POSTTRAUMATIC STRESS SYMPTOMS IN COLLEGE STUDENTS EXPOSED TO

HIGH-MAGNITUDE VERSUS LOW-MAGNITUDE STRESSORS

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include proprietary or classified information.

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POSTTRAUMATIC STRESS SYMPTOMS IN COLLEGE STUDENTS EXPOSED TO

HIGH-MAGNITUDE VERSUS LOW-MAGNITUDE STRESSORS

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THESIS ABSTRACT

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Since the introduction of PTSD, exposure to trauma has been critical to the

conceptualization of the disorder, although Criterion A, the stressor criterion, has

undergone several transformations since it originally appeared in DSM-III.

Notwithstanding the various changes to the Criterion A definition, exposure to a

traumatic event remains a diagnostic requirement for the diagnosis of PTSD. However,

studies have challenged this assumption and have suggested that Criterion A should be

removed from the *DSM* diagnostic requirements as it does not add specificity to the

diagnosis. The current study challenged the findings of one recent study that suggested

individuals who experienced non-Criterion A events had higher rates of PTSD, as well as

more severe PTSD symptoms, than did individuals who experienced Criterion A events.

A conceptual replication was conducted using a sample of young adults from Auburn

University who identified their most stressful life event. Rates of PTSD and PTSD

symptom severity were measured using three distinct definitions of Criterion A and three self-report measures of PTSD. Results demonstrated that careful classification of Criterion A versus non-Criterion A events resulted in individuals who experienced Criterion A events reporting higher rates of PTSD, as well as more severe PTSD symptoms across measures of trauma. Additionally, when stressful life events were rated on a dimensional severity scale, the distinction between Criterion A and non-Criterion A groups became more distinct. These results emphasize the importance of careful classification of Criterion A events and reinforce the idea that more severe events lead to more severe PTSD symptoms.

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INTRODUCTION

Since the introduction of posttraumatic stress disorder (PTSD) in the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition* (DSM-III; American Psychiatric Association [APA]) in 1980, exposure to trauma has been critical to the conceptualization of the disorder. According to *DSM-III*, "*The essential feature* of PTSD is the development of characteristic symptoms *after the experiencing of a psychologically traumatic event or events outside the range of human experience usually considered to be normal*," (p. 1517, emphasis added). While *DSM-III* recognized that not all individuals who experience traumatic stressors will develop PTSD, it specified that PTSD, by definition, occurs only in response to severe stress. A traumatic stressor is thereby a necessary, but not sufficient cause, of PTSD.

Criterion A, the stressor criterion, has undergone several transformations since its introduction in 1980. As Weathers and Keane (2007) noted, significant difficulties have been encountered in the attempt to define trauma, as stressors vary on a variety of dimensions including severity, frequency, duration, predictability, and controllability. According to *DSM-III,* Criterion A involved a "recognizable stressor that would evoke significant symptoms of distress in almost everyone," and should be, "outside the range of usual human experience." This definition had several limitations. For example, epidemiological studies have found that traumatic events are highly prevalent in the general population (e.g., Breslau, 2002; Kessler et al., 1995), although they do not evoke

PTSD symptoms in the majority of individuals who experience them. Additionally, the *DSM-III* definition was vague and allowed room for clinical interpretation.

The *DSM-III* definition of Criterion A was modified for *DSM-III-R* (APA, 1987) such that a list of event types that would qualify as traumatic events were listed. Green (1990) identified eight dimensions that result in events being traumatic: threat to one's life or bodily integrity, severe physical harm, receipt of intentional harm, exposure to the grotesque, sudden loss of a loved one, witnessing or learning of violence toward a loved one, learning of exposure to a harmful agent, and causing death or harm to another. Although these eight dimensions were not directly transferred to the *DSM-III-R* Criterion A definition, the spirit was much the same, in that the definition became a dimensional evaluation of trauma exposure. The *DSM-III-R* definition included the following phrase: "usually experienced with intense fear, terror, and helplessness," adding a subjective appraisal component to the diagnosis. As well, *DSM-III-R* broadened the definition to include "learning about a serious threat or harm to a close friend or relative."

DSM-IV (APA, 1994) introduced several new elements to the definition. Criterion A1 specifies the way in which an individual was exposed to trauma ("experienced, witnessed, or was confronted with"), as well as the nature of the event ("actual or threatened death or serious injury, or a threat to the physical integrity of self or others"). Criterion A2 inquires about the individual's reaction to the event, requiring a response involving "intense fear, helplessness, or horror." Additionally, *DSM-IV-TR* text provides a more extensive list of potentially traumatic events. Notable additions include: "being diagnosed with a life-threatening illness;" "developmentally inappropriate sexual

experiences without threatened or actual violence or injury;" and "learning about the sudden, unexpected death of a family member or close friend." Although Criterion A was organized into a two-part definition in *DSM-IV*, and the components of the current definition have appeared in different forms throughout *DSM* definitions of trauma, the underlying conceptualization of a traumatic event has not changed (Weathers & Keane, 2007).

Notwithstanding the various changes to Criterion A, exposure to a traumatic event remains a diagnostic requirement in the current *DSM-IV-TR* conceptualization of PTSD. Although the majority of individuals who experience significant stressful events do not meet criteria for PTSD, a does-response relationship between stressor severity and PTSD symptoms has been observed. Meta-analyses conducted by Brewin, Andrews, and Valentine (2000) and Ozer, Best, and Lipsey, and Weiss (2003) regarding research into the PTSD dose-response relationship summarized data supporting this phenomenon. Kilpatrick et al. (1998) noted PTSD results more frequently after Criterion A events than it does following less severe stressful life events. Breslau et al. (1998) also reported that the more severe the stressor and the more direct the exposure to the traumatic event (i.e., experiencing directly versus learning about) the higher the rates of PTSD.

A number of studies have challenged this core dose-response assumption of PTSD. The definition of Criterion A events has been called into question as some individuals argue that Criterion A is an unnecessary component for a diagnosis of PTSD. A chronological review of some of the most noteworthy of these studies follows.

