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# Understanding the pattern of PTSD symptomatology: a comparison of between versus within-group approaches

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**Abstract**

This report examines the influence of statistical approach on patterns of Posttraumatic Stress Disorder (PTSD). In this report, 114 women and 51 men were assessed using both the Clinician Administered PTSD Scale (CAPS) and the Posttraumatic Symptom Scale-Self Report measure (PSS-SR). Data were examined using both a between-group and a within-group design. In the between-group approach, three subsamples were formed, representing full syndrome PTSD (fPTSD), partial PTSD (pPTSD), and no PTSD. The fPTSD and pPTSD groups differed on total scores on both PTSD measures, although differences were noted between clinician and self-report measures in specific symptom clusters. In the within-group approach, curve estimation techniques were used to examine linear versus quadratic fit of the data, utilizing the sample as a whole, ranked according to a separate scale of clinical severity. A linear approach was noted for each measure. Results are discussed in light of current design choices in the literature and its impact on the understanding of post-trauma problems.


## 1. Introduction

Within the literature on PTSD, individuals who fail to satisfy diagnostic criteria yet report notable symptomatology have been termed as experiencing partial PTSD (pPTSD; e.g., Kulka, Schlenger, & Fairbank, 1990) or sub-syndromal PTSD (Hickling & Blanchard, 1992). Partial PTSD has been defined in a number of different ways. Stein, Walker, Hazen and Forde (1997) defined pPTSD as lacking one or two of the three required avoidance or numbing symptoms, and/or one of two required hyperarousal symptoms. A related but less stringent approach to defining pPTSD was proposed by Hickling and Blanchard (1992). According to these authors,

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classification of pPTSD involves meeting diagnostic criteria in the reexperiencing cluster and either the avoidance and numbing or the hyperarousal cluster, but not both. Perhaps the most lenient definition was used by Asmundson, Norton, Allerdings, Norton and Larsen (1998), who referred to pPTSD as meeting the required number of symptoms in two of the three symptom clusters, without specifying which cluster could be omitted. The goal of this study is to examine the impact that statistical approach exerts on patterns of symptomatology among individuals with different severity of post-trauma complaints.

It has only been in the last several years that researchers have started to look more closely at the similarities and differences between individuals with partial versus full syndrome PTSD. Available reports suggest a mixed picture, with individuals reporting fPTSD showing both similarities and differences when compared with individuals reporting pPTSD. For example, Blanchard and Hickling (2004) compared MVA survivors with fPTSD and pPTSD using the Clinician Administered PTSD Scale for DSM-IV (CAPS; Blake et al., 1990). In the initial assessment study, significantly more fPTSD participants reported each symptom in the avoidance and numbing cluster, as well as the re-experiencing cluster (with the exception of flashbacks) relative to the pPTSD group. Within the hyperarousal cluster, the groups only differed with respect to concentration difficulties. In a second, treatment-seeking cohort, the fPTSD and pPTSD groups differed on all 17 symptoms of PTSD (Blanchard & Hickling, 2004). To date, no other reports of PTSD symptom profiles have been published. Stein and colleagues (1997) examined interference from trauma symptoms and noted that individuals with pPTSD reported less interference in work and school functioning, relative to individuals with fPTSD, although no differences were noted with respect to home and social functioning. Schutzwohl and Maercker (1999) noted that individuals with pPTSD reported significantly lower scores on well-respected measures of anxiety, depression, and post-trauma symptoms, relative to individuals meeting diagnostic criteria. These reports suggest dimensions of similarity and difference between individuals with full and partial PTSD with respect to PTSD symptom clusters, as well as distress and interference caused by the symptomatology.

In some respects, prior reports have laid important groundwork in describing individuals with pPTSD and examining how they compare to individuals meeting criteria for the full disorder. However, it is unclear how to understand the reported differences (and similarities) between fPTSD and pPTSD. It is possible that these results reflect a meaningful distinction between individuals with fPTSD and pPTSD, which would suggest a qualitative distinction between those who satisfy diagnostic criteria and those who do not. However, it is equally possible that reliance on between-group designs in these studies may be partially responsible for these findings. A recent study by Ruscio, Ruscio and Keane (2002) departs in some important ways from the between-group approach and provides an interesting example of the effect of methodology in this area. Ruscio et al. used multiple taxometric procedures to examine PTSD in male combat veterans. This approach looks for relationships between variables that represent unique underlying classes or taxon. Data from the CAPS and the Mississippi Scale (Keane, Caddell, & Taylor, 1988) were combined to create three different sets of PTSD indicators and examined using three mathematically distinct taxometric procedures to evaluate the latent structure of PTSD. In this fashion, the authors relied on a within-sample approach in their examination of PTSD symptomatology. Each of the three taxometric procedures yielded curves that strongly suggested a dimensional solution to the symptom structure of PTSD. This study indicates that

prior studies may be providing an oversimplified picture of PTSD symptomatology owing to the reliance on between-group designs.

