders (4–10). These disorders are exacerbated by exposure to pre-migration trauma (7, 10), which is frequently experienced in high volume for these individuals (3, 5).

Such research, however, typically relies on a cumulative index measure, indexed by a summation of all potentially traumatic events that an individual has endorsed (11–12) on measures such as the *Harvard Trauma Questionnaire* (HTQ; 13). The lack of detailed information on the association between specific traumatic events and mental health status has left the field with an incomplete understanding of refugee mental health. For example, knowledge of the specific trauma subtypes that are most strongly associated with psychopathology could allow for earlier identification of at-risk populations and facilitate targeted medical and psychological interventions.

The use of cumulative trauma scores in mental health research assumes that the quantity of trauma is what matters. However, there are qualitative differences in people's experience of, and emotional reactions to, different types of trauma, such as sexual assault, physical assault, transportation accident, and illness (14). Different trauma types might therefore contribute differently to psychopathology in a way that would be masked by a cumulative trauma index. Indeed, research in non-refugee populations has shown differences in pathology across subtypes of trauma exposure (15). Specifically, traumas involving betrayal have been associated with greater pathology than similar traumas that do not involve betrayal (e.g., seeing a family member attacked by another family member vs. attacked by a stranger; 15).

The extant literature on trauma in displaced populations also supports a subtype approach. One study, examining the effects of four specific types of torture on PTSD and somatic symptoms in Palestinian prisoners, found that only physical torture and psychological torture were significant predictors of PTSD; deprivation and beatings were not (16). Similarly, research examining Tamil refugees and asylum seekers found that various subtypes of trauma (e.g., detention and abuse, traumatic loss, persecution, and violent death) have differential impacts on outcomes, particularly PTSD symptoms (11, 17).

In light of evidence from the current trauma literature indicating that trauma subtypes may be more clinically useful than cumulative trauma indexes, this study sought to examine trauma subtypes in Iraqi refugees. To date, subtypes of trauma items from the HTQ have been examined in non-Iraqi samples, but not in Iraqi samples. Differences in the items included in the HTQ across culturally distinct versions of the measure prevent the use of

subtypes established in non-Iraqi samples when examining Iraqi refugees (18). This paper presents data on cumulative and specific trauma from the trauma event section of the HTQ for a large sample of newly-arrived Iraqi refugees. The study's primary aim was to examine the factor structure of the trauma events section of the HTQ and compare the predictive power of the extracted trauma factors to that of a single index of cumulative trauma. A secondary aim was to examine associations of the trauma subtypes to PTSD symptoms, depression symptoms, and language skills in order to assess convergent and divergent validities of these subtypes. We hypothesized that: (a) specific trauma factors would explain more variance in trauma exposure items at the measurement level than a single cumulative trauma factor; (b) trauma subtypes would be related to PTSD and depression symptoms (convergent validity test), but would be unrelated to language abilities (divergent validity test); and (c) trauma subtypes would contribute more to the prediction of PTSD and depression symptoms than cumulative trauma due to qualitative differences between traumatic events (e.g., being taken hostage may be more traumatic than being present while someone searches your home).

METHODS

Participants and Data Collection

Newly arrived Iraqi refugees were recruited through multiple community organizations in Southeast Michigan. Those who initially showed an interest in participation were placed into a pool of potential participants and a computer randomly selected 35% for recruitment into this study. Of those who were selected, 98% were willing to participate and were subsequently interviewed in their homes or at community organizations by trained Arabic-speaking research assistants. All participants were interviewed within 6 months of arrival in the U.S. Interviews lasted approximately two hours and were conducted using the measures described below. The final sample consisted of 298 participants (54% male) ranging in age from 18 to 69 years ($M = 33.41$, $SD = 11.29$) who had been in the U.S. for only a short period of time ($M = 1.00$ month, $SD = 1.08$). All procedures and materials were approved by the Institutional Review Board (IRB) at Wayne State University (Protocol#: 025509B3F).

Measures

With the exception of the HTQ, which was already available in Arabic (18), each of the measures below was translated into Arabic by a native, bilingual speaker and then back translated by a second bilingual individual. Participants were asked to report their age, gender, marital status, level of education, and employment status. Participants provided the dates when they left Iraq and arrived in the U.S., and these dates were used to compute transition time, which was defined as the number of months that the individual was displaced outside of their country of origin before arriving in the U.S.

