Affective Instability: Measuring a Core Feature of BPD

Tim Trull

University of Missouri-Columbia

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Across numerous conceptualizations and definitions of borderline personality disorder (BPD), the core affective features of BPD cover a range of negative affective states. For example, looking at the affective features listed in the DSM-IV (APA, 2000), and in the DIB-R (Gunderson & Zanarini, 1992), an overlapping but not synonymous assessment of BPD, there appears to be agreement that the primary negative affective features are:

- *depression/dysphoria*
- *irritability*
- *anger/hostility*
- *anxiety/panic/fear*

It is noteworthy that these affective states, even in extreme form, characterize a number of Axis I and Axis II disorders. So, it does not appear that any one negative (or positive) affective state, or perhaps even some composite of negative (or positive) affect, distinguishes BPD from other disorders. Before suggesting what may aid in this discrimination, it is useful to briefly review approaches to the measurement of affect.

Measuring Affect/Emotion in BPD

There is a long tradition of measuring emotional states or traits via questionnaire or self-report. This is a fairly economical way to measure affect. However, there are some issues that must be considered. First, there is the issue of time frame. Over what period of time is the respondent rating his/her affect? (over the last week? last month? last year? last 2 years? last 5 years?). By definition, the intense negative affects seen in BPD are often reactive, temporary, and subject to change. Therefore, in asking a person with BPD

to rate his or her affective state, we are asking for a type of "average" over some period of time. Some people can do this well, others probably cannot----in the latter case, they be more influenced by their current affective state (which may color their retrospective evaluation of their affect) or by extreme affective states that have been experienced over the time period of interest (which may be more salient). