



Published in final edited form as:

Psychol Assess. 2012 December ; 24(4): 1041–1047. doi:10.1037/a0028518.

The Correspondence of Daily and Retrospective PTSD Reports Among Female Victims of Sexual Assault

Kristin Naragon-Gainey,

University of Iowa, Department of Psychology, Veterans Affairs (VA) Puget Sound Health Care System, Seattle Division

Tracy L. Simpson,

VA Puget Sound Health Care System, Seattle Division

Sally A. Moore,

Evidence Based Treatment Centers of Seattle, VA Puget Sound Health Care System, Seattle Division

Alethea A. Varra, and

VA Puget Sound Health Care System, Seattle Division

Debra L. Kaysen

University of Washington, Department of Psychology

Abstract

Research addressing the association between daily and retrospective symptom reports suggests that retrospective reports are typically inflated. The current study examined the association between daily PTSD symptom reports over one month and a corresponding retrospective report (PTSD Checklist [PCL]; Weathers et al., 1993) for both total scores and symptom clusters. We hypothesized that greater PTSD symptom instability and greater depression would be associated with poorer daily-retrospective agreement. Data were collected from 132 female college students who were sexually assaulted. Multilevel modeling indicated very strong agreement between mean daily and retrospective reports for total scores and symptom clusters, with pseudo- R^2 ranging from .55 to .77. Depression symptoms did not moderate this association, but daily-retrospective agreement was lowest for the avoidance cluster, which was also the most unstable. Finally, retrospective recall for each symptom cluster showed acceptable specificity to the corresponding daily symptom clusters. Overall, these findings suggest that retrospective memories for global PTSD symptoms and symptom clusters, as assessed by the PCL, are consistent with daily reports over a one month period. Implications for clinical assessment methodology are discussed.

Across clinical and research settings, the vast majority of psychopathology assessment involves retrospective methodology. However, the expedience of using retrospective measures may come at the cost of decreased accuracy relative to real-time assessment. When individuals attempt to reconstruct their average experience of symptoms over time, they may answer based on numerous heuristic strategies, such as one's generic construction of oneself (Gorin & Stone, 2001), recent or extreme experiences (e.g., Kahneman, Fredrickson, Schrieber, & Redelmeier, 1993), and current mood state (e.g., Mayer, McCormick, & Strong, 1995). In addition, depressed individuals are subject to negative recall biases (see Gotlib & Joormann, 2010 for a review).

*Correspondence concerning this article should be addressed to Kristin Naragon-Gainey, who is now at the Center for Anxiety and Related Disorders, Boston University, 648 Beacon Street, Boston, MA 02215. kristin.gainey@gmail.com.

Numerous studies have examined correspondence of more frequent symptom reports or ecological momentary assessment (EMA) with retrospective summaries of the same time period. Most have found discrepancies in retrospective vs. real-time symptom reports, including depressive symptoms (Ben-Zeev & Young, 2010), panic attacks (de Beurs, Lange, & Van Dyck, 1992), disordered eating behaviors (Stein & Corte, 2003), alcohol use (Simpson et al., 2010; cf. Leigh, 2000), and affective instability (Solhan, Trull, Jahng, & Wood, 2009). However, daily vs. retrospective reports of average levels of pain intensity (Stone, Broderick, Shiffman, & Schwartz, 2004) and OCD symptoms (Gloster et al., 2008) have shown good agreement. It is important to note that many of the above studies have methodological limitations that may have affected conclusions, including a focus on statistical significance rather than effect sizes, very small sample sizes (i.e., N s < 30), analyses of single items rather than scales, and failure to address the treatment of missing data.

No study to date has compared retrospective measures of posttraumatic stress disorder (PTSD) with corresponding daily symptom reports, despite the frequency of retrospective PTSD assessment in numerous settings (e.g., clinical, research, forensic, disability/compensation). PTSD is among the more prevalent anxiety disorders (12-month prevalence = 3.5%; Kessler, Chiu, Demler, & Walters, 2005) and is associated with substantial functional impairment (Sherbourne et al., 2010). Memories of nontrivial, objective details of traumatic events often change substantially one to three years later (e.g., Engelhard, van den Hout, & McNally, 2008; Southwick, Morgan, Nicolaou, & Charney, 1997), but whether this effect is specific to episodic memory of events or if it generalizes to recall of PTSD symptoms is unknown.

