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Impact of daily assessments on distress and PTSD symptoms in trauma-exposed women

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Abstract

As more advanced methodologies are developed for symptom assessment in traumatic stress studies, it is important to examine how these methodologies can exacerbate distress or contribute to symptoms among study participants. Using a sample of 202 female college students, we examined the changes in PTSD symptoms and general psychological symptomatology among groups of trauma-exposed and non-trauma-exposed women randomly assigned to complete 30 days of daily monitoring of traumatic symptoms and substance use behaviors using Personalized Digital Assistants (PDAs). These two groups were compared to a trauma-exposed sample of women who did not complete daily monitoring assessments and only completed pre- and post-monitoring online assessments. While trauma-exposed participants in the monitoring group reported more distress from the daily assessments than those in the monitoring group with no history of trauma, this distress level was relatively low. Online surveys delivered pre- and post-monitoring showed a similar pattern. Trauma-exposed participants in both monitoring and no monitoring groups reported a decrease in general psychological symptoms over the 30 days; however, monitoring participants reported increased levels of PTSD severity over time. Closer examination revealed the observed changes were relatively moderate. Participants expressed benefits and risks regarding study participation supporting the findings that repeated assessments of traumatic symptoms using personal handheld devices may lead to small increases in distress and PTSD symptoms, but that these approaches may be generally well-tolerated.

Keywords

daily assessments; PTSD; women; distress

Human Subjects Review Boards in the United States are guided by the Belmont Report (1979), which outlines the ethical principles of and guidelines for research involving human

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participants. One of these principles, beneficence, refers to researchers' obligation to "do no harm," which highlights the imperative that research studies be conducted with the goal of maximizing potential societal benefit while avoiding harm to individual participants in the process. Although psychological studies involving data obtained through interviews and surveys typically pose minimal risk to participants, questions that assess potentially traumatic incidents and/or resulting symptoms may raise concerns about whether, for these studies in particular, benefits outweigh their risks. Specifically, there has been debate about whether survey questions and interviews in trauma studies lead to substantial amounts of distress for research participants (Newman & Kaloupek, 2009). In light of the potential risk of reactivating thoughts, emotions, and details about a traumatic incident (e.g., rape, physical assault) that could lead to increased emotional suffering, continued work in this area is important.

Trauma researchers have addressed the issue of beneficence by asking participants after survey assessments and interviews how distressing they found discussing the event and trauma-related symptoms (e.g., Campbell, Adams, Wasco, Ahrens, & Sefl, 2010; Cromer, Freyd, Binder, DePrince, & Becker-Blease, 2006; DePrince & Freyd, 2004). Several studies including both undergraduate and community participants have found, on average, that participants (1) felt neutral (vs. distressed) about answering trauma-related questions and (2) disagreed (vs. agreed) that answering questions about trauma was distressing (DePrince, & Freyd, 2004; Edwards, Kearns, Calhoun, & Gidycz, 2009; Walker, Newman, Koss, & Bernstein, 1997). In addition, participants themselves perceived the benefits to outweigh the costs in these studies. For example, DePrince and Freyd (2004) found that although approximately one-third of women in undergraduate and community samples found questions about sexual and physical assault more distressing than questions about things encountered in everyday life, nearly all of these participants also indicated that the research was important and indicated that they did not think that asking such questions in research surveys was inappropriate or harmful. Those who do experience some distress agree that they would still elect to participate in a trauma-related study even considering how they felt afterwards (Walker et al., 1999), report willingness to be questioned about the traumatic experience again in the future (Griffin, Resick, Waldrop, & Mechanic, 2003), and report benefits from participation such as cathartic experiences from telling the story of the trauma and a sense of helping others (e.g., Campbell et al., 2010; Carlson et al., 2003). Other work has found when participants report distress after trauma-focused interviews and surveys, it is suggested that distress is minimal, does not impact continued presentation in the study, and does not impact negative views of research. For example, research with veteran participants found that while more distress was reported among those discussing trauma content versus neutral content and among those with a Posttraumatic Stress Disorder (PTSD) diagnosis versus no diagnosis, participants were no more likely to regret participating in trauma-focus studies and no less likely to withdraw from the studies than comparison groups who were not asked about trauma content (Ferrier-Auerbach, Erbes, & Poulsny, 2009; Parslow et al., 2000).

The fear of exacerbating symptoms through research may preclude researchers and clinicians from asking about traumatic material in detail during assessments. This fear bleeds into the treatment literature as well. For example, clinicians report concerns about exposure-based treatments (i.e., where traumatic material is repeatedly discussed) in exacerbating trauma symptoms themselves (such as re-experiencing and increased arousal), but also comorbid concerns such as increased suicidality, psychosis, and substance abuse (Becker, Zayfert, & Anderson, 2004). However, the research literature indicates these symptom exacerbations, increased risk of treatment dropout, and contraindications are unfounded (Foa, Zoellner, Feeny, Hembree, & Alvarez-Conrad, 2002; van Minnen, Harner,

Zoellner, & Mills, 2012). Thus, the literature to date suggests that trauma-focused assessments and treatments are tolerated with minimal distress and risks for withdrawal.