Solomon and Canino (1990) investigated the assertion that in order to develop PTSD, an individual must experience an event "outside the range of usual human experience," as stated in the *DSM-III-R* definition. They questioned whether psychological traumas did in fact differ from more common stressful events in the PTSD symptoms they produced. They reported that "common" events, such as experiencing a move or financial difficulties, related more closely to PTSD symptoms than did events considered traumatic, such as a natural disaster. They also hypothesized that individuals may have difficulty linking PTSD symptoms to a traumatic event and therefore, linking of symptoms to a specific trauma should not be a requirement for PTSD diagnosis. Solomon and Canino analyzed data from interviews following two distinct traumatic experiences: floods and/or dioxin contamination and tropical rains resulting in mudslides and flooding. A group of control participants from each location were included among those interviewed. PTSD symptoms were measured using the Diagnostic Interview Schedule/Disaster Supplement (DIS/DS; Robins & Smith, 1983) one to two years following the traumatic events. In addition, a stressful life events scale was administered to assess lifetime trauma history and exposure to both "extraordinary" and "common" life events.

To test the utility of Criterion A, Solomon and Canino (1990) entered both common and extraordinary events as predictors in analyses of covariance (ANCOVA), controlling for the presence of lifetime predisaster PTSD symptoms. The results demonstrated that for the flood and/or dioxin contamination group, exposure did not significantly predict PTSD symptoms, although experiencing a move, financial

difficulties, and household illness/injury did. For participants experiencing tropical rains, disaster exposure did predict PTSD, as did breaking up with a best friend and having to take someone into one's home. They concluded that levels of PTSD following trauma exposure were low because participants had difficulty linking symptoms to the particular stressor. They argued that requiring participants to link symptoms of PTSD to an event resulted in an under-reporting of PTSD symptoms. To test this hypothesis, investigators compared participants' responses regarding the presence of similar symptoms in a depression interview ("Has there been a period in which you lost interest in things such as work, hobbies, or things that you usually liked to do for fun?" (p. 233)) and a PTSD interview ("Did you have any horrible experience that caused you to lose the ability to care about other people, or lose interest in things you used to enjoy?" (p. 233)). Of the participants who endorsed either question, 79% did so on the depression scale only.

Solomon and Canino (1990) concluded that "common" stressors related more closely to symptoms of PTSD than did traumatic events. They reported that maintaining the stressor requirement for PTSD diagnosis created a confound that made PTSD a difficult construct to empirically assess, and therefore impaired research into the disorder. Lastly, they suggested that Criterion A should be removed from the PTSD diagnostic criteria altogether in order to make the PTSD diagnosis consistent with many other *DSM* diagnoses by eliminating the etiologic factor. The primary limitation of this study was investigators' classification of "common" events, such that many of the events identified as common did meet the requirements for a Criterion A event (e.g., robbery, serious illness, household death, other close death).

Resnick, Kilpatrick, Dansky, Saunders, and Best (1993) also reported that linking PTSD symptoms to a particular traumatic event may be difficult for traumatized individuals, and therefore Criterion A is unnecessary for the diagnosis of PTSD. Investigators interviewed a sample of women and assessed for a history of Criterion A events, followed by administration of the National Women's Study (NWS) PTSD Module (Kilpatrick, Resnick, Saunders, & Best, 1989). Participants were not required to link PTSD symptoms to a traumatic event. A positive PTSD diagnosis was assigned if a participant met the *DSM-III-R* criteria based on symptoms endorsement. Of women sampled, 68.69% had experienced at least one Criterion A event lifetime. Among women with Criterion A exposure, 17.9% had lifetime PTSD and 6.7% had current PTSD. They concluded that rates of PTSD calculated using their assessment procedure (not requiring participants to link symptoms to events) did not result in differences in PTSD prevalence; therefore, they concluded Criterion A is not a necessary component of PTSD diagnosis. However, investigators did not report the rates of lifetime and current PTSD for the non-Criterion A group.

Kilpatrick and colleagues (1998) reported that overall rates of PTSD do not vary with different definitions of Criterion A, even when using a definition that allows any event perceived as traumatic by the individual to be deemed a Criterion A event. Therefore, they argued that Criterion A should be removed from the diagnostic criteria for PTSD. Investigators conducted the *DSM-IV* PTSD Field Trial study. In their efforts to evaluate Criterion A, they assessed prevalence rates of trauma exposure based on five proposed definitions for Criterion A, including one definition which permitted any event

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followed by significant symptoms of PTSD to be classified as Criterion A. Also included

were definitions corresponding to Criterion A as presented in *DSM-III-R* and *DSM-IV*.

Trauma exposure prevalence rates were not reported for the five definitions; however,

they stated that different Criterion A definitions produced comparable PTSD rates when

all other required symptoms were considered. Their conclusion, then, was that Criterion

A is an unnecessary component in the current PTSD diagnostic criteria. Kilpatrick and

colleagues argued that very few people develop PTSD symptoms following a non-

Criterion A event, and therefore, Criterion A does not add specificity to the diagnosis.

Gold, Marx, Soler-Baillo, and Sloan (2004) conducted a recent study that

appeared to provide clear data contradicting the necessity of Criterion A, as it is defined

in *DSM-IV-TR,* in the development of PTSD. Their study contradicted the argument

made by Kilpatrick and colleagues (1998) that few individuals experiencing non-

Criterion A events develop symptoms of PTSD by reporting that in their studies' sample,

individuals with trauma-incongruent events experienced more PTSD symptoms than did

individuals with trauma congruent events. Investigators collected information from

undergraduates who described having experienced at least one event the student felt was

traumatic. The original sample was divided into two groups, those with *DSM* trauma-

congruent events and those with *DSM* trauma-incongruent events. All participants were

administered the Brief Symptom Inventory (BSI; Derogatis, 1993), a self-report measure

of psychological distress, as well as the Posttraumatic Stress Diagnostic Scale (PDS; Foa,

1996). The PDS includes a checklist of potentially traumatic events and asks individuals

to endorse all events they have experienced, as well as choose the event that has impacted

them the most. Participants' responses to those items were used to classify their most

distressing event as *DSM* trauma-congruent or trauma-incongruent. The PDS also asks

individuals to report on the severity of PTSD symptoms experienced in the past month, in

order to produce an overall severity score and classify individuals with and without

PTSD.