The current report has two aims. The first aim is to replicate prior observations of partial PTSD using a between-group approach. Participants included 165 individuals who had been involved in a serious MVA. They were categorized as full PTSD, partial PTSD, or no PTSD using the same criteria as Asmundson et al. (1998) and compared with respect to PTSD symptomatology using clinician and self-report measures. This approach will provide a means to assess the consistency of results across different measurement methods. The second aim is to explore the structure of PTSD symptoms using a within-group approach. To pursue this aim, curve estimation techniques were used to establish the best fit for PTSD symptom ratings, again using both clinician and self-report measures. Linear and quadratic functions were examined and compared in order to ascertain whether there was a significant fit with the data. Curve estimation techniques allow for inferences about the pattern of PTSD symptoms with increasing clinical severity. Contrasting these two analytic approaches could help to clarify the effect of design on studies examining post-trauma symptomatology.

## 2. Method

### 2.1. Participants

Participants included 114 women and 51 men ($n = 165$) who had experienced a serious MVA at least one month before participation (mean time since MVA = 32.2 months, SD = 49.6). In order to determine if the MVA met Criterion A for PTSD (American Psychiatric Association, 2000), participants were asked to rate feelings of fear, helplessness, danger and perceptions that they might die during the accident using 0–100 scales (where 0 = 'not at all' and 100 = 'extreme', Blanchard & Hickling, 2004). Participants needed to provide ratings at or above 50 on fear or helplessness (mean fear = 76.0, SD = 32.6; mean helplessness = 83.2, SD = 28.5) and a rating at or above 50 on perceptions of danger or that they might die (mean danger = 72.4, SD = 35.8; mean fear of dying = 35.8, SD = 41.2). All participants were between 18 and 65 years of age (mean age = 40.9 yrs., SD = 11.0). Within the sample, 140 (85 %) were Caucasian, 18 (11%) were African American, and 7 (4%) were of another ethnicity. Most participants (84%) were suffering from pain complaints, which were the result of injuries sustained during the MVA. Individuals with pain complaints tended to have experienced pain for at least 3 months (75% of the pain sub-sample). Participants were referred to the project by primary care physicians, physical therapists, chiropractors, massage therapists, a university pain service and specialists in rehabilitation and internal medicine as well as using flyers distributed in community centers and at the local Department of Motor Vehicles.[1]

[1] Participants were selected from a pool of 189 individuals. Of the 24 participants who were excluded, six had a significant head injury from the MVA and 18 were diagnosed with alcohol or substance abuse/dependence in the preceding six months.

### 2.2. Measures

*PTSD measures*. PTSD symptomatology was assessed with both clinician and self-report measures. The CAPS (Blake et al., 1990), a structured interview that assesses the 17 symptoms of PTSD identified in the current Diagnostic and Statistical Manual (DSM-IV; American Psychiatric Association, 2000) was administered. The CAPS includes standardized questions to determine the frequency and intensity of symptoms, as well as standardized questions assessing subjective distress, and impairment in social and occupational functioning due to the PTSD symptoms. Symptoms were assessed for frequency and intensity in the preceding month, using a 5-point Likert scale (e.g., 0 indicates that the symptom does not occur or does not cause distress and 4 indicates that the symptom occurs nearly every day or causes extreme distress and discomfort). Probes were added to the interview to determine whether each PTSD symptom was attributable to chronic pain.[2]

The CAPS has strong support for its reliability and validity (e.g., Weathers, Keane, & Davidson, 2001) and has been shown to be sensitive to the detection of PTSD in individuals following a MVA (Blanchard et al., 1996). In this report, several measures were derived from the CAPS: total severity score for all 17 symptoms (frequency + intensity) and severity score within each of the three symptom clusters (re-experiencing, avoidance and numbing, physiological hyperarousal).

