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Inconsistencies in the Reporting of Perceived Trauma Severity Among Acute Physical Injury Survivors

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ABSTRACT

This study aimed to identify and predict inconsistency in perceived trauma severity reports over time among trauma survivors. Hospitalized adult survivors of a traumatic injury completed trauma exposure assessments within 40 days post-injury and 6 weeks later (n = 77). The following trauma severity characteristics were examined: (1) threat of loss of life, (2) threat of loss of a body part, (3) threat of serious injury, and (4) peritraumatic emotionality. Potential predictors of inconsistency were also examined. About half of the reports regarding perceived trauma severity characteristics were inconsistent between the baseline to 6-week assessment. The inconsistent reports were mostly small and equally likely to be either more or less severe over time. Increases in posttraumatic stress disorder (PTSD; especially avoidance) predicted increases in severity of life threat and threat of loss of a body part. Thus, acute reports of perceived trauma severity vary and are influenced by PTSD symptoms.

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Researchers and clinicians alike rely heavily on subjective reports of trauma exposure and severity for diagnostic and treatment purposes. As such, it is critical to understand the consistency of such reports and how they may be influenced by time, aspects of the event, or responses to the event. Inconsistency refers to changing reports of trauma exposure and/or severity over time. Various studies have documented inconsistency in reporting[1] of whether trauma exposure objectively occurred (e.g., reporting that an event did occur, then later *not* reporting that it happened, as in a checklist of events; van Giezen, Arensman, Spinhoven, & Wolters, 2005), and in the reporting of subjective characteristics of the event (e.g., severity of stressfulness, danger; Dekel & Bonanno, 2013; Zoellner, Sacks, & Foa, 2001).[2] Specifically, many studies have found that participants tend to show

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[1]Recall and reporting are two separate but related phenomena. We will refer to "reporting" in this article, as we cannot directly assess recall.

memory "amplification" over time in regards to objective and subjective aspects (i.e., reporting a traumatic event that was not reported previously *or* reporting that an event was more intense at a later time point; Bolton, Gray, & Litz, 2006; Giosan, Malta, Jayasinghe, Spielman, & Difede, 2009; King et al., 2000; Krinsley, Gallagher, Weathers, Kutter, & Kaloupek, 2003; Roemer, Litz, Orsillo, Ehlich, & Friedman, 1998; Southwick, Morgan, Nicolaou, & Charney, 1997; Wessely et al., 2003); yet others have found a decline or no change in reporting over time (Dekel & Bonanno, 2013; Engelhard, van den Hout, Arntz, & McNally, 2002; Mollica, Caridad, & Massagli, 2007; Ouimette, Read, & Brown, 2005; Zoellner et al., 2001).

Though prior research has highlighted the issue of inconsistency in such reports, the majority of studies have examined *objective* reports of trauma exposure versus the *subjective perceptions* of the event (e.g., life threat severity, injury severity, peritraumatic emotionality), despite the fact that subjective appraisal of trauma severity is generally a stronger predictor of posttraumatic stress disorder (PTSD) than objective characteristics (Engelhard, van den Hout, & McNally, 2008). Consequently, little is known about consistency of perceived trauma severity over time. Given the importance of such reports in the diagnosis and development of PTSD, this study sought to delineate rates and predictors of inconsistency in perceived trauma severity following a recent physical injury. Although the concepts are related, an important distinction to make is that of *consistency* versus *accuracy* of trauma reporting. This article and the background research presented speak only to that of *consistency* of reporting across time, and not about the *accuracy* or truth of those actual reports and perceptions.

PTSD diagnosis and symptoms often emerge as significant predictors of inconsistency in trauma reporting (King et al., 2000; Koenen, Stellman, Dohrenwend, Sommer, & Stellman, 2007); generally, PTSD symptoms (or increases in PTSD symptoms) predict amplification of reporting (Bolton et al., 2006; Engelhard et al., 2008; Mollica et al., 2007; but see Hepp et al., 2006; for an exception). Across the board, however, the effect of PTSD in predicting inconsistency has been small, indicating that although PTSD leads to amplification of reporting, much of the variance in reporting is *not* accounted for by PTSD symptoms.

As such, a more nuanced examination including the symptom clusters of PTSD may provide critical insight. For example, theory would indicate that re-experiencing or avoidance clusters are specifically predictive of memory amplification and memory decline, respectively (King et al., 2000). That is, re-experiencing symptoms may promote elaboration and enhancement of a memory, whereas avoidance symptoms may promote withdrawal, forgetting, or dismissing of a trauma, thus leading to memory decline. On the other hand, if avoidance and intrusions are cyclical, early avoidance may lead to initial under-reporting of an event but later amplification as trauma memories resurface. In support of these assertions, at least three studies have reported that intrusive or re-

experiencing symptoms are related to amplification (Koenen et al., 2007; Ouimette et al., 2005; Roemer et al., 1998). However, in a sample of disaster restoration workers following 9/11, Giosan and colleagues (2009) reported that initial levels of hyperarousal predicted increased reporting, avoidance predicted decreased reporting, and re-experiencing was not predictive of reporting consistency. For later symptoms, however, only re-experiencing was predictive of increased reporting.