Gold and colleagues (2004) found that the trauma-incongruent group reported

significantly greater PTSD symptom severity than did the trauma-congruent group,

although no difference in general distress was noted. More PTSD cases were found in

the trauma-incongruent group than in the trauma-congruent group. Additionally,

investigators ruled out the hypothesis that time since event accounted for the difference in

severity ratings and PTSD cases. Gold and colleagues (2004) concluded that this data

could be used to argue for the necessity of extending the definition of Criterion A to

include experiences identified by the trauma-incongruent group, such as parental divorce,

bereavement, and unrequited love.

The primary limitation to the study conducted by Gold and colleagues (2004) is

the lack of clarity regarding the Criterion A classification system employed by

investigators. It appears investigators classified death or illness of a loved one as a

trauma-incongruent event, even though *DSM-IV-TR* identifies "the sudden, unexpected

death of a family member or close friend," as an event that meets Criterion A1. Some of

their interesting findings my also stem from the use of the PDS as the only measure of

PTSD. The traumatic events checklist portion of the PDS does not include sudden loss of

a loved as a potential traumatic event. As well, the directions specifically state, "Put a

checkmark in the box next to ALL of the events that have happened to you or that you have witnessed," (Foa, 1996). These instructions do not allow events in which individuals have been "confronted with" traumatic news (e.g., learning that a family member was raped) to be classified as traumatic, as allowed for by the *DSM-IV-TR* definition of Criterion A.

Although the aforementioned studies examined differing data sets using a range of techniques, common threads were present throughout their arguments. Some argued that Criterion A is altogether unnecessary and should be removed from the *DSM* PTSD diagnostic requirements. Investigators also proposed that PTSD should be presented in *DSM* as a syndromal disorder without regard for etiologic events. Others stated that individuals experience difficulty linking PTSD symptoms to specific traumatic events, and therefore, recognition of a particular trauma should not be required for a diagnosis of PTSD. Finally, some investigators report that events not currently classified as meeting Criterion A are equally, or even more likely to result in the presence of PTSD symptoms. The current study aimed to address the final suggestion of Gold and colleagues (2004), namely that trauma-incongruent events are more likely to cause symptoms of PTSD.

Because the study conducted by Gold et al. (2004) has the potential to markedly affect the current conceptualization of PTSD and Criterion A events, it is important that the surprising findings be carefully considered and challenged. The current study attempted to rule out additional hypotheses accounting for the counterintuitive finding that non-Criterion A events are more strongly associated with self-reported PTSD symptoms than Criterion A events, by conducting a careful, intentional examination of a

large data set. Due to the similar nature of the studies, the current study conceptually

replicated and extended the study conducted by Gold and colleagues (2004). Both

studies examined a group of undergraduate students and their reactions to events they

perceived as traumatic. The current study, however, utilized multiple measures of PTSD,

a careful categorization of events as Criterion A or non-Criterion A based on participants

narrative data in addition to checklists, and a 7-point event severity rating scale to

examine the effect of event severity on PTSD.

<div align="center">METHOD</div>

Participants

Participants were male and female undergraduates recruited for an initial

questionnaire session by announcements for students of any age in undergraduate

psychology courses. Students who participated in the questionnaire session had self-

identified with the announcement as having experienced "a very stressful event, such as a

serious car accident, natural disaster (tornado, hurricane, and flood), physical or sexual

assault, or similarly stressful event." Some participants were also selected to return for a

diagnostic interview, though these data were not used in the current study. The Auburn

University Institutional Review Board approved the study.

Participants were 576 undergraduate students who completed the questionnaire

session of the study as an optional activity for extra credit in psychology courses at

Auburn University. Of these, 156 participants were excluded based upon the following

criteria: not enough information was provided to determine if the listed event met

Criterion A or not ($n = 27$); participant was missing more than 10% of PCL or PDS data

(n = 17); participant's PAI profiles were presumed to be invalid due to random responding, carelessness, reading difficulty, confusion, or neglecting to follow instructions, measured by Infrequency scale scores ≥ 75 T or Inconsistency scale scores ≥ 73 T (n = 40; Morey, 1991); participant endorsed an additional event to their index event either on the PCL or PDS (n = 72). Therefore, the final sample for the current study consisted of 420 participants.

Participants were predominantly female (n = 314; 75.1%) and Caucasian (n = 343; 81.9%) or African American (n = 49; 11.7%). Participants' ages ranged from 17 to 36 years (M = 20.2; SD = 2.2 years). Most were full-time students (n = 407; 96.9%) and single (n = 397; 94.5%). The distribution in education status of participants was 36.2% in their freshman year (n = 152), 21.4% in their sophomore year (n = 90), 17.9% in their junior year (n = 75), and 23.6% in their senior year (n = 99).

Measures

Participants completed the measures described below in their questionnaire packet. Packets were ordered such that participants first completed a demographics form, followed by the measures of trauma exposure. The PTSD and other measures were counterbalanced such that the longest measure (Personality Assessment Inventory (PAI; Morey, 2001)) was always presented either first or last, and the PTSD measures were always separated by another measure. Within this organization, the orders of the PTSD measures and the orders of the other measures were randomly assigned. Therefore, many of the measures administered were not used for the present study analyses, and included: the Impact of Event Scale - Revised (IES-R; Weiss & Marmar, 1997), the Life Threat and

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Betrayal Inventory (created for the current study), the Beck Anxiety Inventory (BAI; Beck, Steer, & Brown, 1993), the Beck Depression Inventory – Second Edition (BDI-II; Beck, Steer, & Brown, 1996), the Dissociative Experiences Scale – Second Edition (DES-II; Bernstein & Putnam, 1986), the Cognitive Distortion Scale (CDS; Briere, 2000), the Inventory of Altered Self-Capacities (IASC; Briere, 2000a), the Personality Assessment Inventory (PAI; Morey, 1991), and the Trauma and Attachment Belief Scale (TABS; Pearlman, 2003).