While participants generally report relatively low levels of distress from single-survey or one-time interview assessments, one area of research warranting further exploration is how repeated assessments may contribute to continued distress over time. This is especially important as researchers have begun to use novel and more intensive data collection procedures (e.g., computer-, cell-phone-, Internet-based assessments; daily diary assessment) to address research questions about proximal predictors of trauma symptom aggravation and changes in emotional and behavioral predictors over time. Many of these methodologies use extensive monitoring, either multiple times a day or daily over many days (e.g., Armeli, Todd, & Mohr, 2005; Henker, Whalen, Jamner, & Delfino, 2002). Extensive monitoring has important advantages as this methodology enables researchers to measure sequencing of symptoms, precipitants of symptoms, changes in symptoms as a function of treatment, and reduces memory decay by capturing more proximal reports (e.g., Simpson et al., 2011). However, it is unclear whether frequently monitoring symptoms is minimally distressing for research participants. Although repeated computer-based assessments and online questionnaires about trauma-related symptoms do not appear to be distressing for participants over consecutive days (e.g. Griffin et al., 2003), it is unknown whether this is also true of repeated assessments at the daily level for longer periods of time. Finally, it is important to extend the work of past studies and examine the changes in psychological symptoms over time that may result from participation in such studies. While immediate distress may be minimal, understanding whether assessment of reactions to traumatic incidents increases general psychological and PTSD symptomatology over time is equally important.

The Present Study

The present study was designed to examine how daily assessments of PTSD, affect, and substance use impact reported levels of distress among participants completing a daily diary study. For this purpose, we examined data collected as part of a larger study to examine the feasibility of using personal digital assistants (PDAs) to assess daily PTSD and negative affect as risk factors for problem drinking in female childhood or adult sexual assault/abuse victims. There is a substantial research base linking childhood or adult sexual assault with substance use and resulting problems among college women (Hruska & Delahanty, 2012; Messman-Moore, Ward, & Brown, 2009; Read et al., 2011; Ross et al., 2011) and the broader study focused on these behaviors specifically. For the present study analyses, two groups of participants (women with no-trauma history; women with histories of childhood or adult victimization) completed daily PDA assessments of PTSD symptoms for 30 days. Distress levels, interest in the study, and psychological symptoms were assessed via online surveys before and after the 30-day monitoring period. To determine if daily assessments themselves contributed to distress, a third group of trauma-exposed female participants completed the online pre- and post-monitoring assessments only.

Several hypotheses guided our analyses. First, we examined whether groups differed on baseline levels of PTSD and general psychological symptomatology, hypothesizing that trauma-exposed women would report greater symptom severity than the no trauma participants. Next, we examined how PTSD and general psychological symptomatology changed within each group after the course of the 30-day monitoring period. We expected daily monitoring of PTSD symptoms to lead to small increases in psychological symptoms among trauma-exposed women, but anticipated that the daily reporting would be generally well-tolerated. Similarly, we anticipated that distress ratings reported after the 30 day monitoring period would be higher among trauma-exposed women who completed the daily

monitoring than among those who did not monitor symptoms. We again anticipated these increases to be small and well-tolerated. We compared distress regarding both the online surveys and the daily assessments, hypothesizing based on previous research that reported distress would be comparable and well-tolerated using either methodology. The degree of interest in completing the online surveys and daily assessments were also compared. Finally, we examined themes among participants' open-ended responses regarding the benefits and harms of the study. It was hypothesized that participants in all groups would report perceived benefits along with minimal long-term emotional negative impact.

Method

Participants

Participants from a broader study on feasibility of methods capturing daily diary data were included in analyses for this study. The sample was comprised of 202 undergraduate women enrolled at a large, public, west-coast university. All participants reported consuming at least four drinks per occasion on at least two occasions in the past month. All procedures were approved by the university's Human Subjects Review Board and a federal certificate of confidentiality was obtained. Participants ranged in age from 18 to 39, with mean age of 20.13 ($SD = 1.95$). Seventy-one percent identified as White/Caucasian, while 15% identified as Asian/Pacific Islander, 3% as Hispanic/Latina, 2% as African American/Black, and 9% as "multi-ethnic" or "other ethnicities."

Procedures

The study was conducted in three phases: 1) two pre-monitoring online assessments (i.e., a screening and a baseline survey), 2) a 30-day monitoring period with PDA assessments; and 3) a post-monitoring online assessment. Two groups of participants completed daily monitoring assessments using PDAs, while one group completed online assessments only. Only participants with complete data were included in our analyses and are described here.

Randomization procedures as part of the larger study are described elsewhere (Kaysen et al., 2012). We obtained a list of 11,544 randomly selected undergraduate women at one large west coast university and invited them to the larger study via mail and email. Interested participants completed a 20-minute online screening assessment, $N = 4,342$ (37.6%). Of these participants, 860 (20%) met the study criteria of 1) consuming four or more drinks on one occasion at least twice in the past month, and 2) reporting either no history of trauma exposure or reporting sexual victimization (at least one incidence of childhood sexual abuse or one incidence of adult sexual assault that was not within the past three months). Three-hundred and eighteen participants (38%) were invited to the daily diary portion of the study if they met subsequent additional inclusion criteria: having no prior trauma history or (1) having at least one childhood sexual abuse experience or adult sexual assault that occurred more than three months ago (Criterion A traumatic event); (2) experiencing at least one PTSD intrusive symptom from Criterion B; and (3) experiencing at least one PTSD hyperarousal symptom from Criterion D. Criterion C symptoms were assessed as part of the broader study but were not included as inclusion criteria. We assessed childhood or adult sexual victimization based on the Sexual Experiences Survey (Koss & Oros, 1982) and the Childhood Victimization Questionnaire (CVQ; Finkelhor, 1979), and assessed for other trauma exposure using the Traumatic Life Experiences Questionnaire (TLEQ; Kubany et al., 2000). The Posttraumatic Diagnostic Scale (PDS;;Foa, Cashman, Jaycox, & Perry, 1997) was used to assess PTSD symptoms for purposes of study inclusion. A subsample of participants who met all three criteria for trauma exposure specified above were also retained to complete pre- and post-monitoring assessments but were not invited to the daily monitoring study.

For the purposes of this study, participants with complete data were categorized into three groups for analyses. Group 1 (trauma [monitoring]) contained 141 women who completed 30 days of daily monitoring. Group 2 (trauma [no monitoring]) contained 21 women who completed both the pre-monitoring and the post-monitoring assessment only. These participants did not complete daily monitoring surveys. Group 3 (no trauma [monitoring]) consisted of 40 women reporting no history of any DSM-IV PTSD Criterion A traumatic events. Similar to Group 1, Group 3 completed 30 days of daily monitoring and a post-monitoring assessment. All participants were paid \$45 for each of the pre- and post-monitoring assessments. Daily monitoring participants were paid one dollar for each assessment they completed with bonuses for completing both assessments in a day (\$2 bonus) and for completing all assessments in a 7-day period (\$10 bonus).

All groups completed both pre-monitoring and post-monitoring assessment, but only Groups 1 (trauma [monitoring]) and 3 (no trauma [monitoring]) completed daily assessments of PTSD symptoms, affect, and substance use. During daily assessments, Group 1 (trauma [monitoring]) was asked to consider their symptoms in relation to the DSM-IV Criterion A trauma specified in their baseline survey. Group 3 (no trauma [monitoring]) completed daily monitoring concerning their choice of one of the events they indicated experiencing on the TLEQ. Participants in the no trauma groups denied that the event both (1) involved actual or threatened death or serious injury, or a threat to the physical integrity of the self or other and (2) was met by participant with intense fear, helplessness, or horror. Denial of these criteria suggest that the Criterion A stressful event does not meet criteria for PTSD according to the DSM-IV. During the pre-monitoring assessments, participants completed self-report measures of demographic information, trauma exposure, PTSD symptoms, and current psychological distress as part of a larger battery. During the post-monitoring assessment, participants again completed self-report measures of PTSD symptoms, current psychological distress, and post-study satisfaction (interest in the study, distress attributed to the study).

Individuals randomized to the monitoring groups (141 victimized women and 40 no-trauma controls) received a handheld computer (PDA) and were trained how to use it by project staff. Participants identified a two-hour block in the morning hours and a two-hour block in the evening hours during which an alarm would go off to alert them to complete the surveys. For the next 30 days, they were then alerted (“beeped”) randomly twice daily, once during the morning and once during the evening time blocks. Daily monitoring assessments took on average four minutes to complete and contained single items with multiple choice responses, as well as yes/no questions. The assessments included questions on location (e.g., home, school, work), activity (e.g., studying, partying), who they were with (e.g., alone, with family), affect (e.g., happy, tired, sad), urges to drink alcohol, expectancies regarding the effects of alcohol, PTSD symptoms (using the PTSD checklist items), alcohol and marijuana use (e.g., how much, who they were with, where were they), and coping strategies (i.e., how much control did you have over distress). Further information regarding the procedures and measures collected as part of the daily assessment can be found elsewhere (Kaysen et al., 2012; Naragon-Gainey, Simpson, Moore, Varra, & Kaysen, 2012). Following the 30 day monitoring period, all participants completed an in-person post-monitoring assessment. The purpose of this in-person meeting was to debrief study participants and collect the PDAs. Participants completed an online post-monitoring assessment alone on a computer in closed door of the research lab.