Temporal instability of symptoms may adversely affect accuracy of retrospective recall for PTSD, as it is more difficult to summarize symptoms that vary greatly in intensity or frequency (e.g., Frederickson, 2000; Perrine & Schroder, 2005; Stone, Schwartz, Broderick, & Shiffman, 2005). PTSD is a multidimensional construct that includes some symptoms that are likely to be relatively stable (e.g., inability to recall important aspects of trauma, sense of foreshortened future) and others that are more context-dependent and may therefore be more variable (e.g., physiological reactivity and distress due to trauma cues, hypervigilance, avoidance of situations/people). Thus, it is important to assess PTSD symptom recall at the lower order level, as recall accuracy may vary across symptom clusters.

The current study examines the association of daily reports of PTSD symptom clusters over the course of one month with a corresponding retrospective report in a sample of nonclinical female sexual assault victims. We test the following hypotheses: 1) due to the negative recall biases associated with depression, greater depression will be associated with poorer daily-retrospective agreement for PTSD symptoms; 2) symptom clusters found to have less day-to-day stability will have poorer daily-retrospective agreement, relative to more stable symptom clusters. In addition, we evaluate whether there is evidence of specificity between daily reports of symptom clusters and retrospective reports of those same symptom clusters.

Method

Participants and Procedure

A total of 11,544 undergraduate women ages 18 to 25 were randomly selected and invited to be screened for a larger study examining the feasibility of using PDA's to assess daily PTSD and negative affect as risk factors for problem drinking in female sexual assault or abuse victims. Of those invited, 4,342 completed the screening survey and 752 (17%) met the study criteria of sexual victimization and consuming 4 or more drinks on one occasion at least twice in the past month. Of these, 729 completed the baseline survey (97%) and 216

(29.6%) met criteria for participating in the daily diary portion of the study (i.e., at least one intrusive and one hyperarousal PTSD symptom in the past month). These participants were randomized into either a daily diary group ($n = 144$) or a measurement reactivity control group ($n = 72$) that completed screening, baseline, and post-study assessments only.¹ The 132 participants assigned to the daily diary condition who completed a post-study assessment 30 days after the baseline assessment are the focus of the current report and are included in all analyses unless otherwise noted. These participants completed 70% of the daily assessments overall; 68% of participants completed more than 20 days of monitoring and 79% completed more than 15 days (i.e., > 50% of the daily assessments). There were no significant differences between those missing more vs. less than 50% of the daily assessments for race, PTSD and depression symptoms, or weekly alcohol use.

The mean age of this sample was 20.1 ($SD = 1.4$ years). The self-identified ethnic composition of the sample was as follows: 12% Asian/Pacific Islander, 2% Black/African American, 1% Native American, 71% Caucasian/White, 10% Multi-Ethnic, and 4% other. Seven percent were of Hispanic ethnicity. Based on the Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997), 20% of the sample screened positive for current PTSD. Participants reported consuming a mean of 12.1 drinks in a typical week ($SD = 7.9$).

Participants reported an average of 1.4 incidents of childhood sexual abuse ($SD = 2.3$) and 3.5 sexual assaults as adults (i.e., age 14 or above; $SD = 2.9$). Forty-five percent of the sample reported at least one incident of childhood sexual abuse, and 7% of the sample reported being raped as a child. In terms of adult sexual assault, 53% of the sample reported being raped while incapacitated due to drugs or alcohol and 22% were raped with the threat or use of physical force. During the sexual assault that the participant deemed the worst, 33% were physically restrained and 27% thought they might be killed or seriously injured. Participants were also assessed for potentially traumatic non-sexual events; 91% reported one or more such traumas that were consistent with DSM-IV Criterion A for PTSD (as determined by the nature of the event and their response to it), with a mean of 3.4 ($SD = 2.5$) non-sexual traumatic events.

Eligible participants provided informed consent as approved by the [masked institution] Human Subjects Division prior to completing an online assessment regarding recent substance use, trauma history, and mental health symptoms. They then were instructed on the use of the handheld computers, which they used once in the morning and once in the evening to answer questions about PTSD symptoms, alcohol use, drinking context, mood, coping, and social support. PTSD symptoms were assessed in the morning only. Participants were paid \$10 for screening, \$35 for baseline, and \$10 for the post-monitoring assessment. They received \$1 per daily assessment, with a \$2 bonus for completing both daily assessments and a \$10 bonus for completing all 14 assessments in a week. Thus, participants could earn a total of up to \$215.

Measures

Adult Sexual Assault—A modified 18-item version of the Sexual Experiences Survey (SES; Koss & Gidycz, 1985) was used to assess sexual assault occurring from age 14 and over (Koss et al., 2007). Scores on the SES have produced acceptable internal consistency ($\alpha = .74$) and a 1-week test-retest reliability of 93% in a college student sample (Koss & Gidycz, 1985). Sexual assault was defined as any unwanted sexual contact after age 13.

¹Analyses reported in another manuscript suggested minimal measurement reactivity, as both groups reported comparable symptom decreases over 30 days (Masked Citation, 2012).

Childhood Sexual Victimization—The Childhood Sexual Victimization Questionnaire (CSVQ; Finkelhor, 1979) was used to assess childhood sexual abuse. The CSVQ assesses occurrence and frequency of sexual activities and the relationship of the perpetrator to the victim. For the present study, childhood sexual abuse was defined as sexual activity occurring prior to age 14 with a family member/trusted adult, or any unwanted sexual experiences with a person at least five years older than the respondent at the time.

Trauma Exposure—The Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000) assesses lifetime exposure to potentially traumatic events; we used a 17-item version that excluded sexual assault or abuse due to a more thorough assessment of these experiences with other measures. The TLEQ has follow-up questions to assess Criterion A. TLEQ scores have yielded acceptable test-retest reliability (83% agreement over 60 days) and convergent validity across multiple samples with varying degrees of trauma exposure (Kubany et al., 2000).

Screening for PTSD—The Posttraumatic Diagnostic Scale (PDS; Foa et al., 1997) was administered at baseline. It is a 49-item self-report scale based on DSM-IV criteria, and PDS scores have yielded excellent internal consistency ($\alpha = .92$) and 1-month test-retest reliability for PTSD diagnoses ($\kappa = .74$; 87.3% diagnostic agreement) in a trauma-exposed sample (Foa et al., 1997). PDS items were anchored to the worst sexual victimization event.

Retrospective PTSD Symptom Reports—The PTSD Checklist – Civilian version (PCL-C; Weathers et al., 1993) is a 17-item questionnaire that assesses Criteria B, C, and D of the PTSD construct. Participants rated how much they were bothered in the past month by each symptom on a 5-point scale ranging from “not at all” to “extremely”. The internal consistency of scores on the PCL-C was high in a trauma-exposed sample of veterans ($\alpha = .97$; Weathers et al., 1993). Participants were instructed to think about the worst sexual assault while filling out the PCL-C.

Daily PTSD Symptom Reports—The PCL-C wording was modified to fit the daily time frame and the words “stressful experience” were replaced with “unwanted sexual experience” to focus respondents on the Criterion A sexual trauma identified at baseline.

Depression Symptoms—At baseline, participants completed the depression subscale from the Brief Symptom Inventory (BSI; Derogatis, 1975). This 6-item subscale rates symptoms on a 5-point intensity scale, ranging from 0 (not at all) to 4 (extremely). Scores in a psychiatric sample produced an alpha of .85 and good convergent/discriminant validity (Derogatis, 1975).

Analyses

In order to present all scales on the same metric, we report “percent of maximum possible” (POMP) scores (P. Cohen, J. Cohen, Aiken, & West, 1999) in addition to raw scale scores. POMP scores were calculated with the following formula: $[(\text{raw score} - \text{minimum}) / (\text{maximum} - \text{minimum})] * 100$ (Cohen et al., 1999). We indexed symptom instability for each participant over the 30 days of monitoring with root mean squared successive difference (RMSSD), as it is a comprehensive measure of instability that includes frequency and amplitude of change, as well as temporal dependency (Ebner-Priemer, Eid, Kleindienst, Stabenow, & Trull, 2009). RMSSD scores, interpretable as an individual’s average daily fluctuation, were computed for those with at least 50% of the daily data ($n = 104$; 79%) because estimates based on less daily data are unlikely to be informative regarding day-to-day fluctuations. (The full sample was used for all other analyses). The formula for RMSSD

is $\sqrt{\sum (x_{i+1} - x_i)^2 / (n - 1)}$ where x_i = individual's score on the i th daily assessment and n = number of completed daily assessments.