To a lesser extent, additional methodological, injury-related, and demographic characteristics have also been examined for their role in predicting or moderating inconsistency in reporting. Specifically, the timing of assessments in relation to the actual trauma exposure impacts reporting. Memories assessed further in time from the occurrence of the event may be more consistent, perhaps due to the instability of the initial memory that later becomes consolidated (see Koenen et al., 2007). Although relatively few studies have examined the impact of mechanism of injury, consistency varies across event types (e.g., sexual assault vs. combat vs. physical injury; Corcoran, Green, Goodman, & Krinsley, 2000; Mollica et al., 2007). In some studies, demographic factors have predicted inconsistency in reporting (e.g., education, age, gender, ethnicity; Engelhard et al ., 2008; Krinsley et al., 2003; Mollica et al., 2007; van Giezen et al., 2005), but these findings have not been consistent across studies. Finally, by definition, peritraumatic dissociation may lead to inconsistent reports if it contributes to initial fragmented memories that are later remembered when dissociation subsides (Ouimette et al., 2005; Porter & Peace, 2007). Clearly, research regarding predictors of inconsistency in trauma reports requires further inquiry.

Taken together, prior research has pointed out the problem of inconsistency in trauma reports, but several gaps remain. First, most research did not examine changes in subjective perceptions of trauma over time, though these perceptions are important to understanding the peritraumatic and posttraumatic experience. Likewise, the majority of studies assessing consistency have a large time gap between the initial trauma exposure and the first assessment of trauma reporting (van Giezen et al., 2005). There is a need for more immediate assessment, which would potentially limit hindsight bias and/or identify rates of consistency in the early aftermath of trauma. Furthermore, studies have mainly focused on combat veterans, with some attention to survivors of mass traumas (e.g., 9/11) and sexual assault. Although physical injury is a critical public health challenge and a leading cause of death and disability in the United States (O'Donnell et al., 2009), to our knowledge, no studies have assessed trauma exposure inconsistency in an acute injury population. As no robust predictors have emerged, it is critical to continue to examine predictors of inconsistency in injury populations and to deconstruct the specific symptom clusters of PTSD as predictors.

Current study

To address these gaps, we examined consistency in reporting of perceived trauma severity in a sample of injured adults admitted to a Level 1 trauma center. Over a 6-week period shortly following the trauma, we assessed four characteristics of perceived trauma severity, the first three of which are part of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994): Criterion A1: (1) severity of life threat, (2) severity of threat of loss of a body part, (3) severity of threat of serious injury; and the last of which assessed *DSM-IV* Criterion A2: (4) peritraumatic emotionality (i.e., reported fear, helplessness, or horror). The research was initially conducted when the *DSM-IV* was in use; though the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) definition of trauma no longer incorporates the peritraumatic emotionality criteria, it was retained in these analyses for the following reasons: (1) current *DSM-5* Criterion A still involves an element of the severity of the event, and (2) research indicates that peritraumatic emotion is an important aspect of the posttraumatic experience and one that is predictive of PTSD symptoms (Larsen & Pacella, 2016; Ozer, Best, Lipsey, & Weiss, 2003). Importantly, we assessed initial perceived trauma severity shortly after the event, minimizing initial recall bias. We also explored whether PTSD symptom severity (both total PTSD symptoms and individual symptom clusters), trauma type, time since trauma, demographic factors, and peritraumatic dissociation predicted changes in the reporting of perceived trauma severity over time. Based on past research, and given the recency of trauma exposure in this sample, we hypothesized that there would be small changes in reports of trauma severity. We predicted that increases in PTSD symptoms would generally have a small amplifying effect, and that peritraumatic dissociation would predict inconsistency in reports of trauma severity. Given that demographics have sometimes been predictive of consistency (yet findings conflict across studies), we included demographic variables as predictors but did not have specific hypotheses.

Methods

Participants

We initially assessed 214 adult survivors of single incident traumatic injury who were admitted to a Level 1 trauma center at a large regional medical center in the Midwest (this is referred to as the T1 or baseline sample). The following were excluded from the sample: (1) children <18 years, (2) injury that resulted in an inability to communicate, (3) presence of a moderate to severe traumatic brain injury, and (4) presence of a Glasgow Coma Scale score <13. The initial interview was conducted within the first 40 days of hospitalization; 92.2% of interviews

took place within the first 2 weeks post-injury (range = 1 to 40 days post-injury; mode = 3, M = 5.7, and SD = 5.2).