Pre and Post-monitoring Measures

PTSD symptomatology—PTSD symptom severity was assessed at pre- and post-monitoring with the Posttraumatic Diagnostic Scale (PDS;;Foa, Cashman, Jaycox, & Perry, 1997). This scale assessed DSM-IV criteria for a clinical diagnosis of PTSD. Participants

were presented with PTSD symptoms and were asked to report how much the symptoms bothered them in the past month based on either their worst unwanted sexual experience (trauma-exposed groups) or a stressful life experience (no-trauma control group). Sample items include "Experiencing physical reactions when you were reminded of the traumatic event (for example, breaking out in a sweat, heart beating fast)," "Trying not to think about, talk about, or have feelings about the traumatic event," and "Feeling irritable or having fits of anger." Response options were based on a Likert scale of 0 = *not at all* to 3 = *very much*. Reliability estimates by group were adequate and ranged between $\alpha = .78$ to $.89$.

Psychological symptomatology—The 53-item Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was used to measure psychological symptoms in participants at pre- and post-monitoring. Sample items include "Feeling no interest in things" (depression), "Feeling tense or keyed up" (anxiety), and "Having urges to break or smash things" (hostility). Participants indicated how much each symptom had bothered them in the past 30 days (0 = *not at all*, 1 = *a little bit*, 2 = *moderately*, 3 = *quite a bit*, and 4 = *extremely*). For parsimony in analyses, we examined the General Severity Index only. Reliability estimates by group ranged between $\alpha = 0.94$ and 0.99 .

Post-study satisfaction—During their post-monitoring session, a post-study satisfaction questionnaire was used to determine the extent to which participants found the daily PDA and online surveys (both pre- and post-monitoring) distressing and interesting. Four separate questions examined participants' distress in response to study questions from the PDAs and online surveys (0 = *Not distressing* to 7 = *Very distressing*), as well as participants' rating of interest in the PDA assessments and online surveys (0 = *Very interesting* to 7 = *Very boring*). Only participants in the monitoring groups completed questions regarding PDAs. Open ended questions for benefits and reported harm were also included ("What, if any, benefits do you think you gained from participating in this study?" "What, if any, harm came to you from participating in this study?"), as well as whether the participant would refer the study to a friend (0 = no, 1 = yes).

Analytic Plan

Analyses consisted of mean difference tests and descriptive reports. We ran two repeated measures time $\times$ group analysis of variance (ANOVA) tests to examine within subject changes in PTSD symptoms (PDS) and general psychological symptoms (BSI) over time and between subject differences on these indices. Significant ANOVAs were followed by a priori *t*-tests to evaluate the hypotheses that trauma-exposed women would report greater symptom severity than no trauma control participants at each of the assessment periods and a greater increase in PTSD symptoms and general psychological symptoms from baseline to post-monitoring. Additionally, we conducted four separate one-way ANOVAs with the dependent variables of distress and interest reported regarding the daily monitoring assessments (Groups 1 and 3 compared) and the online assessments (all groups compared). Table 1 presents mean ratings and standard deviations for each dependent variable.

Descriptive qualitative analyses included an examination of the themes reported by participants in the three groups regarding benefits and harms resulting from participation in the study. Three independent raters reviewed each of the open-ended responses and identified themes emerging for each individual response to both benefits and harms. The average pairwise percent agreement was 90.76% for the risks, with a Fleiss' Kappa of 0.77. For benefits, the average pairwise percent agreement was 93.40%, with a Fleiss' Kappa of 0.86. The themes were reviewed with a fourth rater and each open-ended response without full agreement was categorized into a theme based on the agreement of at least two of the

original raters and the final fourth rater. The risks and benefits themes are indicated in Table 2.

Results

PTSD Severity (PDS scores)

As shown in Table 1, participants with no trauma history reported lower PTSD severity than trauma participants for both no monitoring, $t(59) = 4.42, p < .001$ and monitoring, $t(179) = 4.76, p < .001$, at baseline. Similarly, following the 30-days of monitoring, participants with no trauma history reported lower PTSD severity than trauma participants, for both those in the trauma (no monitoring) condition, $t(57) = 3.11, p < .001$, and those in the trauma (monitoring) condition who completed the 30 days of monitoring, $t(57) = 2.98, p < .001$. There were no significant differences in PTSD symptom severity within the trauma exposed participants between monitoring and no monitoring groups at the pre- or post-monitoring assessments.

There was no overall effect for time on changes in PDS scores; however, there was a time $\times$ group effect, $F(2, 193) = 4.44, p < .05$. Trauma monitoring participants experienced a significant rise in PTSD severity from Time 1 to Time 2, $t(138) = 4.92, p < .001$. PDS scores did not significantly change over time for the trauma (no monitoring) group or for the no trauma (monitoring) group.