Trauma Exposure. Trauma history was assessed using the Life Events Checklist (LEC; taken from the Clinician-Administered PTSD Scale; Blake et al., 1995). The LEC is the self-report trauma assessment portion of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990), the most widely used structured interview for PTSD. The LEC consists of 17 items, including 16 items that assess exposure to specific categories of traumatic events (natural disaster, sexual assault, etc.) and one item, labeled "other," that assess exposure to events that do not fit into one of the specific categories. Respondents indicated their lifetime exposure to each of the categories of events by checking one or more of the following options: happened to me, witnessed it, learned about it, not sure, and does not apply. Next, they identified the worst event (the one that has caused the most problems), and reported whether that event met the *DSM-IV-TR* Criterion A1 (actual or threatened death or serious injury, or a threat to the physical integrity of self or others) and Criterion A2 (intense fear, helplessness, or horror). Finally, they provided a brief narrative of their worst event.

A research team composed of a doctoral level supervisor and three graduate students used an extensive coding system to determine whether an index event met Criterion A1 based on all information on the event reported in the participant's measures. This metric was created in order to assure that events considered Criterion A did, in fact, meet the *DSM-IV-TR* Criterion A definition. One doctoral level graduate student rated all LEC narratives as either meeting Criterion A1 or not, while two other doctoral level graduate students each rated half of the narratives. Events with a mismatched code, in which one rater coded there was not enough information available and the other rater coded that the event was definite Criterion A1 were submitted to further analysis with the doctoral level supervisor, and a consensus code was reached by discussion of each narrative. Of seven such events, two were determined to be definite Criterion A1 and five were determined to have not enough information available. As previously reported, 27 participants were removed from the sample because both raters concluded there was not enough information present to determine if Criterion A1 was met (e.g., "a death") or because after consensus it was determined that not enough information was available. Rater codes were then collapsed into either (1) definite Criterion A1 ($n = 332$) or (2) non-Criterion A ($n = 54$) and subthreshold Criterion A ($n = 34$). Kappa coefficients for inter-rater reliability were computed with these codes (kappa = .748) indicating acceptable agreement. A percent agreement of 91.66% was achieved.

Severity Rating. Prior to data analyses, and independent of Criterion A1 ratings, a team of two doctoral level graduate students, with guidance from a doctoral level supervisor, independently rated the severity of each participant's identified trauma using

the *DSM-III* (1980) suggested rating scale for the severity of psychosocial stressors on Axis IV. Graduate students evaluated stressors on several non-hierarchical and non-exclusionary guidelines (e.g., level of threat or injury, level of exposure, unpredictability, uncontrollability, closeness of perpetrator or victim, and chronicity). After rating 90 participants' events, graduate students met to discuss discrepancies and to increase their understanding of how the scale would be applied. Then the two students again independently rated each event. The original scale (a 7-point Likert scale), was intended for use with all psychosocial stressors (not just those preceding a PTSD diagnosis, such as preparation for retirement), and the current study applied the scale in a similar fashion, such that all identified stressors were rated, regardless of whether or not they met Criterion A. The anchor values provided by the *DSM-III* authors were as follows: 1 = None; 2 = Minimal; 3 = Mild; 4 = Moderate; 5 = Severe; 6 = Extreme; 7 = Catastrophic; 0 = Unspecified. Examples and distributions from the current data set were as follows: 1 = Taking an exam ($n = 1$); 2 = Did not receive football scholarship ($n = 23$); 3 = Divorce of parents ($n = 122$); 4 = Witnessed loved on in severe motor vehicle accident ($n = 153$); 5 = Suicide of close friend ($n = 88$); 6 = Held at gunpoint while house was robbed and friend was shot ($n = 16$); 0 = refers to items in which there is not enough information available to make a rating, for example, "taken advantage of," ($n = 17$). No events in the current sample were rated at a 7, or catastrophic. Inter-rater reliability was computed based on rater's determination of whether there was enough information to make a severity rating or not. Kappa coefficients for this reliability were computed (kappa = .653) indicating acceptable reliability and a percent agreement on whether enough

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information was provided or not was computed at 97.4%. A Pearson correlation was

calculated for ratings of severity (r = .748). Raters met to decide on a consensus severity

rating for each of the narratives on which they did not agree. Severity rating

discrepancies were resolved through discussion and assistance was provided by a

doctoral level supervisor. Seventeen of the 420 narratives were judged to contain not

enough information to make a severity rating, although the narratives were judged to

contain enough information to make a Criterion A1 rating (e.g., abortion without explicit

appraisal, multiple deaths in one week).

Posttraumatic Stress Disorder (PTSD). The questionnaire packet assessed

prevalence and severity of PTSD symptoms using three self-report measures. The PTSD

Checklist (PCL; Weathers, 1993) is a 17-item self-report measure that assesses each of

the 17 *DSM-IV-TR* symptoms of PTSD. On the specific version (PCL-S) that was used in

the present study, respondents first identified an index event and then referred to this

event as they completed the items. Respondents indicated how much they were bothered

by each PTSD symptom in the past month, using a five-point scale (1 = not at all to 5 =

extremely). The PCL has been used extensively in a wide variety of trauma populations

and has been shown to possess excellent psychometric properties (Blanchard, Jones-

Alexander, Buckley, & Forneris, 1996; Ruggerio, Del Ben, Scotti & Rabalais, 2003).

The Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1996) is a 49–item scale on

which participants are asked to identify which of a list of events have happened to them

or they have witnessed. Next, they are asked to identify the event that bothers them the

most, briefly describe the event, and report on the symptoms of PTSD they have

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experienced in the past month. Participants then identify whether or not their symptoms of PTSD have interfered in various domains (e.g., relationships, work, overall functioning). In contrast to the other measures of PTSD used in the current battery, the PDS includes a scale assessing the functional impairment caused by the symptoms of PTSD; however, the PDS does not allow for individuals to endorse events they have learned about and does not list sudden, unexpected death (SUD) as a event category.

The Detailed Assessment of Posttraumatic Stress (DAPS; Briere, 2001) is a 104-item self-report measure designed to assess for history of trauma exposure, reactions to past traumatic events, dissociation, symptoms of PTSD, alcohol and substance abuse, and suicidal ideation. The DAPS also includes two validity scales that evaluate underreporting and over-reporting of symptoms. These features set the DAPS apart from most other self-report measures of PTSD, and the DAPS appears to have excellent reliability and validity (Briere, 2001). However, other than the information provided in the manual, no published studies to date have evaluated the psychometric properties of the DAPS.