The trauma events section of the Iraqi version of the HTQ (18) was used to assess pre-migration trauma exposure. Participants indicated whether they had experienced each of 39 traumatic events before coming to the U.S. Response options were "yes" and "no." Cumulative and specific trauma exposure scores were calculated by a count of "yes" responses to all items (cumulative trauma) or items in specific domains (specific trauma).

PTSD symptoms were assessed with the civilian version of the PTSD Checklist (PCL-C), which includes 17 self-report items asking the participant to indicate the degree to which they were distressed by each of the symptoms of PTSD listed in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders*, text revision (*DSM-IV-TR*; 19). Each item was rated on a scale from 1 (not at all) to 5 (extremely), and total PTSD symptom severity scores were calculated by summing these ratings. The PCL has been shown to have good test-retest reliability ($r = .87$) as well as convergent validity with the Davidson Trauma Scale ($r = .74$; 20). Internal consistency was high for this sample ($\alpha = .91$). During data collection, one item was missing from the PCL-C for 88 participants. These missing data were imputed using regression.

Symptoms of depression were assessed with the 7-item depression subscale of the Hospital Anxiety and Depression Scale (HADS; 21). The internal consistency of the scale was high for this sample ($\alpha = .93$). Items were rated on a scale from 0 to 3, with higher total (summed) scores indicating greater depression symptoms.

Participants were asked the following two questions regarding their English language abilities: “How well do you speak English?” and “How well do you write in English?” Both questions were answered on a 4-point scale ranging from 1 (not at all) to 4 (very well). Other studies have successfully measured language abilities using single-item measures similar to the items used here (22, 23). These questions were asked post-migration; however, the surveys were administered very soon (0 – 6 months) after arrival in the U.S.

Analyses

Principal components analysis (PCA) with oblique rotation ($\delta = 0$) was then conducted on the items of the HTQ to identify subtypes (or factors) of specific traumatic events. Oblique rotation was used because the trauma subtypes were expected to correlate moderately with one another, and we did not want to force the factors to be independent (24). Items with primary loadings greater than 0.30 on the same factor were then summed to create factor scores for subsequent analyses (24). The variance accounted for in trauma items for the multi-factor model was compared to the variance in trauma items accounted for by a model in which the items were forced into a single factor, representative of how the HTQ has previously been used in a cumulative fashion (7,12). The sample size in this study ($N = 298$) was adequate for a stable solution using PCA; samples of 200 – 300 participants are suggested to ensure stability (24).

Convergent and divergent validity were examined by calculating Pearson product moment correlation coefficients between each of the identified trauma subtypes and the following variables: spoken language skills, written language skills, PTSD symptoms, and depressive symptoms.

Two hierarchical regression analyses were conducted to predict PTSD symptoms and depressive symptoms from the new trauma subtypes, after controlling for age, gender, education, transition time, and time in the U.S. Control variables were entered in the first step of each regression analysis, and trauma variables were entered in the second step using simultaneous forced entry for each set of variables. Two similar regression analyses were

conducted predicting PTSD and depression symptoms with trauma exposure assessed as a single cumulative score. Alpha was set to a two-tailed value of .05 for these regressions.

RESULTS

Data were first analyzed to determine which potentially traumatic events were extremely rare (experienced by less than 5% of the sample; 13 items) and which were extremely common (experienced by more than 95% of the sample; 2 items). The frequency of occurrence in these items is problematic because they do not contribute enough information to maintain a meaningful factor structure (25). The uncommon events involved religious persecution, witnessing harm to others, sexual violence, and being forced to harm someone else in some way, while the common events involved witnessing combat and being confined to one's home. Two additional items (hearing about events happening to others and having one's property looted) were deleted due to dual loadings on multiple factors. This resulted in 22 items that were suitable for the PCA, described next.

The rotated solution of the PCA revealed five trauma components, which together accounted for 50% of the variance in the items. Every item loaded greater than 0.30 on at least one factor and no item loaded greater than 0.30 on a secondary factor (Table I; only loadings $> .30$ are shown). By comparison, the model in which all the HTQ items were forced into a single component explained only 14% of the item variance, and 9 of the 22 items had factor loadings less than 0.30 (Table I). Based on the item content for each of the five components, the following names were assigned to the trauma subtypes: (a) physical trauma to others, (b) physical trauma to the self, (c) lack of necessities, (d) abduction of family or friend, and (e) persecution/coercion. Descriptive statistics for these components and other key variables are summarized in Table II.

