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The impact of ecological momentary assessment on posttraumatic stress symptom trajectory

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ABSTRACT

Ecological momentary assessment includes continuous, real-time gathering of self-report data in a participant's natural environment. The current study evaluated the possible impact of this assessment strategy on severity of posttraumatic stress (PTS) in a sample of participants who reported experiencing a past traumatic event. Participants with clinically elevated PTS symptoms reported symptom severity at three time-points: during an initial screening, following an unmonitored period, and following two weeks of monitoring. During the monitoring period, participants carried an Android device which prompted them to report PTS symptoms and negative emotions six times daily. PTS severity scores were then compared across these three time-points. Results indicated that participating in the ecological momentary assessment protocol was associated with a significant reduction in PTS severity, whereas significant changes were not noted over the unmonitored control condition. The authors conclude that ecological momentary assessment may have therapeutic value even when not combined with formal intervention, and it may be a useful tool for improving the efficiency of a stepped-care approach to treating PTS symptoms.

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1. Introduction

Ecological Momentary Assessment is a data collection strategy that allows continuous, real-time gathering of self-report data in a participant's natural environment (Stone and Shiffman, 1994). The primary advantages of this methodological approach are that it avoids recall bias, enables the study of processes over time, and enhances ecological validity (Stone et al., 2007). These benefits have led to a proliferation of research using ecological momentary assessment across a wide range of clinical conditions (e.g., mood disorders and dysregulation; anxiety disorders, substance use disorders, and psychosis; Trull and Ebner-Priemer, 2009), including the recent application of this assessment technique to understanding symptom change in Posttraumatic Stress Disorder (PTSD).

As an example of this approach Kleim et al. (2013) conducted a study using electronic diaries to monitor intrusion symptoms in victims of motor vehicle accidents. Participants carried electronic diaries and reported real-time information about intrusive re-experiencing of their trauma. Results indicated that individuals with PTSD were no more likely to experience intrusions than individuals who did not meet criteria for the disorder, although participants with PTSD reported more vivid intrusive symptoms. The authors concluded that momentary assessment, in this study, provided useful information about individual perceptual experiences of PTSD symptoms that may have been otherwise obscured by retrospective reporting.

While this data collection strategy can provide rich information about how cognitive, behavioral and emotional processes change in real-time, PTSD may present a serious challenge for ecological momentary assessment protocols given that a primary feature of the disorder is the intentional avoidance of trauma-related stimuli, thoughts and memories. Repeated prompts to provide information about current PTSD symptoms may disrupt a participant's normal avoidance strategies and lead to a recording of symptoms that is not ecologically valid. Because responding to prompts may actually represent a form of exposure, it would be worthwhile to evaluate how PTSD symptoms change as the result of participation in an ecological momentary assessment study.

To date, few studies have examined how protocols using momentary assessment may affect PTSD symptom severity. In one such study, Possemato and colleagues (2012) provided veterans who screened positive for hazardous drinking behaviors and subthreshold PTSD symptoms with a cell phone and contacted them randomly four times a day for 28 days in order to monitor drinking

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behaviors and PTSD symptoms. Results of their study indicated a decrease in PTSD symptom severity, specifically of avoidance symptoms, throughout the data collection period. A notable limitation of this study was the absence of an unmonitored control condition which would serve as an internal validity check for the effectiveness of momentary assessment as an intervention strategy.

The purpose of the current investigation is to examine the potential impact of participation in an ecological momentary assessment protocol on Posttraumatic Stress (PTS) symptom severity by comparing participants' PTS symptoms across three time points: during an initial screening, during an interview prior to completing the momentary assessment protocol, and during an interview one week following completion of the protocol. It expands on previous research by using a within-subjects design with multiple data-points to determine if participation in an ecological momentary assessment protocol is associated with a greater reduction in PTS symptoms in comparison to a control time period. In this investigation the control time period was between the initial screening and the initial interview. Consistent with past research, it was hypothesized that there would be a significant decrease in PTS symptom severity following completion of the momentary assessment protocol. It was also hypothesized that PTS symptom severity would remain unchanged during the unmonitored control condition.