Multilevel modeling (MLM) was applied to assess the correspondence between daily and retrospective symptom reports, as these analyses model the nested structure of the data (days within individuals) and account for missing data without biasing parameter estimates or standard errors (Singer & Willett, 2003). All multilevel models were run in HLM7, and predictors were grand mean centered. We calculated pseudo- R^2 to provide an effect size estimate for the explanatory power of each model: Pseudo- $R^2 = [\sigma^2_0$ (empty model) - σ^2_0 (model of interest)] / σ^2_0 (empty model), where σ^2_0 = between-person variance estimate (Singer & Willett, 2003).

We first examined agreement between daily and retrospective reports of global PTSD symptoms using the following models: 1) retrospective PTSD as a level 2 predictor of mean daily PTSD²; 2) retrospective PTSD as a level 2 predictor of mean daily PTSD, moderated by depression symptoms.³ To assess recall at the lower order level, we used the Simms, Watson, and Doebbeling (2002) model for the structure of PTSD symptoms—consisting of intrusions, avoidance, hyperarousal (i.e., hypervigilance and exaggerated startle), and dysphoria (i.e., the numbing symptoms and the remaining hyperarousal symptoms)—because a recent meta-analysis indicated that this model provides the best fit to the data generally (Yufik & Simms, 2010), and specifically for female victims of sexual assault (e.g., Ullman & Long, 2008). The POMP metric allowed for the comparison of instability across symptom clusters via paired t-tests (Cohen et al., 1999); a Bonferroni-corrected alpha was set at .008 (.05 / 6 comparisons). In order to assess the specificity of agreement across clusters, we evaluated MLMs in which each daily symptom cluster was predicted by each retrospective symptom cluster individually. Next, all four retrospective symptom clusters served as joint level-2 predictors for each daily symptom cluster.

Results and Discussion

Descriptive statistics for the daily measures and retrospective measures are shown in Table 1. Coefficients alpha were all above .70. The mean PCL-C score was in the subthreshold range for PTSD ($M = 36.5$; $SD = 13.1$), as was the mean BSI depression score ($M = 6.2$; $SD = 5.1$). Paired t-tests were conducted to examine differences in instability across symptom clusters. Daily symptoms of avoidance had significantly greater instability (POMP RMSSD = 16.3) than did the other symptom clusters (POMP RMSSDs = 11.3 to 12.3; $ps < .008$). Zero-order correlations among the daily symptom clusters and depression ($rs = .15$ to $.75$), as well as retrospective symptom clusters and depression ($rs = .12$ to $.64$), are shown in Table 1.

Multilevel modeling revealed very strong agreement between mean daily reports and retrospective total scores, with pseudo- R^2 indicating that retrospective reports accounted for 72% of the between-subjects variance in daily reports (Table 2).⁴ When retrospective

²Although it may seem counterintuitive to predict daily PTSD from a retrospective PTSD assessment collected after the daily reports, we chose this directionality because outcome variables in MLM are typically individual-level variables. This model is justified theoretically because the daily and retrospective reports assess the same symptoms over the same time period.

³We would theoretically expect instability to moderate daily-retrospective agreement, but we could not assess this model because mean daily levels and instability are both functions of daily scores. Such a model would violate the assumption of uncorrelated fixed and random effects.

⁴This strong agreement may be somewhat surprising given that visual inspection of the mean POMP values of daily vs. retrospective PTSD reports shows a consistent tendency for retrospective scores to be higher (Table 1). However, comparisons of the descriptive statistics are limited because they do not take into account missing daily data, whereas MLM adjusts parameter estimates and standard errors for missing data using maximum likelihood estimation.

depression was added to the model, its main effect and interaction term were non-significant ($ps > .40$). Furthermore, there was no difference in pseudo- R^2 for a model that included the depression-PTSD interaction term vs. a model with main effects (both pseudo- $R^2 = .71$; Table 2), indicating that depression level did not affect agreement between daily and retrospective PTSD reports.⁵