General Psychological Symptomatology (BSI Scores)

At the pre-monitoring assessment, no trauma participants reported fewer psychological symptoms than trauma participants for both the no monitoring, $t(59) = 4.51, p < .001$, and monitoring groups, $t(179) = 5.80, p < .001$, with no significant differences between the trauma groups. At the post-monitoring assessment, no trauma participants reported lower BSI scores than trauma participants, for both no monitoring $t(176) = 5.57, p < .001$, and monitoring groups, $t(176) = 4.63, p < .001$. There were no significant differences on BSI scores between the trauma groups regardless of monitoring condition at pre- or post-monitoring.

There was an overall time effect for psychological symptomatology, $F(1, 193) = 25.44, p < .001$, as well as a time $\times$ group effect, $F(2, 193) = 3.70, p < .05$. Both trauma groups experienced a reduction in BSI scores between the pre-monitoring to post-monitoring assessments: monitoring $t(139) = 5.47, p < .001$; no monitoring $t(15) = 2.64, p < .05$.

Post-monitoring Satisfaction Survey (Online surveys)

Interest in online surveys—There was an overall effect for interest in the pre-monitoring and post-monitoring online assessments, $F(2, 193) = 3.68, p < .05$, with a marginally significant difference between specific groups. Though not significant, the no trauma participants reported greater interest than the trauma participants for both no monitoring, $t(178) = 2.29, p = 0.07$, and monitoring groups, $t(54) = 2.36, p = 0.06$. Mean interest scores were close to, but lower than, the midpoint of the scale.

Distress from online surveys—There was an overall effect for distress regarding the online assessments, $F(2, 193) = 11.26, p < .001$, with the no trauma participants reporting significantly less distress than the trauma (monitoring) participants, $t(178) = 4.74, p < .001$. There was a nonsignificant trend for the no trauma participants endorsing less distress than the trauma (no monitoring) participants, $t(54) = 2.27, p = .07$. The mean level of distress reported by the trauma (monitoring) participants was 3.13 ($SD = 1.48$), which is below the midpoint on the scale from 1 “not distressing” to 7 “very distressing”. Descriptive statistics

indicated that 59% participants rated distress from the web assessments between 1 and 3, while 17% rated it between 5 and 7, with three rating it as 7 (very distressing).

Post-monitoring Satisfaction Survey (PDA Daily Assessments)

Interest in PDA assessments—No significant differences were observed for participants' interest in completing the PDA assessments ($p = 0.24$). Again, mean interest scores were slightly lower than the midpoint of the interest scale.

Distress from PDA assessments—For participants who completed the daily monitoring, there was a main effect for distress, $t(177) = 4.41, p < .001$, such that participants in the trauma (monitoring) group reported greater levels of distress than participants in the no trauma group. The distress level for the trauma participants represented a mean of 2.72 ($SD = 1.57$) on a scale from 1 “not distressing” to 7 “very distressing.” Seventy-one percent of these participants rated distress from the PDA assessments between 1 and 3, while 14% rated it between 5 and 7. Two participants rated the PDA assessments as 7 (very distressing).

Differences between online and PDA assessments—Within the monitoring groups, participants in the no trauma condition did not experience significant differences between their rating of interest or of distress between the online surveys and PDA daily monitoring assessments. Trauma participants reported similar levels of interest between the online surveys and PDA assessment, but reported significantly higher levels of distress regarding the online surveys, $t(138) = 3.62, p < .001$.

Recommending Study to a Friend

When asked whether they would be willing to recommend a study like this one to a friend, 93% of those participating in the monitoring conditions said they would (93% of the trauma group, 90% of the no trauma group). In the trauma (no monitoring) group all participants reported they would recommend it to a friend.

Themes from Open-ended Questions Regarding Benefits and Harms

Benefits—The percentages of participants within each group referencing each of the benefit themes are reported in Table 2. Between 26% and 62% of participants in each group failed to respond to the open-ended item asking about benefits obtained from study participation. The benefit themes coded were generally related to increased awareness of behaviors/emotions and changing patterns of behavior (see Table 2). The theme related to self-awareness of moods, thoughts, and behaviors not specific to trauma/stressful experiences or substance use behaviors was referenced by the greatest percentage of participants within each group (e.g., “made me think about myself and how I deal with problems, “I learned some things about myself”). A small percentage (2%) of the trauma groups discussed both drinking-related and trauma-related self-awareness. For example, one participant in the trauma (monitoring) group wrote “I realized that drinking often put me in the same type of setting/situation that reminded me of the unwanted sexual encounter and so it would bring back those memories.” Ten percent of trauma (no monitoring) and 3% of trauma (monitoring) participants reported some altruistic benefit to helping others and researchers better understanding the impact of traumatic events on individuals. For example, a participant in the trauma (no monitoring) group wrote, “Realizing that many people have the same distressing issues that I do and that is it okay to talk about it/help other people learn more about these types of issues.” More than 5% in both trauma groups discussed changing avoidance patterns and learning new skills to cope with the traumatic experience. For example, one participant in the trauma (monitoring) group wrote, “Helped me to realize what I am doing to 'cope' with my stress and anxieties, and how this form of coping does not

necessarily help me. Helps me to see what I can do differently.” Finally, 4% of the trauma (monitoring) group discussed potentially changing their drinking behaviors (e.g., “Learned about my drinking habits. Made me reflect on my lifestyle and think about if I needed to make any changes”).