Hypotheses

The purpose of the current study was to conceptually replicate and extend the study conducted by Gold et al. (2004), and specifically, to examine several possible explanations for their counterintuitive findings. The following hypotheses were tested:

Hypothesis 1: Aside from the necessary modifications, a conceptual replication of the Gold et al. (2004) study was conducted. The replication was conceptual rather than exact for two reasons. First, Gold et al. did not sufficiently specify the Criterion A

classification scheme they employed. Therefore, although the classification of Criterion

A in the current study was based on an effort to follow as closely as possible the rules

that Gold et al. appeared to have followed, some inferences regarding their scheme were

necessary. Second, the LEC was used to assess trauma history, instead of the PDS

checklist utilized by Gold et al. for several reasons. First the design of the current study

included multiple measures of PTSD, several of which had their own trauma checklists.

For consistency, investigators designated the LEC as the primary trauma measure and as

so, the LEC was administered first to all participants. Second, the LEC is a

comprehensive measure of trauma in that it includes more event categories and assesses

all three exposure levels (experienced, witnessed, confronted with) as compared to the

PDS. Aside from these modifications, the current study closely paralleled the Gold et al.

study and was predicted to produce similar results. Specifically, when individuals who

identified SUD as their index event were included in the non-Criterion A trauma group,

as they appeared to be in Gold et al., rates of PTSD as well as PTSD severity would be

higher in the non-Criterion A group as measured by the PDS.

Hypothesis 2: After conducting a conceptual replication of the Gold et al. study,

SUD was reclassified as a Criterion A event. It was hypothesized that this change would

result in a reversal of the Gold et al. findings, such that the Criterion A group rather than

the non-Criterion A group would have a higher prevalence of PTSD and higher mean

PTSD severity scores, based on the PDS.

Hypothesis 3: A third hypothesis was that the PDS may have accounted in part for

the unexpected findings of Gold et al. (2004). The standard PDS scoring rule (items

endorsed at "1= once a week or less" or higher counted as PTSD symptoms) was hypothesized to be too lenient, thereby generating inflated prevalence rates of PTSD. Further, as a continuous measure of PTSD severity, the PDS was hypothesized to lack sufficient specificity for discriminating between the Criterion A and non-Criterion A groups. Building on Hypothesis 2, and thus including SUD as a potential Criterion A event, it was hypothesized that the PCL and DAPS would generate lower rates of PTSD overall and significantly improve discrimination between the Criterion A and non-Criterion A groups in terms of PTSD prevalence and PTSD symptom severity. .

Hypothesis 4: The fourth hypothesis was based on the possibility that using a dichotomous rating to classify stressful events as either Criterion A or non-Criterion A may result in setting too lenient of a threshold of stressor severity. To address this question, a 7-point rating scale of stressor severity was created, based on the rating scale for Axis IV used in *DSM-III*. It was hypothesized that better discrimination between Criterion A and non-Criterion A groups, with respect to PTSD prevalence and PTSD symptom severity, could be achieved by selecting a more stringent threshold of stressor severity for defining Criterion A. A cutoff score of four and above was chosen for the current study, such that any narrative with a severity rating of four or higher was classified as Criterion A events. This cutoff was chosen to set a more stringent threshold for classifying stressors as Criterion A events. Events with a severity rating of three or below were classified as non-Criterion A events.

RESULTS

This study attempted to conceptually replicate the results of Gold et al. (2004) and to account for their counterintuitive findings. Means across three different Criterion A classification systems and three measures of PTSD were compared using two-tailed, independent samples *t*-tests. Chi-square test of association were used to compare the number of individuals in the Criterion A and non-Criterion A trauma groups across three definitions of Criterion A who met diagnostic criteria for PTSD using the PDS, PCL, and DAPS. The three definitions of Criterion A were labeled as follows: replication refers to the use of the classification system as employed by Gold et al. including SUD in the non-Criterion A group; SUD-Inclusive refers to the classification system in which sudden, unexpected death was moved into the Criterion A category; stressor severity refers to the use of the 7-point severity rating scale cutoff of four and above as a Criterion A event.

Each of the three tables presents data relevant to each of the four main hypotheses. Table 1 presents the prevalence of exposure to various LEC events by category, exposure type, and Criterion A classification system. Table 2 presents PTSD symptom severity across measures of PTSD and classification systems to determine which measures and definitions provide the most discrimination among groups. Table 3 provides PTSD prevalence rates across three measures of PTSD and classification systems, and provides results from chi-square analyses to determine if significant differences exist between the Criterion A and non-Criterion A proportions of PTSD diagnoses.

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To test hypothesis 1, sudden, unexpected deaths, as they appeared to be in Gold et al. (2004), were classified as non-Criterion A events (Table 2, replication columns). The prevalence of PTSD as measured by the PDS and symptom clusters B, C, and D in the replication Criterion A group ($n = 272$) was 29.8 percent, and in the replication non-Criterion A group ($n = 148$) the rate was 26.4 percent. Prevalence rates were not significantly different when chi-square tests of proportions were conducted ($\chi^2 = (1, N = 420) = .552, p = .458$). When PTSD prevalence was measured using the PDS and symptom cluster B through F, the rate in the replication Criterion A group was 22.1 percent and in the replication non-Criterion A group was 18.9 percent. Again, the prevalence rates for the two groups were not significantly different ($\chi^2 = (1, N = 420) = .571, p = .450$). Prevalence rates with the replication definition of Criterion A were higher than rates found by Gold et al. (18 percent), although they were not clear which symptom clusters were used to make diagnoses. Severity ratings for replication Criterion A and non-Criterion A groups are presented in Table 2, and were significantly different only on cluster D (hyperarousal) symptoms. The results of the current study did not precisely replicate the results of Gold et al., in that higher rates of PTSD were not found in the replication non-Criterion A group nor was PTSD severity as measured by the PDS higher for the replication non-Criterion A group. However, the expected dose-response relationship was also unsupported. Replication Criterion A and non-Criterion A groups were nearly equivalent in both prevalence and severity ratings.