All of the trauma subtypes were significantly correlated with at least one mental health outcome, with the exception of Persecution/Coercion. Four trauma subtypes, Physical Trauma to the Self, Lack of Necessities, Physical Trauma to Others, and Abduction of a Family Member or Friend, predicted higher PTSD symptoms ($r = .27, p < .001$; $r = .17, p < .01$; $r = .15, p < .01$; $r = .13, p < .05$; respectively). In addition, two trauma subtypes (Physical Trauma to the Self and Lack of Necessities) predicted higher depression symptoms ($r = .18, p < .01$; $r = .27, p < .001$; respectively). On the other hand, there were no significant correlations between trauma and self-rated language abilities, that is neither speaking English nor writing English was significantly related to any trauma subtype.

The results of the hierarchical regression analyses predicting PTSD and depression symptoms are reported in Table III. For both PTSD and depression symptoms, higher levels of physical trauma to the self and lack of necessities were significant predictors of higher symptom levels, after controlling for age, gender, education, transition time, and time in the U.S. More cumulative trauma was a significant predictor of both higher PTSD symptoms ($R^2 = .07, F(1,268) = 20.23, p < .001$; power = .94) and higher depression symptoms ($R^2 = .03, F(1,268) = 8.41, p = .004$; power = .56); however, the five trauma subtypes jointly accounted for 5% more variance in PTSD symptoms ($R^2 = .12, F(5,264) = 7.73, p < .001$; power = .99) and 7% more variance in depression symptoms ($R^2 = .10, F(5,264) = 6.63, p$

< .001; power = .98) than did cumulative trauma. The trauma subtype models also accounted for more variance in PTSD symptoms ($R^2_{adjusted} = .11$) and depression symptoms ($R^2_{adjusted} = .09$) than the cumulative trauma models ($R^2_{adjusted} = .07$, $R^2_{adjusted} = .02$; respectively) when accounting for differences in degrees of freedom.

Although these results show the overall results of the full models, the effects of specific predictors are of interest as well. Cumulative trauma uniquely accounted for 7% of the variance in PTSD symptoms, whereas physical trauma to the self accounted for 8% of the variance in PTSD symptoms. Similar results can be seen in the models predicting depression symptoms. Cumulative trauma uniquely accounted for 3% of the variance in depression symptoms, whereas physical trauma to the self uniquely accounted for 3% and lack of necessities uniquely accounted for 6% of the variance in depression symptoms. This suggests that some specific trauma subtypes independently accounted for more variance in symptoms than did cumulative trauma.

DISCUSSION

This study classified specific trauma events into subtypes of trauma using factor analytic techniques in a large sample of recently arrived Iraqi refugees. This study also assessed the validity of using trauma subtypes as a measure of various trauma exposures by examining the correlations of trauma subtypes with PTSD symptoms, depression symptoms, and language abilities. Finally, this study assessed the usefulness of these subtypes of trauma compared to a measure of cumulative trauma in three ways: (a) by comparing how well each method summarized the trauma exposure data, (b) by analyzing the convergent and divergent validity of the subtypes, and (c) by comparing how well each method predicted mental health outcomes. Analyses supported a 5-component model of trauma exposure as assessed by the HTQ. As predicted, the specific trauma components (i.e., physical trauma to others, physical trauma to the self, lack of necessities, abduction of family or friend, and persecution/coercion) explained more variance in trauma exposure items at the measurement level than did the single measure of cumulative trauma. Furthermore, these subtypes appear to be a valid way of assessing trauma exposure in recently arrived refugees, in that they demonstrated convergent and divergent validity in accordance with our predictions. Finally, trauma subtypes revealed better predictive strength for PTSD and depression symptoms than did cumulative trauma, even though symptom levels were somewhat low in this sample. Thus, all three study hypotheses were supported.

The results of the PCAs reported here suggest that trauma exposure is better conceptualized using specific subtypes of traumatic events than using a single, cumulative trauma index. Subtypes provide additional information that could increase our understanding of the mechanisms contributing to observed differences in mental health outcomes. Regression analyses further supported the usefulness of specific trauma subtypes, which demonstrated increased predictive power over that of cumulative trauma when predicting both PTSD and depression symptoms. This is in line with prior research on refugees and asylum seekers, which suggests that cumulative trauma has a relatively low predictive power, accounting for only about 20% of the variance in PTSD and depression symptoms (26).