Six weeks after initial assessment, 77 participants were re-assessed (this is referred to as the T2 or follow-up sample; these 77 comprised our sample for all following analyses). Attrition was due mainly to inability to reestablish contact with participants after multiple attempts (e.g., failure to answer phone calls and failure to show for scheduled follow-up appointments without a reason given; n = 114).[3] To a lesser degree, inability to reach participants was a result of disconnected phone numbers (n = 16) or lack of time or interest (n = 7). The resultant sample was primarily male (60%), Caucasian (72%; 18% African-American), and employed (62%); the mean age was 45 (SD = 16.97, range 18–84), and participants had an average of 14 years of education (SD = 2.7, range 5–20). The most prevalent mechanisms of injury were automobile crash (46%), followed by gunshot (12%), home accident (8%), industrial accident (4%), assaultive injury (4%), or "other" (26%), which included recreational accidents and pedestrians struck by vehicles. Per prior research and for the purpose of data analysis, mechanism of injury was classified as assaultive or non-assaultive (84% non-assaultive; 16% assaultive).

Analysis of the differences between participants who completed the 6-week assessment versus those who did not demonstrated no significant differences in age, gender, PTSD scores at baseline (T1), or reported perceived trauma severity. Those who completed the follow-up assessment, however, were more educated (M = 13.8, SD = 2.7) than those who did not complete the follow-up assessment (M = 12.8, SD = 2.2, t (211) = −2.852, p = .005). Those who completed the follow-up assessment were also more likely to be White versus non-White than those who did not complete the follow-up assessment, $\chi^2(1) = 10.51$, p = .001.

Measures

See Table 1 for correlations among T1 study variables.

Outcome variables: Perceived trauma severity

Perceived severity of life threat, threat of loss of a body part, and threat of serious injury. To assess these Criterion A elements, participants were asked to recall how frightened they were at the time of the trauma that they would (a) lose their life, (b) lose part of their body, or (c) be severely injured.[4] Participants answered on a 5-point Likert-type scale from 0 (*not at all*) to 4 (*extremely*). Given that these initial 5-point scales had bimodal distributions (i.e., both floor and ceiling effects; see Table 2), responses were trichotomized: 0 (*not at all*), 1

[3]This study was unfunded and in a low-SES population with unstable contact information, both of which contributed to low retention rates.

[4]These items incorporate both an objective element (e.g., life threat) and a subjective element (i.e., fear about that possibility). Thus, we refer to them as "perceptions" rather than *objective* reports of the severity of the event.

Table 1. Correlations Among Baseline (T1) Variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Life threat															
2. Body part threat	.40**														
3. Injury threat	.48**	.46**													
4. Peritraumatic emotionality	.22	.09	.29*												
5. Gender[a]	.09	−.13	.05	.02											
6. Age	−.21	−.21	−.07	.02	−.15										
7. Ethnicity[b]	−.38**	−.11	−.09	−.02	−.14	.29**									
8. Employment[c]	−.22	.01	.19	.00	−.11	.19	.28*								
9. Education	−.06	−.11	.04	−.13	.07	.22	.18	.23*							
10. Trauma type	.30*	.24	.22	−.04	−.17	−.33*	−.54**	−.38**	−.30*						
11. Time since trauma	−.05	−.17	−.03	.11	−.22	.09	.12	.10	.05	.04					
12. Dissociation	.20	−.12	.02	−.18	−.04	−.14	−.17	−.18	.04	.25	.07				
13.Total PTSD	.30**	.09	.14	−.05	.27*	−.21	−.23*	−.22	−.12	.27*	.10	.26*			
14. Re-experiencing	.26*	.00	.16	.05	.17	−.22	−.13	−.17*	−.22	.31*	.10	.18	.85**		
15. Avoidance	.22	.19	.16	−.18	.11	−.16	−.20	−.16	−.03	.18	.00	.30**	.81**	.57**	
16. Hyperarousal	.22	.02	−.01	.03	.38**	−.13	−.23*	−.19	−.04	.20	.14	.13	.70**	.41**	.30**

[a]Male = 1, Female = 2.
[b]White = 1, Non-White = 0.
[c]Employed = 1, Unemployed = 0.
[d]Assaultive = 1, Non-assaultive = 0.
*$p < .05$. **$p < .01$.

Table 2. Trauma Severity Characteristic Answers (Non-Transformed Data).