Analyses for Hypothesis 2 were conducted with sudden, unexpected death moved to the Criterion A group (SUD-inclusive, see Table 1). Employing this classification of

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Criterion A and non-Criterion A events, the percentage of participants meeting PDS cluster B, C, and D criteria for PTSD was 30.4 percent and 21.6 percent for SUD-inclusive Criterion A and non-Criterion A respectively, although this difference was not statistically different ($\chi^2 = (1, N = 420) = 2.658,\ p = .103$). Using the PDS and clusters B through F, rates of PTSD for SUD-inclusive Criterion A events were 22.3 percent and 15.9 percent in the SUD-inclusive non-Criterion A group. Again the prevalence rates were not significantly different ($\chi^2 = (1, N = 420) = 1.710,\ p = .191$). Movement of sudden, unexpected death to the non-Criterion A group did not result in significantly higher prevalence of PTSD in the Criterion A group as hypothesized. As shown in Table 2, PTSD severity as measured by the PDS was greater in the SUD-inclusive Criterion A group on symptom cluster D and total PDS severity ($p < .05$ for both).

As stated in Hypothesis 2, the use of the PDS in Gold et al. (2004) may have been too lenient, thereby generating inflated prevalence rates of PTSD and lacking sufficient specificity for discriminating the Criterion A and non-Criterion A groups. As Hypothesis 3 added to the second hypothesis, the SUD-inclusive definition of Criterion A was used for analyses. Both the PCL and DAPS produced lower overall prevalence rates of PTSD in the SUD-inclusive Criterion A and non-Criterion A groups (see Table 3). Prevalence rates differed when using the DAPS ($\chi^2 = (1, N = 420) = 4.089,\ p = .043$), but were not statistically different when using the PCL ($\chi^2 = (1, N = 420) = 2.306,\ p = .129$). As hypothesized, the PCL and DAPS both demonstrated the ability to differentiate between Criterion A and non-Criterion A groups, as groups differed significantly ($p < .05$ for all)

on PCL Cluster B, C, and D scores, PCL total scores, and DAPS Reexperiencing, Avoidance, Arousal, and Total scores.

Given the difficulty of classifying events into dichotomous categories (Criterion A versus non-Criterion A), and the concern that use of a dichotomous rating of stressful events may result in too lenient of a severity threshold, a 7-point severity rating scale was employed. Events rated as four or higher were classified as Criterion A events using the stressor severity classification system. The PDS and PTSD B, C, D clusters ($\chi^2 = (1, N = 420) = 5.490$, $p = .019$), the PDS and clusters B through F ($\chi^2 = (1, N = 420) = 7.529$, $p = .006$), the PCL ($\chi^2 = (1, N = 420) = 4.421$, $p = .035$), and the DAPS $\chi^2 = (1, N = 420) = 8.220$, $p = .004$) all produced significantly different rates of PTSD between stressor severity Criterion A and non-Criterion A groups. Severity ratings between the two groups were also different across all measures Cluster and Total scores with the exception of the PDS Cluster B (Reexperiencing) scale ($p < .01$ for all, see Table 2).

DISCUSSION

The purpose of the current study was to examine the relationship between Criterion A events (traumatic stressors) and symptoms of PTSD. More specifically, the current study addressed the surprising findings of Gold and colleagues (2004), who reported that college students who had experienced non-Criterion A events were experiencing more severe symptoms of PTSD and higher rates of PTSD than students who identified Criterion A events, both measured by the PDS. After conducting a conceptual replication of Gold et al., several hypotheses that might account for their findings were tested.

Contrary to the findings of Gold and colleagues, when the replication classification system was applied, proportions of Criterion A and non-Criterion A individuals diagnosed with PTSD using the PDS were not statistically different, nor did the groups vary in symptom severity. However, in line with the results of Gold et al., the Criterion A group did not have significantly worse PTSD severity or prevalence rates as would be expected given the dose-response relationship between trauma and PTSD.

The hypothesis that the classification of sudden, unexpected death as a non-Criterion A event would account for the findings of Gold et al. was partially supported. Although rates of PTSD remained statistically equivalent between the two groups, they did vary on PDS symptom severity, such that the SUD-inclusive Criterion A group reported significantly more severe PDS total scores and PDS cluster D (hyperarousal) scores. It was clear, however, that the classification of sudden, unexpected death alone could not account for the findings of Gold et al., although this classification decision did account for a portion of their findings.

Additional measures of PTSD demonstrated increased specificity in discriminating between Criterion A and non-Criterion A groups across classification systems. The DAPS performed particularly well, discriminating between groups across all definitions of Criterion A. The PCL also demonstrated better group discrimination than did the PDS, in that it was able to discriminate between SUD-inclusive Criterion A and non-Criterion A events on Cluster and Total scores of PTSD severity.

In order to address the concern that a dichotomous classification of traumatic events may result in a lower threshold of stressor severity, as traumatic events likely exist

on a continuum of severity, the 7-point stressor scale originally introduced in *DSM-III* was applied to LEC narratives. When events rated at four or higher were considered Criterion A events, the stressors severity classification resulted in the best discrimination between Criterion A and non-Criterion A groups across measures, in both prevalence and severity ratings.

The current findings suggest that more severe stressors do, in fact, result in more severe PTSD symptoms. Additional conclusions can be drawn from the data that suggest several areas for future research. First, limitations of the trauma history portion of the PDS (i.e., incomplete list of potential traumatic events and limited exposure levels represented) may confuse individuals who are completing the measure and are uncertain as to which PDS category would best fit their event. This may produce incomplete or inaccurate information for clinicians and researchers regarding the presence of PTSD symptoms. Additionally, the standard PDS scoring rule, which includes items endorsed as "1 = once a week or less" or higher as symptoms, may be too lenient. Researchers and clinicians should consider the use of more stringent PDS scoring rule to avoid overestimating PTSD prevalence and symptom severity.

Additional research should be conducted to evaluate the use of the DAPS as both a research and clinically useful tool for evaluating symptoms of PTSD. As a relatively new measure, it will be necessary for additional studies to replicate the findings of the current study that suggest the DAPS is a comprehensive measure that has the ability to detect differences between Criterion A and non-Criterion A groups at least as well as more well-validated measures such as the PCL and PDS.

Lastly, the use of the 7-point rating scale of stressor severity, based on the rating scale for Axis IV used in DSM-III, demonstrated significant utility in discriminating the individuals with Criterion A and non-Criterion A events across measures of PTSD. The severity rating scale allows for researchers and clinicians to look past exposure level and specific trauma type, to the core of the stressor. In development of the rating scale for the current study, several guidelines for rating were developed. Stressors were evaluated on several non-hierarchical and non-exclusionary guidelines, including level of threat or injury, level of exposure, unpredictability, uncontrollability, closeness of perpetrator or victim, and chronicity. Future research into the utility of a stressor severity rating would be useful and may prevent researchers and clinicians from being forced to make difficulty dichotomous classifications of complex stressful events.