Table 2 also shows the results of the multilevel analyses at the symptom cluster level. We first ran models in which each mean daily symptom cluster was predicted by each of the retrospective clusters individually. For convergent analyses (e.g., retrospective intrusions predicting daily intrusions), agreement was variable but good in all cases (pseudo- $R^2 = .55$ to $.76$). Consistent with our hypothesis that more unstable symptom clusters would show poorer agreement, avoidance symptoms had the lowest pseudo- R^2 value ($.55$; next lowest value = $.62$ for intrusions). Although retrospective symptoms were also significantly predictive ($p < .001$) of mean daily symptoms in all discriminant analyses (e.g., retrospective intrusions predicting daily avoidance), predictive power was substantially weaker (pseudo- $R^2 = .18$ to $.38$) than in the convergent analyses (see Table 2).

Analyses predicting each daily cluster from all four of the retrospective symptom clusters are presented in Table 2. These analyses remove the considerable shared variance among the retrospective symptom predictors (see correlation matrix in Table 1). For daily levels of dysphoria and hyperarousal, each retrospectively-reported cluster was significantly predictive ($p < .001$) of its own daily levels only, with minimal or no additional variance explained by the other retrospective symptom clusters. In contrast, daily intrusion symptoms were significantly predicted by retrospective intrusions ($p < .001$) and retrospective hyperarousal ($p = .002$). Similarly, daily avoidance symptoms were predicted by retrospective avoidance ($p < .001$) and retrospective intrusions ($p = .021$). Taken together, retrospective recall was generally specific for each symptom cluster, with evidence for limited specificity in only 2 of 12 discriminant cases.

The results of this study suggest that trauma-exposed individuals can retrospectively report their PTSD symptoms over the past 30 days in a manner that is consistent with their daily reports. This is reassuring for both clinical and research contexts that assess PTSD symptoms via retrospective self-report. However, there are several circumstances where EMA or at least more frequent assessment of PTSD symptoms may be helpful. PTSD symptoms may be more unstable during therapy (e.g., “sudden gains”, or a spike in intrusive memories early in cognitive behavioral therapy) than prior to an intervention; as such, clinicians may wish to have clients complete relatively frequent symptom reports to increase the likelihood of accurate reporting. This may be especially important for avoidance symptoms, as they were the most variable and retrospective avoidance reports were the least consistent with daily reports in the current study. Finally, EMA is likely to be the preferred methodology if one is interested in a nuanced understanding of the shifting context in which symptoms occur or how symptoms change and interact with one another over time (e.g., Gloster et al., 2008; Stone et al., 2004).

Strengths of the current study include the use of MLM to handle missing data and account for the nested structure of the assessments, and examination of PTSD symptoms both overall and at the symptom cluster level. Still, this study also includes some notable limitations. First, since individuals reported their symptoms during the preceding 24 hours, the daily data included a retrospective component that could be subject to recall biases. Second,

⁵Because the sample had elevated and variable rates of alcohol use, we tested a model in which average number of weekly drinks moderated daily and retrospective agreement for PTSD reports. Moderation was not supported, as the interaction term added no predictive power beyond a main effects model (both pseudo- $R^2 = .72$; ps for main effect and interaction terms $> .15$).

although the PDS and PCL-C are well-established measures of PTSD symptoms, we did not include gold-standard interview measures of PTSD to establish diagnostic status. Third, because the sample was selected based on elevated alcohol use, the results may not be generalizable and should be replicated in other trauma-exposed samples.⁶ Finally, the current sample was a non-clinical sample. While such a sample may be more representative of the general population and allows for the inclusion of subthreshold PTSD symptoms independently associated with impairment (e.g., Marshall et al., 2001), results may not generalize to clinical samples with greater severity.

In conclusion, the current study found strong overall agreement between retrospective and daily reports of PTSD symptoms in a trauma-exposed sample, as well as good agreement and specificity at the symptom cluster level. This should be further examined using other measures of PTSD and clinical samples. In addition, we found substantial daily variability in PTSD symptoms (particularly avoidance symptoms); future studies should focus on assessing daily instability and how it may affect retrospective assessment.

Acknowledgments

This research was funded in part by National Institute of Alcohol Abuse and Alcoholism Grant R21AA016211 (Principle Investigator: Debra L. Kaysen). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Alcohol Abuse and Alcoholism or the National Institutes of Health, the University of Washington, or the Veterans Affairs Puget Sound Health Care System. We thank David Atkins, for his statistical consultation in the preparation of this manuscript.