In addition to these measures, each participant was rated by the interviewer using a 0–8 Clinical Severity Rating (CSR) for PTSD, where 0 indicates no symptom of the disorder, 4 indicates that the individual reports adequate symptomatology to satisfy the criteria for PTSD described within DSM-IV and reports notable interference or distress from these symptoms (thus, 4 = threshold rating for a diagnosable disorder), and 8 indicates extreme interference and distress. This rating scale is more commonly used with other diagnostic interviews such as the Anxiety Disorders Interview Schedule (DiNardo, Brown, & Barlow, 1994). The purpose of including the CSR was to give a separate but related indicator of symptom severity, which takes into account the level of distress and interference the individual is experiencing due to PTSD symptoms, as well as the presence and severity of symptoms.

The CAPS was administered by 8 trained clinicians who were advanced doctoral students in clinical and counseling psychology. All clinicians received extensive training in the use of the CAPS and methods for gauging the CSR (DiNardo, Moras, Barlow, Rapee, & Brown, 1993). All interviews were videotaped and 28% ($n = 47$) were randomly selected to be reviewed by a second clinician to establish reliability for the CAPS and the CSR. Inter-diagnostician agreement, reflected by interclass correlation, was strong for both the CAPS (total score: $r = 0.96$; re-experiencing cluster: $r = 0.97$; avoidance and numbing cluster: $r = 0.93$; physiological hyperarousal cluster: $r = 0.93$) and the CSR for PTSD ($r = 0.97$).

Additionally, participants completed the PTSD Symptom Scale-Self Report (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993). The PSS-SR contains 17 items, reflecting the DSM-IV symptoms of PTSD, which are rated on a 3-point Likert scale. This measure has good test-retest reliability over a 1-month interval and high internal consistency (Foa et al., 1993).

[2] For example, if a patient reported difficulty sleeping, the clinician assessed whether this symptom was due to pain. If so, the symptom was not scored on the CAPS.

As with the CAPS, the PSS-SR was scored to produce a total summed score and a score within each of the three symptom clusters. The PSS-SR demonstrated high internal consistency in this sample (total score: $\alpha = 0.94$; re-experiencing cluster: $\alpha = 0.89$; avoidance and numbing cluster: $\alpha = 0.87$; physiological hyperarousal cluster: $\alpha = 0.85$).

### 2.3. Procedure

All procedures were reviewed by the University at Buffalo—SUNY Institutional Review Board. After providing informed consent, the CAPS was administered to the individual. Each participant returned for a second appointment and completed a self-report battery that included the PSS-SR.

### 2.4. Analytic strategy

In order to pursue the first aim, participants were categorized as full PTSD, partial PTSD, and no PTSD, using the same criteria as Asmundson et al. (1998). This definition was selected as it is the least restrictive in the literature. In order to determine if an individual endorsed a symptom, the frequency rating had to be 1 or higher and the intensity rating had to be 2 or higher (Blanchard et al., 1995).[3] This categorization resulted in 62 patients in the no PTSD group (meeting criteria on one or none of the symptoms clusters), 32 in the partial PTSD group (meeting diagnostic criteria in two of the three symptoms clusters),[4] and 71 in the full PTSD group (meeting full diagnostic criteria). Then, the three groups were compared on the total and symptom cluster scores of the CAPS and PSS-SR using ANOVA.

To pursue the second aim, the CSR for PTSD was selected as the independent variable. Curve estimation techniques (via polynomial contrasts using the ANOVA) were used to examine the linear and quadratic fit for total and symptom cluster scores of the CAPS and PSS-SR. This approach allowed for examination of the pattern of PTSD symptoms with increased clinical severity.

In these analyses, effect size was determined based on partial $\eta^2$, which describes the percentage of variance accounted for. Using this measure, small effects range from 2–12% of variance, medium effects from 13–44% and large effects are those that account for 45% or more of variance (Cohen, 1988). Bonferroni correction was used within each measure to control for multiple subscales.

## 3. Results

### 3.1. Examination of fPTSD, pPTSD, and no PTSD samples using between-group approach

*PTSD measures*. As reported in Table 1, a significant mean difference was found between the pPTSD and fPTSD groups with respect to the total CAPS scores as well as the avoidance and numbing and the hyperarousal symptom clusters. No difference between these groups was found

[3] Although Weathers, Ruscio and Keane (1999) suggest that this is a lenient rule to use in the diagnosis of PTSD, it has been shown to reliably identify individuals suffering from PTSD after a MVA (Blanchard et al., 1995).