Limitations and Future Directions

These results are restricted by the limitations of self-report measurement, such as the addition of error by individuals who did not follow instructions. The current study attempted to minimize the effects of careless responding by excluding participants who exhibited response patterns that suggested responding without attention to item content. Nevertheless, it would be desirable for studies to examine the differences across measures of PTSD using diverse methods of measurement, such as clinical interview, ratings of friends and family members, behavioral observation, and physiological indicators. Additional research should also control for the presence of predisaster lifetime trauma exposure as this presumably could confound results.

It is important to note that these findings were collected within a nonclinical sample, and therefore it is likely that these participants were relatively well-functioning compared to clinical samples. Given that there is evidence that PTSD is a dimensional disorder (Ruscio, Ruscio, & Keane, 2002), valuable information about the mechanisms of PTSD can be obtained from continuous measures of its underlying processes across the full range of symptom severity, including the relatively lower-severity sample of college students. With respect to the severe end of this continuum, there is evidence suggesting that the current sample included assessment of clinically relevant PTSD, with sample prevalence rates ranging from 30.4 to 6.1 percent depending on Criterion A and non-Criteiron A classification, as well as the measure used to evaluate PTSD. Additionally, during the diagnostic interview phase of the research protocol, several participants were judged by a clinical psychology graduate student to have met criteria for PTSD based on the CAPS and several participants disclosed participation in treatment for PTSD.

Also, given the exploratory nature of examining different classifications of Criterion A and non-Criterion A events across several measures of trauma, a large number of analyses were run and the likelihood that some of the individual significant findings could be a result of Type I error is relatively large. Therefore some of the significant differences may be due to chance and thus may not replicate in future studies.

Overall, the clear finding of this study was that, as expected, more severe stressor lead to higher rates of PTSD, as well as more severe PTDS symptoms. Careful classification of stressors as Criterion A or non-Criterion A events is important, as is selection of measures capable of detecting differences between group when they do, in

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fact, exist. Clinicians should ensure they conduct a thorough assessment of potentially traumatic events and should be cautious in determining if client's meet criteria for a diagnosis of PTSD, as this will affect treatment goals and the direction of therapy.

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Table 1
LEC trauma exposure based on Criterion A classification systems and exposure type

	Replication		SUD-Inclusive		Stressor Severity	
	Criterion A ($n = 272$)	Non-Criterion A ($n = 148$)	Criterion A ($n = 332$)	Non-Criterion A ($n = 88$)	Criterion A ($n = 257$)	Non-Criterion A ($n = 163$)
LEC Trauma Types	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Natural Disaster						
Experienced	31(11.4)	8(5.4)	31(9.3)	8(9.1)	27(10.5)	12(7.4)
Witnessed	1(.4)	1(.7)	1(.3)	1(1.1)	0(0)	2(1.2)
Confronted With	2(.7)	0(0)	2(.6)	0(0)	1(.4)	1(.6)
Fire or Explosion						
Experienced	6(2.2)	2(1.4)	6(1.8)	2(2.3)	6(2.3)	2(1.2)
Witnessed	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Confronted With	0(0)	1(.7)	0(0)	1(1.1)	0(0)	1(.6)
Transportation Accident						
Experienced	69(25.4)	12(8.1)	69(20.8)	12(13.6)	55(21.4)	26(16.0)
Witnessed	6(2.2)	0(0)	6(1.8)	0(0)	3(1.2)	3(1.8)
Confronted With	0(0)	1(.7)	0(0)	1(1.1)	0(0)	1(.6)
Other Serious Accident						
Experienced	8(2.9)	7(4.7)	8(2.4)	7(8.0)	9(3.5)	6(3.7)
Witnessed	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Confronted With	1(.4)	1(.7)	1(.3)	1(1.1)	0(0)	2(1.2)
Toxic Substance Exposure						
Experienced	1(.4)	0(0)	1(.3)	0(0)	0(0)	1(.6)
Witnessed	1(.4)	0(0)	1(.3)	0(0)	0(0)	1(0)
Confronted With	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Physical Assault						
Experienced	15(5.5)	3(2.0)	15(4.5)	3(3.4)	16(6.2)	2(1.2)
Witnessed	2(.7)	0(0)	2(.6)	0(0)	2(.8)	0(0)
Confronted With	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Assault with a Weapon						
Experienced	7(2.6)	0(0)	7(2.1)	0(0)	7(2.7)	0(0)
Witnessed	6(2.2)	0(0)	6(1.8)	0(0)	1(.4)	5(3.1)
Confronted With	3(1.1)	0(0)	3(.9)	0(0)	3(1.2)	0(0)
Sexual Assault						
Experienced	29(10.7)	2(1.4)	29(8.7)	2(2.3)	29(11.3)	2(1.2)
Witnessed	2(.7)	0(0)	2(.6)	0(0)	2(.8)	0(0)
Confronted With	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Combat Exposure						
Experienced	6(2.2)	0(0)	6(1.8)	0(0)	4(1.6)	2(1.2)
Witnessed	2(.7)	0(0)	2(.6)	0(0)	2(.8)	0(0)
Confronted With	1(.4)	0(0)	1(.3)	0(0)	1(.4)	0(0)
Captivity						
Experienced	1(.4)	0(0)	1(.3)	0(0)	1(.4)	0(0)
Witnessed	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Confronted With	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Life-Threatening Illness						
Experienced	17(6.3)	1(.7)	17(5.1)	1(1.1)	6(2.3)	12(7.4)
Witnessed	22(8.1)	9(6.1)	22(6.6)	9(10.2)	14(5.5)	17(10.4)
Confronted With	4(1.5)	1(.7)	4(1.2)	1(1.1)	2(.8)	3(1.8)

Table 1 (continued)