Harms—The large majority of participants either did not indicate any specific harm from the study or endorsed no reported harm from participation (see Table 2). Ten percent of trauma (no monitoring) and 18% of trauma (monitoring) indicated experiencing some distressing reminders of the traumatic event. Many of these open-ended responses appeared to reflect thoughts or feelings that may have been brought up even without the study (e.g., “The only ‘harm’ I would say is that it reminded me of the unwanted sexual experience when I wanted to forget about it, but at the same time maybe it wasn’t bad to think about it, to get some closure” and “Painful memories, but nothing I wouldn’t have felt otherwise.”), with others hinting at an exposure-based benefit to approaching these thoughts, feelings, and memories (e.g., “At first, having to think about the particular incident was distressing. However, after many assessments it wasn’t as difficult” and “Only harm might be having to think about the situation and how it affects me every day.”) Ten-percent of the trauma (no monitoring) group and 6% of the trauma (monitoring) group indicated distressing affective responses to completing the assessments. Reports of distress were relatively benign and whereas others had a positive twist (e.g., “Some stress” and “Having to think about the experience so much was a little hard at times, but well worth it!”). Three participants in the trauma (monitoring) group indicated noteworthy distress such as feeling glad the study the over due to discomfort and reported increases in anxiety and depression. Two out of these three participants reported they would recommend this study to a friend and still reported some benefit to participation (one did not indicate any benefit). Finally, one participant from the no trauma group reported experiencing some harm (i.e., “causes me to think about the event more than I would.” Given the event selected from the TLEQ, it is not unreasonable to believe that a participant could experience distress from an event that did not meet criteria for a PTSD Criterion A event as specified by the DSM-IV.

Discussion

In the present study, we examined reported distress and changes in psychological symptoms resulting from participating in an assessment study involving daily monitoring of PTSD symptoms and substance use behavior. As hypothesized, female participants who had experienced childhood or adult sexual victimization reported greater levels of PTSD and psychological symptomatology than non-trauma exposed women at baseline and after the 30-day of daily monitoring period. Trauma-exposed women who engaged in daily monitoring of PTSD symptoms and substance use behaviors reported increased levels of PTSD severity at the end of the 30-day monitoring period while trauma-exposed women who did not engage in the daily monitoring did not show such an increase in PTSD symptom severity. Additionally, the trauma-exposed women who monitored symptoms, mood, and drinking daily reported significantly greater distress resulting from the daily assessments compared to a non-trauma exposed sample of women who also completed daily assessments. Contrary to hypotheses, trauma-exposed participants who completed monitoring assessment reported greater distress resulting from the online surveys with targeted questions regarding the traumatic event(s) compared to daily assessments. A non-hypothesized reduction in general psychological symptomatology was observed for both trauma-exposed samples.

While the pre- and post-monitoring online assessments and daily monitoring appeared to lead to increased symptom severity and greater distress among trauma-exposed women, these findings are tempered by a closer examination of the data. First, average reported

PTSD severity after the 30-day monitoring period for the trauma (monitoring) group was generally quite moderate (16.38) and resembled PDS scores closer to the mean for a non-PTSD sample (12.54) and was nearly half that of a sample diagnosed with PTSD (33.59) in the original study documenting the PDS scale norms (Foa et al., 1997). Additionally, Rauch and colleagues (2009) determined that a change score of 7.8 represented clinically meaningful change in PDS scores, which again was more than double the change experienced by the trauma (monitoring) group. Thus, the observed changes from baseline were relatively modest and not clinically significant. However, while approximately 70% of the trauma (monitoring) participants reported distress lower than the mid-point of the seven-point Likert scale for distress severity, it is noteworthy that two participants did report the highest score for distress.

Secondly, participants' open-ended responses regarding the benefits and harms resulting from the study help to put the distress levels experienced by study participation into context. A substantial percentage of participants in each of the groups reported experiencing no harm from participation (39% of trauma [monitoring] participants) while few reported no benefit from participation. Benefits were generally classified as helping to increase awareness of drinking behaviors, the impact of mood on behavior, and how the traumatic event impacted daily life. With a few exceptions, harms expressed were minimal and generally related to affective responses such as anxiety and depression or reminders of the traumatic incident. Interestingly, approaching negative emotions and thoughts about traumatic incidents is a major component of efficacious PTSD interventions (Resick, Nishith, Weaver, Astin, & Feuer, 2002; Schnurr et al., 2007) and repeated exposure to traumatic material does that appear to exacerbate PTSD symptoms, lead to lasting distress, or result in drop-out from treatment studies (Foa et al., 2002). It is possible that the perceived "distress" stemming from participation actually had a cathartic effect for participants. In fact, several participants alluded to this idea in their reported benefits.