References

- Ben-Zeev D, Young MA. Accuracy of hospitalized depressed patients' and healthy controls' retrospective symptom reports: An experience sampling study. *The Journal of Nervous and Mental Disease*. 2010; 198:280–285. [PubMed: 20386257]
- Cohen P, Cohen J, Aiken LS, West SG. The problem of units and the circumstances for POMP. *Multivariate Behavioral Research*. 1999; 34:315–346.
- de Beurs E, Lange A, Van Dyck R. Self monitoring of panic attacks and retrospective estimates of panic: Discordant findings. *Behaviour Research and Therapy*. 1992; 30:411–413. [PubMed: 1352100]
- Derogatis, LR. *Brief Symptom Inventory*. Baltimore: Clinical Psychometric Research; 1975.
- Ebner-Priemer UW, Eid M, Kleindienst N, Stabenow S, Trull TJ. Analytic strategies for understanding affective (in)stability and other dynamic processes in psychopathology. *Journal of Abnormal Psychology*. 2009; 118:195–202. [PubMed: 19222325]
- Engelhard IM, van den Hout MA, McNally RJ. Memory consistency for traumatic events in Dutch soldiers deployed to Iraq. *Memory*. 2008; 16:3–9. [PubMed: 17852729]
- Finkelhor, D. *Sexually victimized children*. New York: Free Press; 1979.
- Foa EB, Cashman LA, Jaycox L, Perry K. The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment*. 1997; 4:445–451.
- Fredrickson BL. Extracting meaning from past affective experiences: The importance of peaks, ends, and specific emotions. *Cognition & Emotion*. 2000; 14:577–606.
- Gloster AT, Richard DCS, Himle J, Koch E, Anson H, Lokers L, Thornton J. Accuracy of retrospective memory and covariation estimation in patients with obsessive-compulsive disorder. *Behaviour Research and Therapy*. 2008; 46:642–655. [PubMed: 18417100]

⁶The likelihood of replication in samples not selected for elevated alcohol use is bolstered by high comorbidity rates between substance misuse and PTSD (Kessler et al., 2005), and invariant PTSD symptom structure in substance using and non-substance using samples (Yufik & Simms, 2010). Furthermore, alcohol use did not moderate daily-retrospective agreement (Footnote 5).