		Not at all *n* (%)	Mildly *n* (%)	Somewhat *n* (%)	Moderately *n* (%)	Extremely *n* (%)
Life threat	T1	29 (38%)	10 (13%)	8 (10%)	9 (12%)	20 (26%)
	T2	32 (42%)	17 (22%)	6 (8%)	4 (5%)	15 (20%)
Body part threat	T1	43 (56%)	6 (8%)	8 (10%)	8 (10%)	12 (16%)
	T2	43 (56%)	9 (12%)	5 (7%)	7 (9%)	10 (13%)
Injury threat	T1	21 (27%)	3 (4%)	10 (13%)	16 (21%)	27 (35%)
	T2	24 (31%)	5 (7%)	11 (14%)	10 (13%)	24 (31%)
		No	Yes			
Peritraumatic emotionality	T1	29 (38%)	43 (56%)			
	T2	37 (48%)	38 (49%)			

Note. Percentages do not add to 100 due to missing data.

(*mildly, somewhat, or moderately*), and 2 (*extremely*). This method also minimizes categorizing non-meaningful changes (e.g., from "mildly" to "somewhat") as inconsistent reports.

Peritraumatic emotionality. Participants were asked whether they were *very anxious or frightened, horrified, or helpless* during the event. Interviewers coded a dichotomous yes/no response for whether the participant responded overall with "intense fear, helplessness, or horror" (see Table 2).

Predictor variables

Demographic information. At initial assessment, participants reported gender, age, ethnicity, employment, and education level.

Type of Event. Participants were asked at the initial assessment when the injury took place and the mechanism of injury (motor vehicle crash, gunshot wound, assaultive injury, industrial accident, home accident, or "other"). Mechanism of injury was classified into assaultive and non-assaultive.

Peritraumatic dissociation. Dissociation was assessed at the initial assessment using the Peritraumatic Dissociative Experiences Questionnaire, rater version (PDEQ; Marmar, Weiss, & Metzler, 1998). The PDEQ rater version is a brief structured interview assessing peritraumatic dissociation specifically during a traumatic event and is the most widely used measure of this construct, with adequate psychometric properties (Brooks et al., 2009).

PTSD symptoms. PTSD was assessed at both time points using the Post-Traumatic Stress Scale-Interview form (PSS-I; Riggs, Rothbaum, & Foa, 1995). The PSS-I is a semi-structured interview that includes 17 questions reflecting the *DSM-IV* PTSD symptoms. Participants reported symptoms on a 4-point scale

ranging from 0 (*not at all*) to 3 (*5 or more times per week/very much*) since the trauma occurred. The PSS-I yields a total PTSD severity score (using all 17 items) as well as scores for each *DSM-IV* subscale: re-experiencing, avoidance, and hyperarousal. Studies have shown that it has good test-retest reliability, interrater reliability, and concurrent validity with other measures of PTSD symptoms (Foa, Riggs, Dancu, & Rothbaum, 1993). For the current study, Cronbach's α = .82 and .89 for T1 and T2, respectively.

Statistical analyses

All analyses were completed using SPSS version 21.

Quantification of inconsistency

Consistency was examined in three ways. First, we calculated the percent of absolute agreement for each reported perceived trauma severity characteristic between baseline and 6-week follow-up (i.e., whether participants gave the same rating at each time point) for severity of life threat, threat of loss of a body part, and threat of severe injury (trichotomized scores of 0, 1, or 2), as well as for peritraumatic emotionality (yes vs. no).[5] Second, Cohen's kappa (Cohen, 1960) was used to test the null hypothesis that agreement between T1 and T2 reports differed by more than chance. Third, we utilized two non-parametric tests to examine whether changes in reporting from T1 to T2 were directional: McNemar's tests were applied for dichotomous outcomes (McNemar, 1947) and marginal homogeneity tests were used for outcomes with more than two categories (Agresti, 2002). McNemar's and marginal homogeneity are nonparametric tests of the null hypothesis in which changes from T1 to T2 are equal in both directions (i.e., that participants' reports are equally likely to amplify or decline between the two time points).

Predictors of inconsistency

Next, a series of ordinal logistic regressions examined whether changes in reporting of the four perceived trauma severity outcome characteristics (severity of life threat, threat of loss of a body part, threat of serious injury, and peritraumatic emotionality) could be predicted from a set of variables. For these regressions, we recoded each dependent variable into a new trichotomous variable to indicate whether reported severity *decreased* (e.g., changed from "extremely" to "moderate"), *stayed the same*, or *increased* (e.g., changed from "moderate" to "extremely") in intensity from T1 to T2. Thus, for these regressions we had four trichotomous outcome variables (representing change in each of the four perceived trauma severity characteristics).

[5]For peritraumatic emotionality, consistency is measured via interrater reliability given that ratings on this measure were determined by raters.