Results also indicated that participants in the trauma (monitoring) group found the pre- and post-monitoring online assessments more distressing than the daily reports. One potential explanation of this effect could be due to the length and amount of detail about the traumatic incidents requested in the web survey, which likely required greater emotional contact with memories of the traumatic event than the daily assessments. For example, on the pre-monitoring online survey participants were asked to indicate which traumatic event they experienced and answer a series of questions from the PDS (Foa et al., 1997) regarding this event. Daily assessments referred to "the traumatic event" only and participants did not need to specifically identify the event as they did on the pre- and post-monitoring surveys. Additionally, the BSI included in the pre- and post-monitoring assessments was lengthy (53 items) and asked participants about a variety of behaviors and feeling ranging from depression and anxiety to hostility and obsessions/compulsive acts. It is possible these surveys led to some distress as participants thought about other issues they were having (e.g., depression, relationship difficulties) that were non-specific to the traumatic event.

While reports of general symptomatology assessed with the BSI declined over the course of the study for the trauma-exposed groups, these changes were also perhaps not large enough to draw any clinically meaningful conclusions. As monitoring of substance use behavior is a component of many multi-component interventions with college students (Larimer & Cronce, 2007), monitoring behavior alone (and possibly mood as in the present study) may have intervening effects. Many of the participants reported self-awareness of mood fluctuations and/or drinking behavior as a benefit to participating in the study and a small proportion of participants in the trauma (monitoring) group indicated a desire to change their drinking behavior due to this increased awareness.

Limitations

Despite important implications of this research, limitations exist. First, we included participants in our analyses who completed all study requirements (i.e., pre-monitoring assessment, daily monitoring, and post-monitoring assessment). Indeed, dropping out of a study (or neglecting to sign up) may be a behavioral sign of avoidance or concerns about distress exacerbation. There is some evidence that participants with more severe symptoms of trauma and sexual-related childhood abuse (i.e., compared to verbal or physical abuse) are more likely to drop-out of studies (Hlavka et al., 2007; Matthieu & Ivanoff, 2006). This research needs to be replicated in larger more representative samples beyond college student women. In other populations, type of traumatic incident (e.g., sexual, verbal, physical, combat-related) may impact degree of distress or exacerbation of psychological symptoms, as our sample included only those who experienced childhood and/or adult sexual victimization. The sample size of the trauma (no monitoring) group was small, which may have impacted power and led to reduced statistical significance for some tests.

Regarding data collection, participants were asked to report on distress and satisfaction resulting from the pre- and post-monitoring online surveys on post-monitoring survey only. Thus, participants were reporting on distress and satisfaction experienced from the baseline survey retrospectively. In addition, the qualitative data reported is only descriptive and follow-up quantitative work utilizing these themes and benefit/harm themes from other work (e.g., DePrince & Freyd, 2004; Cromer et al., 2006) is encouraged. As participants were asked to indicate “what, if any, benefits [harms]” were experienced, it is unclear if those participants who did not respond chose not to answer or left the item blank due to not experiencing any harm and/or benefit from participation. It is also possible that denial of distress associated with research participation may be due to disengagement from the question content or emotional avoidance – hallmarks of PTSD symptomatology (Foa, Riggs, & Gershuny, 1995). In their qualitative work, Hlavka and colleagues (2007) found that nearly a quarter of women who reported sexual abuse refused to talk in detail about their experiences, while 29% discussed their experience in a factual manner without appearing to be emotionally connected to the content. Thus, we do not know if the participants who did not indicate any harms (rather than endorse “none”) actually felt some distress from the study.

Finally, the focus of this study was to examine distress resulting from the trauma-based assessments, though participants were monitoring substance use behaviors as well. We did not examine whether distress resulted from trauma-specific content itself or substance use in conjunction with trauma symptoms. However, a review of the themes revealed that very few participants endorsed harms that only mentioned substance use (i.e., only one participant identified noticing patterns of substance use as a harmful effect). Finally, we did not examine the daily diary data in this paper, which focused on a retrospective examination of the distress experienced by study participants resulting from the method used. One manuscript thus far (Naragon-Gainey et al., 2012) and a forthcoming paper (Kaysen et al., 2012) include a more detailed examination of the daily diary data.