[4] For the pPTSD group, 26 participants were missing criteria in the avoidance and numbing symptom cluster while only six individuals were missing criteria in the hyperarousal cluster.

Table 1
Mean and standard deviation for MVA survivors with no PTSD, partial and full PTSD on PTSD measures[1]

| | no PTSD ($n = 62$) | pPTSD ($n = 32$) | fPTSD ($n = 71$) | $F$ (2,162) | Partial $\eta^2$ | $p$ |
|---|---|---|---|---|---|---|
| *CAPS* | | | | | | |
| Total score | 15 (13)[a] | 44 (12)[b] | 69 (17)[c] | 223.80 | 0.734 | 0.001 |
| Reexperiencing symptoms | 6 (7)[a] | 17 (7)[b] | 21 (8)[b] | 72.10 | 0.471 | 0.001 |
| Avoidance and numbing symptoms | 5 (6)[a] | 12 (5)[b] | 27 (8)[c] | 167.30 | 0.674 | 0.001 |
| Hyperarousal symptoms | 4 (4)[a] | 14 (5)[b] | 22 (7)[c] | 174.50 | 0.683 | 0.001 |
| *PSS-SR* | | | | | | |
| Total score | 8 (9)[a] | 22 (12)[b] | 29 (11)[c] | 64.23 | 0.442 | 0.001 |
| Reexperiencing symptoms | 3 (2)[a] | 9 (4)[b] | 12 (4)[b] | 54.83 | 0.404 | 0.001 |
| Avoidance and numbing symptoms | 3 (4)[a] | 9 (5)[b] | 12 (5)[c] | 54.86 | 0.404 | 0.001 |
| Hyperarousal symptoms | 4 (3)[a] | 8 (4)[b] | 9 (4)[b] | 37.63 | 0.317 | 0.001 |

*Note*: CAPS = The Clinician-Administered PTSD scale, PSS-SR = PTSD Symptom Scale—Self Report.
[1] Means with the same superscript are not statistically different.

on the reexperiencing cluster. The no PTSD group differed from the other two groups on the total CAPS score and each symptom cluster (see Table 1). A slightly different picture emerged on the PSS-SR (see Table 1). A significant difference was found between the pPTSD and fPTSD groups on the total PSS-SR score and the avoidance and numbing cluster. However, no difference was found between these groups on the reexperiencing and the hyperarousal symptom clusters. As with the CAPS, the no PTSD group differed from the pPTSD and fPTSD groups on the total PSS-SR score and each cluster (see Table 1).

When considering the effect sizes for the CAPS and the PSS-SR, it is notable that the clinician ratings (CAPS) showed considerably larger effect sizes relative to self-reported symptoms (the PSS-SR, see Table 1). The observed power for both measures was 1.00, indicating robust analyses.

### 3.2. Examination of PTSD symptoms using within-group approach

*PTSD measures*. Using a within-group approach, the data were examined for linear and quadratic fit, using polynomial contrasts. A linear relationship was noted between CSR ratings and the total score on the CAPS and scores in each symptom cluster (see Table 2). A linear relationship was also noted between CSR ratings and the total score on the PSS-SR, as well as each symptom cluster score (see Table 2).

As with the between-group approach, the effect sizes for the clinician ratings (CAPS) was considerably larger relative to self-reported symptoms (the PSS-SR; see Table 2). The observed power for both measures was 1.00, indicating robust analyses.[5]

[5] In order to explore the potentially confounding role of group differences in elapsed time since the accident, the number of individuals who were assessed between one and three months post-MVA was determined. Eleven out of the 165 participants had waited less than three months since their accident for their evaluation, of whom five were diagnosed with full PTSD. The statistical analyses were conducted again excluding these 11 participants and no changes were observed in the results. As such, the inclusion of individuals with less than three months recovery post-MVA did not appear to impact the obtained results.