Given that PTSD is the most consistent predictor of changes in reports, changes in PTSD from T1 to T2 were included as predictors in all analyses. We conducted one set of ordinal regressions with overall changes in PTSD as a predictor and then a second set of regressions with changes in the three PTSD symptom clusters (re-experiencing, avoidance, and hyperarousal) as predictors. Potential covariates (T1 dissociation, time since trauma, trauma type [assaultive vs. non-assaultive], and demographics) were screened in bivariate regression analyses; significant covariates were then included in the ordinal regression.

Results

Quantification of inconsistency

See Table 3 for the percent agreement in reports of each perceived trauma severity characteristic from the T1 to the T2 assessment. Slightly more than half the sample had consistent scores at T1 and T2, with the remainder split roughly equally between reporting more intense or less intense trauma at T2. Very few participants changed from one extreme to the other (e.g., from reporting their life was threatened *extremely* at T1 to *not at all* at T2), and more of these extreme changes were in the direction of reporting less severe trauma over time.

Table 4 presents Cohen's kappa to quantify agreement between T1 and T2. All kappas were relatively low but statistically significant (except the marginally significant kappa for peritraumatic emotionality), indicating that agreement between assessments was greater than that expected by chance. Results of McNemar's (1947) test and marginal homogeneity tests were nonsignificant (see Table 4), indicating that changes in reporting for all outcomes were equally likely to be in the more severe versus less severe direction.

Table 3. Percent Sample With Changes in Reported Severity of Trauma Exposure Characteristics from T1 (Baseline) to T2 (6-Week Follow-up).

	Reported severity decreased (%)	No change in reported severity (%)	Reported severity increased (%)
Severity of life threat	27.0[a]	55.4	17.6
Severity of threat of loss of a body part	24.0[b]	54.7	21.3[c]
Severity of threat of serious injury	22.7[b]	60.0	17.3[c]
Peritraumatic emotionality	25.4	59.2	15.5

[a]One participant (1.4% of the sample) changed from "extremely" to "not at all." The rest changed by a smaller degree.
[b]Four participants (5.4% of the sample) changed from "extremely" to "not at all." The rest changed by a smaller degree.
[c]Two participants (2.7% of the sample) changed from "not at all" to "extremely." The rest changed by a smaller degree.

Table 4. Statistics Quantifying Consistency of Reported Severity of Trauma Exposure Characteristics from T1 (Baseline) to T2 (6-Week Follow-up).

	Kappa	McNemar/Marginal homogeneity
Severity of life threat	0.32**	MH stat = 1.33
Severity of threat of loss of a body part	0.22*	MH stat = 0.56
Severity of threat of serious injury	0.40**	MH stat = 0.87
Peritraumatic emotionality	0.21#	$\chi^2 = 1.24$

#$p < .10$. *$p < .05$. **$p < .01$.

Predictors of inconsistency

Next we conducted bivariate analyses to determine potential covariates for use in regressions to predict changes in reporting (see Table 5 for bivariate correlations; dichotomized data were also analyzed using chi square analyses). These bivariate analyses indicated that changes in the three Criterion A1 trauma severity characteristics were nonsignificantly correlated with T1 dissociation, time since trauma, trauma type, or demographic variables, with the exception of ethnicity, which was marginally related to change in threat of serious injury, such that White participants tended to report less severe threat over time, $\chi^2(2, N = 74) = 5.22$, $p = .07$. Two covariates were significantly correlated with changes in peritraumatic emotionality: (1) Time between trauma and first assessment was a marginally significant correlate; those who were interviewed sooner after the trauma tended to report less fear at T1 and thus were more likely to show an increase in reporting of peritraumatic emotionality from T1 to T2, $F(2, 67) = 2.98$, $p = .057$. (2) Men were more likely to report a decrease in peritraumatic emotionality over time than women, $\chi^2(2, N = 70) = 7.23$, $p = .03$. Thus, gender and time since trauma were included as covariates in analyses predicting changes in peritraumatic emotionality.

We conducted separate ordinal regressions for each of the four trichotomous outcome variables, using change in total PTSD symptom scores as a predictor of changes in each of the four dependent variables (see Table 6, Panel 1). Changes in PTSD significantly predicted changes in reporting of life threat and loss of body part, but not threat of injury or peritraumatic emotionality. Regarding peritraumatic emotionality, only time since trauma negatively predicted changes in this outcome: Those who were interviewed sooner after the trauma showed an increase in reports of peritraumatic emotionality from T1 to T2.