Conclusion

Findings from the present longitudinal study indicate that repeated assessments of daily traumatic symptoms and substance use behaviors using personal handheld devices may lead to small increases in distress and PTSD symptoms, but that these symptom exacerbations are generally well-tolerated. For example, change in PTSD symptoms did not evidence clinically significant change from pre- to post-study levels and the mean of reported distress from the daily assessments and the online assessments were below the mid-point of distress ratings. Researchers and clinicians may be hesitant to discuss traumatic material with

individuals suffering from PTSD due to fear of exacerbating PTSD symptoms. However, there is now a substantial base of research literature suggesting that discussion of PTSD content in research and clinical settings is generally well-tolerated and does not associate with increased risk of drop-out from studies or therapy sessions (e.g., Becker et al., 2004; Foa et al., 2002; van Minnen et al., 2012). Due to fluctuations in PTSD symptoms even at the daily level (Simpson, Stappenbeck, Varra, Moore, & Kaysen et al., 2012), studies that utilize these daily diary approaches are important to better understand PTSD symptomatology and the interplay between PTSD and other behaviors. Findings that most individuals find these approaches non-invasive, tolerable, and somewhat beneficial will hopefully encourage more research with these innovative approaches.

Combined with research looking at assessments using single-survey or one-time interviews (Cromer et al., 2006; DePrince & Freyd, 2004; Newman & Kaloupek, 2009), this study further supports the idea that benefits may outweigh the costs of trauma-focused research. While some participants do report harms from these studies, it is the researcher's responsibility to continue closely monitoring participants in trauma-related studies for potential harms. It is also important for future longitudinal research to examine what factors (e.g., demographics, baseline distress levels) predict increases in reported harms among participants to help identify those who may require more careful monitoring. Human Subjects Review Boards are encouraged to utilize the available research to help make informed decisions regarding study approvals.

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Table 1

Means and standard deviations of dependent variables from pre- to post-monitoring by group

	Pre-monitoring			Post-monitoring		
		Mean	SD		Mean	SD
PTSD severity	No Trauma (monitoring)	6.10	7.20	<i>a</i>	7.23	7.43
	Trauma (no monitoring)	15.86	10.99	<i>b</i>	15.28	10.03
	Trauma (monitoring)	13.09	7.99	<i>b</i>	16.38	9.35
General psychological symptomatology	No Trauma (monitoring)	0.54	0.52	<i>a</i>	0.45	0.39
	Trauma (no monitoring)	1.49	1.13	<i>b</i>	1.08	0.93
	Trauma (monitoring)	1.36	0.78	<i>b</i>	1.04	0.76
<i>Post-study reactions (online surveys)</i>						
Distress	No Trauma (monitoring)	--			1.92	1.25
	Trauma (no monitoring)	--			2.88	1.20
	Trauma (monitoring)	--			3.13	1.48
Interest	No Trauma (monitoring)	--			3.60	1.43
	Trauma (no monitoring)	--			2.81	1.17
	Trauma (monitoring)	--			3.11	1.08
<i>Post-study reactions (PDA assessments)</i>						
Distress	No Trauma (monitoring)	--			1.80	1.02
	Trauma (monitoring)	--			2.72	1.57
	No Trauma (monitoring)	--			3.45	1.43
	Trauma (monitoring)	--			3.17	1.32

Note:

a, b Different superscripts within each dependent variable and within Time indicate significant differences between groups for each dependent variable.

PTSD = Posttraumatic Stress Disorder; BSI = Brief Symptom Inventory; PDAs = personal digital assistant

Table 2

Themes from open-ended benefits and harms questions by group

	No trauma (<i>n</i> = 40)	Trauma (no monitoring) (<i>n</i> = 21)	Trauma (monitoring) (<i>n</i> = 141)
<i>Benefits</i>			
Did not indicate	28%	62%	26%
None	5%	0%	2%
Self-awareness of moods, thoughts, and behaviors (trauma-related)	3%	11%	12%
Self-awareness of moods, thoughts, and behaviors (drinking-related) ^{<i>I</i>}	25%	5%	15%
Self-awareness of general moods, thoughts, and behaviors (non-specific to drinking or trauma)	38%	14%	36%
Altruistic benefit (help others struggling with trauma, help researchers understand trauma symptoms)	0%	10%	3%
Incentive/payment	5%	5%	2%
Changed avoidance patterns/learned skills to cope with trauma	0%	5%	6%
Changed/considered changing drinking behavior	0%	0%	4%
<i>Harms</i>			
Did not indicate	40%	62%	35%
None	52%	19%	39%
Trauma-related reminders (memories, nightmares, thoughts)	3%	10%	18%
Affective response (stressed, depressed, anxious)	0%	10%	6%
Technological hassles	5%	0%	2%
Recognition of potential harmful drinking patterns	0%	0%	2%

Note: Percentages within groups may not equal 100% due to multiple themes expressed by some participants.

^{*I*} category is specified as “drinking-related” because the vast majority of participants referenced alcohol use rather than other substances. Four participants referenced “smoking” (i.e., marijuana use) and one participant referenced “drugs and other substances.”