Two trauma subtypes were important in predicting both PTSD and depression symptoms, physical trauma to the self and lack of necessities; however, the strength of the associations differed for the two outcomes. Physical trauma to the self was a stronger predictor of PTSD symptoms than lack of necessities, and lack of necessities was a stronger predictor of depression symptoms than physical trauma to the self. Although personally experienced events are typically more closely associated with poor mental health than are events that are only experienced vicariously, these results suggest that the nature of those personally experienced events is important as well. It may be that the threat or danger of physical trauma precipitates the anxious hypervigilance, intrusions, and avoidance of PTSD. In contrast, deprivation of things needed for survival (i.e., food, shelter, and medical care) may cause the helplessness or defeat that is associated with depression. Note that such explanatory power is lost when assessing trauma exposure with only a cumulative score. Not only does the cumulative model explain less of the variance in PTSD and depression symptoms, but it provides no information regarding which specific events actually influence those outcomes. Therefore, both predictive power and descriptive power are lost by the use of a cumulative trauma exposure score.

Prior research suggests that ongoing exposure to a war environment can induce negative mental health outcomes (27–28); however, people in the present study showed rather low rates of mental health problems even though they came from an environment in which they had substantial exposure to war-related events. Our data suggest that it was not the events directly related to the war that were associated with poor mental health outcomes, but rather the events directly impacting the individuals. Prior studies have used somewhat broad or nonspecific definitions of the war environment by including a wide range of events such as exposure to landmines, exposure to a combat situation, abduction of friends or family, personal assault, lack of food or shelter, and detention (17,27). The results of the present study suggest that such events form separate domains with differential effects on mental health. Our data also suggest that experiencing more personal events, such as physical harm or lacking necessities, increases the risk of negative mental health outcomes, and these effects are different than the effect of simply being in the war environment.

This study has many strengths. First, it is one of few studies examining specific subtypes of trauma and how those trauma subtypes improve the prediction of mental health outcomes. Second, the present study examined a large number of refugees sampled from a wide variety of community organizations. Third, this study assessed refugees who had recently arrived in the U.S., whereas prior research on refugee populations used convenience samples of refugees who had been in the U.S. for an average of four years (10). By examining refugees who have very recently arrived in the U.S., the present study is better able to attribute mental health outcomes to the specific trauma subtypes examined, because post-migration factors, such as social and economic challenges in the host country, have had very limited time to exert their influence.

This study also has some limitations. First, this study examined only refugees, and only from the country of Iraq; it is possible that the specific trauma subtypes could be different for non-refugees and those from other countries. Additionally, the HTQ is somewhat culture-specific, which limits comparisons to other cultural groups on these specific scales. Second,

the present study measured trauma using the trauma events section of the HTQ, but did not use the HTQ to measure trauma symptoms. Although this may be a limitation, the use of the PCL allowed for a more specific assessment of PTSD. Unlike the trauma symptoms section of the HTQ which asks about a variety of symptoms that could result from trauma, the PCL focuses specifically on symptoms of PTSD as defined in the *DSM-IV-TR*. Third, the analyses used in this study were somewhat exploratory, and replication is indicated. Finally, symptom levels in this sample were particularly low, which could be a result of the speed at which they were tested after arriving in the U.S. This is in line with research examining soldiers, which suggests that low symptom levels are common in the months immediately following return from deployment (29–30). Nonetheless, the relatively low scores on the symptom measures likely limit the magnitude of the correlations we obtained with the trauma measures.

Overall, these results suggest that information on specific trauma exposures should be taken into account when assessing the mental health of at-risk populations in order to potentially optimize diagnosis, treatment, and prevention programs. This study suggests that it may be beneficial to use trauma subtypes rather than cumulative trauma scores to better describe trauma experiences and predict mental health outcomes. Future research should examine the effect of these specific trauma variables over time, which would provide insight as to the time-course of mental health outcomes, and how that time-course is influenced by differential trauma exposure. Also, the mechanisms through which such traumas influence mental health should be examined. Such examinations could aid in distinguishing the effects of various influences, such as culture, environmental factors, and one's interpretation of events, on mental health outcomes.

Further examination of trauma subtypes could advance the understanding of the role of trauma in mental health, thereby allowing for earlier identification of at-risk individuals. Understanding the mechanisms through which observed group differences occur may also facilitate appropriate diagnosis and treatment of mental health disorders. Such information is needed given the large number of refugees immigrating to the U.S. (1). More accurate identification of individuals who are at-risk for poor mental health could allow incoming refugees to be better served by the social and health programs that are currently in place, thereby increasing the cost efficiency of those programs.