See Table 6, Panel 2 for results of the regressions using changes in individual PTSD symptom clusters as predictors. Avoidance was a significant predictor of changes in the reporting of life threat and threat of loss of a body part and was a marginal predictor of changes in peritraumatic emotionality. Hyperarousal and re-experiencing were also significant predictors of changes in reported life threat severity: Hyperarousal in the expected direction and re-experiencing in the

Table 5. Correlations Among Predictor Variables, Changes in Trauma Severity Characteristics, and Changes in PTSD.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Δ Life threat[a]															
2. Δ Body part threat[a]	.54**														
3. Δ Injury threat[a]	.35**	.38**													
4. Δ Peritraumatic emotionality[a]	.18	.12	.23												
5. Gender	−.06	.22	.04	.24*											
6. Age	.03	.07	−.16	−.03	—[f]										
7. Ethnicity	.05	−.17	−.26*	−.16	—	—									
8. Employment	.22	−.12	−.12	−.08	—	—	—								
9. Education	.04	.12	−.16	.11	—	—	—	—							
10. Trauma type	.12	.03	.15	.07	—	—	—	—	—						
11. Time since trauma	.08	.13	−.07	−.27*	—	—	—	—	—	—					
12. Dissociation	.07	.07	−.10	.00	—	—	—	—	—	—	—				
13. Δ Total PTSD[a]	.30*	.26*	.16	.05	−.07	−.11	−.30**	−.15	−.15	.44**	−.03	.15			
14. Δ Re-experiencing[a]	.07	.15	.18	.00	−.07	−.02	−.34**	−.19	−.05	.33*	−.07	.10	.87**		
15. Δ Avoidance[a]	.32**	.29*	.12	.14	.04	−.02	−.23*	−.09	−.16	.35**	.12	.06	.80**	.55**	
16. Δ Hyperarousal[a]	.33**	.19	.10	−.03	−.16	−.23*	−.18	−.11	−.15	.46**	−.14	.21	.83**	.66**	.42**

[a]Δ = Change from T1 to T2.
[b]Male = 1, Female = 2.
[c]White = 1, Non-White = 0.
[d]Employed = 1, Unemployed = 0.
[e]Assaultive = 1, Non-assaultive = 0.
[f]Dash (—) indicates that correlations in these quadrants are the same as Table 1.
*$p < .05$. **$p < .01$.

Table 6. Multivariate Ordinal Regression Predicting Changes in Reported Severity of Trauma Exposure Characteristics From T1 (Baseline) to T2 (6-Week Follow-up; $N = 77$).

	Δ[a] Report of severity of life threat	Δ Report of severity of threat of loss of a body part	Δ Report of severity of threat of serious injury	Δ Report of peritraumatic emotionality
	Regression coefficient (SE)	Regression coefficient (SE)	Regression coefficient (SE)	Regression coefficient (SE)
		Panel 1: Overall PTSD Symptom Score as IV		
Ethnicity[b]	—[c]	—	−1.12 (.58)[#]	—
Gender	—	—	—	.82(.54)
Days between injury and Time 1 assessment	—	—	—	−.06(.04)[#]
Δ PTSD symptoms	**.06(.02)***	**.05(.02)***	.02(.02)	.02(.03)
Model Statistics	$X^2(1) = 6.90$, $p = .009$	$X^2(1) = 5.27$ $p = .022$	$X^2(2) = 5.73$, $p = .06$	X^2 (3) = 8.01, $p = .044$
		Panel 2: PTSD Symptom Cluster Scores as IV's		
Ethnicity	—	—	−1.07 (.60)	—
Gender	—	—	—	—.66(.55)
Days between injury and Time 1 assessment	—	—	—	**−.09(.04)***
Δ Re-experiencing	**−.23(.09)***	−.05(.08)	.06(.09)	−.01(.10)
Δ Avoidance	**.17(.07)****	**.13(.06)***	.00(.06)	.14(.07)[#]
Δ Hyperarousal	**.25(.08)****	.06(.07)	−.00(.07)	−.08(.09)
Model Statistics	$X^2(3) = 19.38$, $p < .001$	$X^2(3) = 7.41$, $p = .060$	$X^2(4) = 5.95$, $p = .203$	$X^2(5) = 11.71$, $p = .039$

Note: Bolded text highlights those results that are significant at the $p < .05$ level.
[a]Δ = "Change from T1 to T2."
[b]Ethnicity coded as White vs. non-White.
[c]Dash (—) indicates variable was not significant in bivariate analyses; for parsimony was not included in multivariate analyses.
[#]$p < .10$. *$p < .05$. **$p < .01$.

opposite direction.[6] Similar to the prior analysis, the only significant covariate was time between trauma and assessment of peritraumatic emotionality.