- Gorin, AA.; Stone, AA. Recall biases and cognitive errors in retrospective self-reports: A call for momentary assessments. In: Baum, A.; Revenson, TA.; Singer, JE., editors. *Handbook of health psychology*. Mahwah, NJ: Erlbaum; 2001. p. 405-413.
- Gotlib IH, Joormann J. Cognition and depression: Current status and future directions. *Annual Review of Clinical Psychology*. 2010; 6:285–312.
- Kahneman D, Fredrickson BL, Schreiber CA, Redelmeier DA. When more pain is preferred to less: Adding a better end. *Psychological Science*. 1993; 4:401–405.
- Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month *DSM-IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*. 2005; 62:617–627. [PubMed: 15939839]
- Koss MP, Abbey A, Campbell R, Cook S, Norris J, Testa M, Ullman S, West C, White J. Revising the SES: A collaborative process to improve assessment of sexual aggression and victimization. *Psychology of Women Quarterly*. 2007; 31:357–370.
- Koss MP, Gidycz CA. Sexual Experiences Survey: reliability and validity. *Journal of Consulting and Clinical Psychology*. 1985; 53:422–423. [PubMed: 3874219]
- Kubany ES, Haynes SN, Leisen MB, Owens JA, Kaplan AS, Watson SB, Burns K. Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The Traumatic Life Events Questionnaire. *Psychological Assessment*. 2000; 12:210–224. [PubMed: 10887767]
- Leigh BC. Using daily reports to measure drinking and drinking patterns. *Journal of Substance Abuse*. 2000; 12:51–65. [PubMed: 11288474]
- Marshall RD, Olfson M, Hellman F, Blanco C, Guardino M, Struening EL. Comorbidity, impairment and suicidality in subthreshold PTSD. *American Journal of Psychiatry*. 2001; 158:1467–1473. [PubMed: 11532733]
- Impact of daily assessments on distress and PTSD symptoms in trauma-exposed women. 2012 Masked Citation. Manuscript submitted for publication.
- Mayer JD, McCormick LJ, Strong SE. Mood-congruent memory and natural mood: New evidence. *Personality and Social Psychology Bulletin*. 1995; 21:736–746.
- Perrine MWB, Schroder KEE. How many drinks did you have on September 11, 2001? *Journal of Studies on Alcohol*. 2005; 66:536–544. [PubMed: 16240561]
- Sherbourne CD, Sullivan G, Craske MG, Roy-Bryne P, Golinelli D, Rose RD, Chavira DA, Bystritsky A, Stein MB. Functioning and disability levels in primary care out-patients with one or more anxiety disorders. *Psychological Medicine*. 2010; 40:2059–2068. [PubMed: 20146834]
- Simms LJ, Watson D, Doebbeling BN. Confirmatory factor analyses of posttraumatic stress symptoms in deployed and nondeployed veterans of the Gulf War. *Journal of Abnormal Psychology*. 2002; 111:637–647. [PubMed: 12428777]
- Simpson TL, Galloway C, Rosenthal CF, Bush KR, McBride B, Kivlahan DR. Telephone monitoring compared with retrospective recall of alcohol use among patients in early recovery. *American Journal on Addictions*. 2010; 20:63–68. [PubMed: 21175922]
- Singer, JD.; Willett, JB. *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. New York: Oxford University Press; 2003.
- Solhan MB, Trull TJ, Jahng S, Wood PK. Clinical assessment of affective instability: Comparing EMA indices, questionnaire reports, and retrospective recall. *Psychological Assessment*. 2009; 21:425–436. [PubMed: 19719353]
- Southwick SM, Morgan CA, Nicolaou AL, Charney DS. Consistency of memory for combat-related traumatic events in veterans of Operation Desert Storm. *American Journal of Psychiatry*. 1997; 154:173–177. [PubMed: 9016264]
- Stein KF, Corte CM. Ecologic momentary assessment of eating-disordered behaviors. *International Journal of Eating Disorders*. 2003; 34:349–360. [PubMed: 12949927]
- Stone AA, Broderick JE, Shiffman S, Schwartz JE. Understanding recall of weekly pain from a momentary assessment perspective: Absolute agreement, between-and-within-person consistency and judged change in weekly pain. *Pain*. 2004; 107:61–69. [PubMed: 14715390]
- Stone AA, Schwartz JE, Broderick JE, Shiffman SS. Variability of momentary pain predicts recall of weekly pain: A consequence of the peak (or salience) memory heuristic. *Personality and Social Psychology Bulletin*. 2005; 31:1340–1346. [PubMed: 16143666]

- Ullman SE, Long SM. Factor structure of PTSD in a community sample of sexual assault survivors. *Journal of Trauma & Dissociation*. 2008; 9:507–524. [PubMed: 19042794]
- Weathers, F.; Litz, B.; Herman, D.; Huska, J.; Keane, T. The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility; Paper presented at the Annual Convention of the International Society for Traumatic Stress Studies; San Antonio, TX. Oct. 1993
- Yufik T, Simms LJ. A meta-analytic investigation of the structure of posttraumatic stress disorder symptoms. *Journal of Abnormal Psychology*. 2010; 119:764–776. [PubMed: 21090877]

Table 1

Descriptive Statistics

Scale	Mean		SD		α^a
	Raw	POMP	Raw	POMP	
<i>Mean Daily Scores</i>					
Total	28.73	17.25	12.18	17.91	.92
Intrusions	7.00	10.01	3.32	16.60	.83
Avoidance	3.56	19.48	2.06	25.70	.70
Dysphoria	14.59	20.61	6.85	21.40	.88
Hyperarousal	3.57	19.67	2.35	29.34	.93
<i>Mean Instability in Daily Scores (RMSSD)</i>					
Total	6.36	9.37	4.08	6.02	NA
Intrusions	2.26	11.28	1.79	8.96	NA
Avoidance	1.31	16.29 ^b	0.84	10.60	NA
Dysphoria	3.81	11.82	2.32	7.29	NA
Hyperarousal	1.07	12.31	0.90	11.31	NA
<i>Retrospective PCL Scores</i>					
Total	36.53	28.72	13.08	19.24	.92
Intrusions	9.36	21.82	3.74	18.70	.83
Avoidance	4.89	36.08	2.20	27.53	.78
Dysphoria	17.86	30.82	7.16	22.39	.86
Hyperarousal	4.42	30.21	2.59	32.36	.95
<i>Retrospective BSI Depression</i>	6.17	25.13	5.08	21.16	.85
<i>Zero-Order Correlations</i>					
	1.	2.	3.	4.	5.
1. Intrusions	—	.64	.56	.51	.24
2. Avoidance	.75	—	.51	.47	.26
3. Dysphoria	.63	.56	—	.60	.44
4. Hyperarousal	.66	.51	.67	—	.12
5. Depression	.15	.21	.42	.16	—