LEC Trauma Types	Replication		SUD-Inclusive		Stressor Severity	
	Criterion A ($n = 272$)	Non-Criterion A ($n = 148$)	Criterion A ($n = 332$)	Non-Criterion A ($n = 88$)	Criterion A ($n = 257$)	Non-Criterion A ($n = 163$)
	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Sudden, Violent Death						
Experienced	4(1.5)	0(0)	4(1.2)	0(0)	2(.8)	2(1.2)
Witnessed	7(2.6)	0(0)	7(2.1)	0(0)	6(2.3)	1(.6)
Confronted With	11(4.0)	1(.7)	11(3.3)	1(1.1)	10(3.9)	2(1.2)
SUD						
Experienced	0(0)	15(10.1)	15(4.5)	0(0)		2(1.2)
Witnessed	0(0)	13(8.8)	12(3.6)	1(1.1)	5(2.0)	5(3.1)
Confronted With	0(0)	33(22.3)	33(9.9)	0(0)	21(8.2)	12(7.4)
Other Stressful Event						
Experienced	6(2.2)	32(21.6)	6(1.8)	32(36.4)	3(1.2)	35(21.5)
Witnessed	0(0)	3(2.0)	0(0)	3(3.4)	0(0)	3(1.8)
Confronted With	1(.4)	2(1.4)	1(.3)	2(2.3)	0(0)	3(1.8)
Total						
Experienced	200(73.5)	82(55.4)	215(64.8)	67(76.1)	178(69.3)	104(63.8)
Witnessed	49(18.0)	26(17.6)	61(18.4)	14(15.9)	41(16.0)	34(20.9)
Confronted With	23(8.5)	40(27.0)	56(16.9)	7(8.0)	38(14.8)	25(15.3)

Note: Percentages indicate percentage within Criterion A and non-Criterion A groups by exposure level. LEC categories for Sexual Assault and Other Unwanted or Uncomfortable Sexual Experience were combined. No events from LEC categories Severe Human Suffering or Serious Injury, Harm, or Death you caused to Someone Else were reported. n = number in category. LEC = Life Events Checklist.

Table 2
PTSD severity across trauma measures and Criterion A classification systems

Trauma Measure	Replication			SUD-Inclusive			Stressor Severity		
	Criterion A M(SD)	Non-Crit A M(SD)	t	Criterion A M(SD)	Non-Crit A M(SD)	t	Criterion A M(SD)	Non-Crit A M(SD)	t
PDS									
Cluster B	2.9(2.9)	2.7(2.7)	.50	2.9(2.9)	2.3(2.5)	1.79	3.0(3.0)	2.5(2.7)	1.58
Cluster C	3.4(4.3)	2.8(3.3)	1.76	3.4(4.1)	2.6(3.5)	1.79	3.6(4.2)	2.6(3.5)	2.64**
Cluster D	3.1(3.3)	2.3(3.0)	2.24*	3.0(3.2)	2.1(3.0)	2.36*	3.2(3.3)	2.2(3.0)	3.15**
Total	9.4(9.2)	7.8(7.9)	1.76	9.3(9.0)	7.0(7.9)	2.24*	9.8(9.2)	7.3(8.0)	2.84**
PCL									
Cluster B	8.6(3.6)	8.6(3.7)	.04	8.8(3.8)	7.9(3.1)	2.17*	9.1(3.9)	7.9(3.0)	3.30**
Cluster C	11.3(5.2)	10.5(3.9)	1.65	11.3(5.0)	10.1(3.7)	2.08*	11.6(5.2)	10.2(4.0)	2.93**
Cluster D	8.5(4.0)	7.9(3.4)	1.62	8.5(3.9)	7.5(3.5)	2.18*	8.8(4.0)	7.5(3.4)	3.55**
Total	28.4(11.3)	27.0(9.6)	1.32	28.6(11.1)	25.5(8.9)	2.45*	29.4(11.5)	25.5(9.0)	3.70**
DAPS									
Reexperiencing	58.8(14.3)	55.9(12.9)	2.05*	58.7(14.2)	54.7(12.2)	2.37*	59.4(14.4)	55.4(12.6)	2.89**
Avoidance	56.2(14.2)	52.6(11.3)	2.61**	55.8(13.8)	51.8(11.2)	2.47*	56.5(14.1)	52.4(11.8)	3.04**
Arousal	56.6(14.0)	52.3(10.9)	3.23**	55.9(13.5)	52.1(11.3)	2.41*	56.6(13.3)	52.7(12.5)	2.95**
PTSD	57.3(13.3)	53.8(11.3)	2.64**	56.9(13.0)	52.9(11.0)	2.56*	57.7(13.2)	53.4(11.5)	3.35**

* $p < .05$, ** $p < .01$

Note: PDS = Posttraumatic Stress Disorder Scale; PCL = PTSD Checklist; DAPS = Detailed Assessment of Posttraumatic Stress; M = mean; SD = standard deviation; Non-Crit A = Non-Criterion A; PTST = DAPS total PTSD severity rating. DAPS scores reported are *t*-scores.

Table 3
PTSD prevalence rates across Criterion A classification systems and measures of trauma

Measure	Replication Criterion A (n = 272) n(%)	Non-Crit A (n = 148) n(%)	χ^2	SUD-Inclusive Criterion A (n = 332) n(%)	Non-Crit A (n = 88) n(%)	χ^2	Stressor Severity Criterion A (n = 257) n(%)	Non-Crit A (n = 163) n(%)	χ^2
PDS Dx									
Criteria b-d	81(29.8)	39(26.4)	0.55	101(30.4)	19(21.6)	2.66	84(32.7)	36(22.1)	5.49*
Criteria b-f	60(22.1)	28(18.9)	0.57	74(22.3)	14(15.9)	1.71	65(25.3)	23(14.1)	7.53*
PCL Dx	32(11.8)	10(6.8)	2.67	37(11.1)	5(5.7)	2.31	32(12.5)	10(6.1)	4.42*
DAPS Dx	44(16.2)	12(8.1)	5.40*	50(15.1)	6(6.8)	4.09*	44(17.1)	12(7.4)	8.22*

* p < .05
Note: Percentages indicate percentage within Criterion A and non-Criterion A groups. Dx = diagnosis; Non-Crit A = Non-Criterion A; PDS = Posttraumatic Stress Disorder Scale; PCL = PTSD Checklist; DAPS = Detailed Assessment of Posttraumatic Stress.