Discussion

To our knowledge, this study was the first to assess consistency of reports of Criterion A1 characteristics (severity of threat to life, loss of a body part, and serious injury) and peritraumatic emotionality in the immediate aftermath of a single-incident, acute traumatic physical injury. Our analysis considered a number of demographic, event-related, and response factors that could potentially affect perceived trauma severity. These results both replicate and extend existing reports regarding moderate levels of inconsistency in reporting (Dekel

[6]This was likely an artifact. First, when entered on its own, change in re-experiencing was not a significant predictor. Second, changes in re-experiencing are correlated with changes in avoidance ($r = .55$) and changes in hyperarousal ($r = .66$).

& Bonanno, 2013; Giosan et al., 2009; Hepp et al., 2006; Koenen et al., 2007; Krinsley et al., 2003): About half of the physical injury survivors in this study reported perceived trauma severity that was consistent between the in-hospital baseline to 6-week follow-up assessments (and most changes were not extremely large).

Those whose reports differed at follow-up were equally likely to report either more or less severe trauma over time, contrasting with studies that have demonstrated amplification of reporting over time (e.g., Bolton et al., 2006; Giosan et al., 2009; King et al., 2000; Krinsley et al., 2003; Roemer et al., 1998; Southwick et al., 1997; Wessely et al., 2003). However, with the exception of Giosan and colleagues, the majority of prior studies involved continued media or cultural exposure to combat or wartime-related trauma versus a single-incident traumatic event. Additionally, although kappa levels in this sample were relatively low compared to other studies (e.g., Krinsley et al., 2003; Ouimette et al., 2005), this issue may be accounted for by our initial assessment being conducted close to the actual traumatic event (see Koenen et al., 2007), by use of single-item indicators of reporting, and by our examination of the subjective versus objective aspects of the event (see Dekel & Bonanno, 2013).

PTSD symptoms and reporting consistency

Increases in total PTSD symptoms, particularly avoidance symptoms, predicted increases in reported severity of these event characteristics. Consistent with the finding that PTSD symptoms are associated with *increased* reporting of objective trauma exposure (Bolton et al., 2006; King et al., 2000), they were also predictive of reports of increased severity of two of the three A1 perceived trauma severity characteristics (severity of life threat and threat of loss of a body part) at the 6-week versus in-hospital assessment. This increase in reporting may be related to a failure of habituation or fear extinction (Mollica et al., 2007), thereby resulting in a likelihood to "amplify" certain aspects of their trauma memories. However, changes in PTSD were not predictive of inconsistency regarding the A1 characteristic of threat of serious injury, and results were mixed regarding ratings of peritraumatic emotionality. Additionally, after controlling for gender and time since trauma, ratings were enhanced for peritraumatic emotionality, but none of the variables included in the model were uniquely predictive of this inconsistency; time since trauma only emerged as a trend, such that earlier assessments (i.e., closer to the trauma) were associated with enhanced reporting of peritraumatic emotionality at follow-up. It is possible that additional predictors of inconsistency would have emerged with a larger sample size and greater power.

With regard to the individual symptom clusters, an increase in the reporting of hyperarousal symptoms across time was predictive of increased symptomology for the outcome of life threat only. Giosan et al. (2009) similarly found that hypervigilant symptoms early on (but not later) predicted trauma memory

amplification; thus, it is possible that these hypervigilant symptoms (e.g., the feeling that danger may be imminent, thereby relating to life threat) and the consequent physical manifestations of these symptoms are important in the acute phase of trauma.

Avoidance emerged as the symptom cluster that was the most predictive of changes in reporting of perceived trauma severity across time. Increases in avoidance symptoms were associated with significantly increased reporting of severity of life threat and threat of loss of a body part and were associated with marginally significantly increased reporting of peritraumatic emotionality. Our finding is in contrast to two studies in which avoidance predicted decreased reporting following trauma (Giosan et al., 2009; Ouimette et al., 2005). However, as previously mentioned, avoidance may be likely to either decrease *or* increase reporting given that early avoidance may lead to later re-experiencing, which would predict trauma memory amplification (King et al., 2000). As avoidant coping is thought to perpetuate PTSD symptoms by impeding habituation and/or processing of the traumatic memory into a less distressing and/or coherent narrative (Bryant & Harvey, 1995), avoidance as a means of coping with trauma is central to most theories and therapies for PTSD.

Contrary to prior studies that have documented re-experiencing symptoms to be associated with enhanced trauma reporting (Koenen et al., 2007; Ouimette et al., 2005; Roemer et al., 1998), intrusions were predictive of *decreased* reporting of life threat severity. Given that the three PTSD symptom clusters are highly correlated, this may be a spurious finding as it is the only outcome in which re-experiencing symptoms emerged as a significant predictor. Regardless, the emergence of avoidance versus re-experiencing as predictive of inconsistency may be attributable to the timing of assessment of perceived trauma severity in the acute aftermath of the event. This may reflect the short-term usefulness of avoidance as a strategy for most people, or that fear of the trauma memory contributes to early downplaying of its seriousness and/or to later inflation of its seriousness (see Bolton et al., 2006). Longitudinal studies with longer follow-up time points would help to tease apart this relationship and see whether it would unfold differently over time.