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TABLE I
 Item Loadings for Single Component (Cumulative) vs. Multiple Component (Specific) Trauma Models

Item	CT	PTO	PTS	LN	AFF	P/C
Witnessed physical harm of others	.50	.71				
Witnessed murder	.55	.70				
Witnessed execution of civilians	.40	.64				
Witnessed rotting corpses	.58	.63				
Searched arbitrarily	.46	.39				
Witnessed shelling, burning or razing	.31	.38				
Present during a search of your home	.39	.31				
Taken as a hostage	.35		.91			
Kidnapped	.28		.91			
Physically harmed or beaten	.43		.78			
Lack of food/clean water	.18			.78		
Had no access to medical care	.22			.74		
Lacked shelter	.20			.71		
Family or friend taken hostage	.46				.97	
Family or friend kidnapped	.51				.96	
Disappearance of family or friend	.41				.37	
Violent death of family member	.28				.36	
Forced to flee	.23					.75
Forced to settle	.27					.62
Oppressed	.04					.52
Someone informed on you	.30					.46
Witnessed desecration	.26					.35

Note: Components are as follows (CT) Cumulative Trauma, (PTO) Physical Trauma to Others, (PTS) Physical Trauma to the Self, (LN) Lacked Necessities, (AFF) Abduction of Family member or Friend, and (P/C) Persecution/Coercion. No secondary loadings exceeded .30.

TABLE II

Descriptive Statistics for Study Variables

	Range	<i>M</i>	<i>SD</i>
Age	18–69	33.27	11.10
Months in US	0–4.50	1.00	1.09
Transition Time (months)	0–237	28.85	28.44
Physical Trauma to Others	0–7	2.65	1.72
Physical Trauma to Self	0–3	0.33	0.81
Lack of Necessities	0–3	0.42	0.78
Abduction of Family/Friend	0–4	1.99	1.40
Persecution/Coercion	0–5	3.71	1.13
Cumulative Trauma	0–22	9.16	3.25
PTSD Symptoms	17–85	19.44	5.40
Depression Symptoms	0–21	1.91	3.50

Note: Range indicates the possible range on a given scale, not the actual range in the sample. Exceptions to this are Age, Months in the US, and Transition Time. The range indicated for these variables is the range in the sample.

TABLE III

Prediction of Mental Health Disorder Symptoms via Specific vs. Cumulative Trauma

Trauma	Predictor	PTSD Symptoms					Depressive Symptoms				
		β	t	p	r ²	p	β	t	p	r ²	
Specific N = 275	Gender (Female = 0)	-.11	-1.83	.07	.01	<.001	-.09	-1.41	.16	.006	
	Education (HS = 0)	-.04	-0.75	.46	.002	<.001	-.15	-2.71	.007	.02	
	Age	.15	2.59	.01	.02	<.001	.24	4.12	<.001	.05	
	Months between Home and US	-.03	-0.42	.68	.001	<.001	-.10	-1.59	.11	.008	
	Months in US	<.001	0.00	1.00	<.001	<.001	-.04	0.72	.47	.002	
	Physical Trauma to Others	.11	1.73	.09	.01	<.001	.03	0.52	.61	<.001	
	Physical Trauma to Self	.29	4.85	<.001	.08	<.001	.20	3.38	.001	.03	
	Lack of Necessities	.13	2.17	.03	.02	<.001	.25	4.27	<.001	.06	
	Abduction of Family/Friend	.09	1.54	.13	.008	<.001	.04	0.60	.55	.001	
	Persecution/Coercion	-.01	-0.17	.87	<.001	<.001	-.05	-0.79	.43	.002	
Cumulative N = 275	Gender (Female = 0)	-.09	-1.43	.15	.007	<.001	-.07	-1.23	.22	.005	
	Education (HS = 0)	-.06	-0.96	.34	.003	<.001	-.18	-3.00	.003	.03	
	Age	.16	2.67	.008	.02	<.001	.25	4.30	<.001	.06	
	Months between Home and US	.04	0.69	.49	.002	<.001	-.01	-0.15	.88	<.001	
	Months in US	-.01	-0.12	.91	<.001	<.001	.06	-0.98	.33	.003	
	Cumulative Trauma	.28	4.50	<.001	.07	<.001	.18	2.90	.004	.03	

Note: Reference categories for nominal variables are indicated in parentheses following the variable for which the category is a reference. When no reference category is indicated continuous measures were used. r² indicates the squared semi-partial correlation which tells us the unique variance in depression symptoms accounted for by that predictor (16).