Table 2
Linear and quadratic components and their respective effect sizes between Clinical Severity Ratings and PTSD measures

| | Linear component $F(1, 157)$ | Partial $\eta^2$ | $p$ | Quadratic component $F(1, 157)$ | Partial $\eta^2$ | $p$ |
|---|---|---|---|---|---|---|
| *CAPS* | | | | | | |
| Total score | 848.11 | 0.844 | 0.001 | 0.07 | 0.004 | n.s. |
| Reexperiencing | 216.03 | 0.579 | 0.001 | 0.83 | 0.005 | n.s. |
| Avoidance and numbing | 549.73 | 0.778 | 0.001 | 4.78 | 0.030 | n.s. |
| Hyperarousal | 297.56 | 0.655 | 0.001 | 0.16 | 0.001 | n.s. |
| *PSS-SR* | | | | | | |
| Total score | 135.88 | 0.464 | 0.001 | 0.11 | 0.001 | n.s. |
| Reexperiencing | 111.48 | 0.415 | 0.001 | 0.12 | 0.001 | n.s. |
| Avoidance and numbing | 115.93 | 0.425 | 0.001 | 0.04 | 0.0002 | n.s. |
| Hyperarousal | 961.32 | 0.310 | 0.001 | 1.00 | 0.0004 | n.s. |

*Note*: CAPS = The Clinician-Administered PTSD scale, PSS-SR = PTSD Symptom Scale—Self Report.

## 4. Discussion

This report was designed to expand available data about the pattern of PTSD symptoms, with particular focus on comparing between and within-group approaches. The first aim was to replicate prior findings concerning partial PTSD using a between-group approach. As reported previously, the fPTSD group reported higher scores on the CAPS and PSS-SR, both on the total score and the avoidance and numbing cluster score, relative to the pPTSD group. The two groups did not differ in their reexperiencing symptom score on either measure. A difference between the CAPS and the PSS-SR was noted for the hyperarousal symptom score, with the two groups showing a significant difference only on the CAPS. These results are consistent with prior studies where individuals with fPTSD have reported higher levels of total PTSD symptoms than individuals with pPTSD (Blanchard & Hickling, 2004; Schutzwohl & Maercker, 1999).

The second aim was to explore the pattern of PTSD symptoms with increasing levels of clinical severity, using curve estimation techniques to examine the adequacy of fit of linear and quadratic components. On both the CAPS and the PSS-SR, a significant linear pattern was found for total scores, as well as each symptom cluster. Thus, in this sample of MVA survivors, the results suggest a pattern of symptomatology that shows a linear relationship with increased clinical severity. These results are consistent with the recent results of Ruscio et al. (2002) that strongly suggest a quantitative structure of PTSD symptoms using taxometric approaches. Given differences between the samples and the statistical approaches used in the current report and by Ruscio et al. (2002), some degree of replication is suggested across studies.

In interpreting these findings, it is interesting to contrast the seemingly contradictory results from the between-group versus the within-group approaches. The between-group analyses seem to imply clear differences between individuals with pPTSD and those satisfying diagnostic criteria, while the within-group results suggest a pattern of increasing symptoms and distress with increasing levels of clinical severity. In light of these observed differences in results, it is possible that previously published distinctions between full and partial PTSD may be due to reliance on

between-group designs. In contrast, curve estimation techniques suggested that individuals who satisfy diagnostic criteria and those who fall one or two symptoms short of PTSD criteria may not be qualitatively different but rather quantitatively different.

Like most empirical studies, the current report has both strengths and weaknesses. A strength of this study is the inclusion of both clinician and self-report measures. Second, this study includes both male and female participants, unlike related work that has focused exclusively on male combat veterans (e.g., Ruscio et al., 2002). As well, this study used relatively simple statistical approaches, which do not require large sample sizes and should be easy to use in future studies. However, the present results may be specific to MVA-related PTSD or influenced by the presence of comorbid pain complaints in many participants. Additionally, overlap exists between the clinical severity ratings and the CAPS data. Specifically, the clinical severity ratings rely in part on the presence and severity of PTSD symptoms, although the interviewer also emphasizes distress and impairment in forming this rating. Given consistency between data from self-reported PTSD symptoms and the CAPS using both between-group and within-group approaches, increased confidence can be placed in these findings. Ideally, the use of an independent measure of clinical severity, such as global assessment of functioning ratings, would be useful in future efforts.

In sum, the current study demonstrates the important role of statistical approach in examination of the pattern of PTSD symptoms. As discussed by Ruscio et al. (2002), using categorical designs perhaps results in a simplified understanding of trauma recovery, particularly subsyndromal presentations of PTSD symptoms. The current study lends additional support to this assertion, by demonstrating the impact that research design can have on the obtained results.

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