2. Method

2.1. Participants

Participants ($n=32$) were recruited from a large university in the American Mountain West region during three separate group screening days in Introductory Psychology classes. Participants who endorsed a traumatic event on the Trauma History Screen (Carlson et al., 2011) and scored at least a 44 on the PTSD Checklist-Civilian Version (PCL-C; Blanchard et al., 1996) were contacted to participate. The sample included mainly women ($n=25$), and 88% of the sample identified as European–American. The mean age was 20.3 (SD=3.53), and participants reported experiencing approximately three "emotionally bothersome" events ($M=2.78$, SD=1.31; see Table 1 for frequency of specific event types). The average length of time since the reported events was 5.1 years (SD=3.6). Ten participants reported currently receiving some form of treatment, including either medication or counseling, for an average length of 48 weeks (SD=52.67), with a range of three weeks to three years.

Table 1
Number of participants reporting specific traumatic events on the trauma history screen.

Event	n[a]
Sudden death of a family or close friend	19
A really bad car, boat, train, or airplane accident	10
Some other sudden event that made you feel very scared, helpless, or horrified	10
Hit or kicked hard enough to injure – as a child	9
Suddenly abandoned by spouse, partner, parent, or family	9
Forced or made to have sexual contact – as an adult	8
Sudden move or loss of home and possessions	7
Hit or kicked hard enough to injure – as an adult	5
Forced or made to have sexual contact – as a child	5
Seeing someone die suddenly or get badly hurt or killed	4
A really bad accident at work or home	3
Attacked with a gun, knife, or weapon	3
A hurricane, flood, earthquake, tornado or fire	1
During military service – seeing something horrible or being badly scared	1

[a] This number can range from 0 to 32.

2.2. Measures

2.2.1. Trauma History Screen

The Trauma History Screen (Carlson et al., 2011) is a brief measure of exposure to high magnitude stressor events that are usually associated with severe posttraumatic distress. Participants are asked to indicate whether they have experienced a traumatic event, and then indicate if any of the events listed "really bothered [them] emotionally." In an initial validation study, the Trauma History Screen demonstrated good temporal stability over periods of one week, two weeks and two months (Carlson et al., 2011). In the current study this measure was used to screen potential participants for past traumatic events.

2.2.2. PTSD Checklist – Civilian Version

The PCL-C (Blanchard et al., 1996) is a self-report inventory of PTSD symptoms based on symptoms from the Diagnostic and Statistical Manual of Mental Disorders 4th edition-Text Revision. (DSM-IV-TR; American Psychiatric Association, 2000). Past research has found scores on the PCL to demonstrate adequate test-retest reliability ($r=.87$), internal consistency ($\alpha=.91$), and clinical utility in college students (Adkins et al., 2008). For the current study, the PCL-C was used as the primary outcome measure, and internal consistency at the three time points was $\alpha=0.74$, 0.81 and 0.89. Only participants who initially scored above a 44 (in addition to endorsing an event on the Trauma History Screen, above) were contacted to participate because this score has been recommended as a clinical cut-off for individuals who are likely to have PTSD (Blanchard et al., 1996).

2.3. Procedure

All methods and procedures were reviewed by the University of Montana Institutional Review Board. Participants were recruited for the study during the group screening day process described above. During each screening session, potential participants completed a packet of measures which included the Trauma History Screen and PCL-C. These screening data provide the first data point used in this study. The PI later contacted participants who included their contact information and met the inclusion criteria in order to schedule an initial meeting. At each initial meeting informed consent was obtained and the purpose of the study discussed. Participants then completed a packet of questionnaires which again included a PCL-C. Participants also scheduled a final meeting with the PI to occur after the momentary assessment period. Participants were instructed that the momentary assessment data would be stored locally on the device and downloaded after being returned at the final meeting. The data obtained from this interview served as the second time point in this study.

The momentary assessment data collection period began on the morning after this meeting. Data were collected using a time-stratified sampling schedule which randomly prompted participants within six distinct, two-hour blocks from 10 AM to 10 PM. Each prompt asked participants to complete 22 items on the Android screen. The items were always in the same order, and the first 17 questions corresponded to items from the PCL-C, revised for consistency of wording and brevity; the final five items asked participants to rate the intensity of current emotions (fear, anger, guilt, shame and sadness when thinking about the traumatic event). Participants received six daily prompts, and data collection lasted for two weeks. After completing the momentary assessment protocol, participants had a scheduled meeting with the PI for a final session of data collection. Participants completed the paper-and-pencil format PCL-C for a third time and an exit interview questionnaire. After completion of these forms, participants were given course credits for their involvement and entered in a raffle

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