Meaning of inconsistency in reporting

Though it is not well understood, multiple explanations for the presence of reporting inconsistencies have been proposed. Consistent with our findings, trauma survivors may initially inhibit their reporting of the stressful experience due to the presence of avoidance and numbing symptoms immediately post-trauma (see Bolton et al., 2006). Then, "motivated recall" may occur during the latter assessment timeframe, which would enhance reporting of trauma characteristics. Another such proposed mechanism for memory amplification is source monitoring, which occurs when people confuse and integrate

information learned after the trauma (intrusive memories or conversations) with what actually happened during the event (Strange & Takarangi, 2015). Alternately, trauma survivors may have different interpretations of items, forgotten certain aspects of the trauma between assessment times, or incorporated other people's recollections of the trauma into their own, thereby creating inconsistencies in reporting (Engelhard & McNally, 2014). Indeed, this is consistent with the memory literature more generally, which finds that both emotional and non-emotional memories are subject to distortion and modification over time (though traumatic events are better remembered than less personally significant events; van Giezen et al., 2005).

It is also unknown whether and how these inconsistencies in reporting are related to the accuracy in recall of the traumatic event. More specifically, increased symptoms may either lead to symptom exaggeration (decreased accuracy) *or* better access to memories (increased accuracy). On the other hand, symptom reduction may be associated with forgetting details of the trauma and less accurate reporting (see Brewin, 2011), or with individuals moving forward and minimizing the memory of the trauma (Dekel & Bonanno, 2013; Mollica et al., 2007). Though our data cannot speak to the accuracy of trauma recall or to other mechanisms, future research into the accuracy of recall is warranted.

Strengths and limitations

Some limitations of this study warrant caution in interpreting the present results, including the low retention rate and small sample size at the 6-week follow-up. Retention rates also differed by education and race (non-retained participants tended to have less education and to identify as African-American). Given that the baseline interviews occurred during hospitalization following the traumatic event, several potential unmeasured factors may also impact trauma recall reports, including whether patients were taking sedative/anesthetic and/or pain medications, filing status of post-discharge disability-related claims, and/or the presence of post-concussive symptoms. Finally, our study cannot examine accuracy of memory reporting as we have no objective measure of event severity, nor any direct measure of trauma memory.

Despite these limitations, several strengths of this study include the use of standardized interview measures for both perceived trauma severity and PTSD symptoms, the acute time frame of assessment to limit recall bias, and the assessment of the subjective aspects of the exposure memory (vs. the presence or absence of exposure). Given that the relevant elements of Criterion A1 remained the same in the transition from *DSM-IV* to *DSM-5*, these results apply to PTSD diagnoses derived from both versions of the *DSM*. Further, the heterogeneity of the sample, reflecting the physical injury population as a whole, allows for generalization to hospitalized survivors of multiple types of traumas (motor vehicle accident, assaultive violence wounds, accidents, etc.).

Conclusion

This study provides useful baseline data regarding the consistency of perceived trauma severity reported by acute injury survivors. Despite minor changes in consistency over time, no robust predictors of these inconsistencies were identified; similar to prior studies with varied samples, changes in PTSD symptoms predicted change for some but not all of the trauma severity characteristics assessed. Extending this data to include assessments over months and years post-trauma may allow for additional predictors of consistency to emerge and would allow for a more detailed comparison with the majority of the literature that assessed trauma survivors years after the trauma exposure(s). Further, given the sparse extant data about trauma reporting consistency in populations, such as (non-combat) assaultive trauma survivors and the rare use of objective or external measures of trauma severity (e.g., physician ratings of medical injury severity and reports by key informants), future investigations of these aspects in regards to trauma reporting consistency are warranted.

In summary, though these results indicate some caution in relying on retrospective memory of perceived trauma severity, reports were not drastically influenced by changes in PTSD symptoms over time. As such, patient reports of perceived trauma severity should be considered an effective manner of informing diagnostic criteria. A better understanding of how to predict these changes in acute injury survivors—including use of additional change-related variables not analyzed here—may aid in informing clinical intervention and research in this population. Theoretically, these results indicate that—like other types of memory—memory for personal traumatic events is subject to some minor change over time. In a clini-pal context, our results imply that clinicians cannot assume that trauma memories are entirely accurate but that they are likely to be relatively consistent. It is possible that with treatment that decreases PTSD symptoms, the trauma will be remembered as less fear-inducing over time, though future research must examine this assumption.

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