Note. $N = 104$ for RMSSD statistics; $N = 132$ for all others. POMP = percentage of maximum possible; RMSSD = root mean squared successive difference. In the correlation matrix, correlations below the diagonal are for mean daily PTSD scores; correlations above the diagonal are for retrospective PTSD scores (depression was assessed retrospectively only). All correlations at or above .18 are significant at $p < .05$.

^a median daily Cronbach alpha for daily scores.

^b Instability in the avoidance cluster was significantly greater than instability in the other three clusters ($p < .008$), which did not differ significantly from one another.

Table 2

Results of Multilevel Models Predicting Mean Daily PTSD Symptoms

Model Predictors	Coefficient	SE	df	p	Pseudo-R ²
<i>Criterion: Daily Global PTSD Score</i>					
Retrospective PTSD only	.668	.038	130	<.001	.72
Main effects of PTSD and depression					.71
PTSD	.660	.047	129	<.001	
Depression	.011	.043	129	.790	
Interaction of PTSD and depression					.71
PTSD	.665	.047	128	<.001	
Depression	.022	.045	128	.629	
PTSD X depression	-.001	.001	128	.464	
<i>Criterion: Daily Intrusions</i>					
Retrospective Intrusions	.493	.036	130	<.001	.62
Retrospective Avoidance	.223	.033	130	<.001	.27
Retrospective Dysphoria	.296	.039	130	<.001	.32
Retrospective Hyperarousal	.217	.037	130	<.001	.36
All retrospective symptom clusters					.66
Intrusions	.407	.040	127	<.001	
Avoidance	-.020	.032	127	.526	
Dysphoria	.043	.039	127	.271	
Hyperarousal	.083	.026	127	.002	
<i>Criterion: Daily Avoidance</i>					
Retrospective Intrusions	.661	.076	130	<.001	.38
Retrospective Avoidance	.540	.044	130	<.001	.55
Retrospective Dysphoria	.445	.070	130	<.001	.24
Retrospective Hyperarousal	.287	.049	130	<.001	.21
All retrospective symptom clusters					.58
Intrusions	.210	.090	127	.021	
Avoidance	.404	.058	127	<.001	
Dysphoria	.059	.072	127	.413	

Model Predictors	Coefficient	SE	df	p	Pseudo-R ²
Hyperarousal	.036	.048	127	.454	
<i>Criterion: Daily Dysphoria</i>					
Retrospective Intrusions	.468	.075	130	<.001	.23
Retrospective Avoidance	.286	.052	130	<.001	.18
Retrospective Dysphoria	.661	.042	130	<.001	.67
Retrospective Hyperarousal	.311	.041	130	<.001	.31
All retrospective symptom clusters					.67
Intrusions	.012	.071	127	.871	
Avoidance	-.006	.046	127	.898	
Dysphoria	.607	.057	127	<.001	
Hyperarousal	.060	.038	127	.120	
<i>Criterion: Daily Hyperarousal</i>					
Retrospective Intrusions	.740	.103	130	<.001	.29
Retrospective Avoidance	.408	.075	130	<.001	.19
Retrospective Dysphoria	.683	.083	130	<.001	.35
Retrospective Hyperarousal	.699	.036	130	<.001	.76
All retrospective symptom clusters					.77
Intrusions	.160	.086	127	.064	
Avoidance	-.048	.056	127	.389	
Dysphoria	.092	.069	127	.182	
Hyperarousal	.632	.046	127	<.001	

Note. N = 132. Raw scores were first converted to POMP metric, and predictors were grand mean centered. Pseudo-R² > .50 are shown in boldface.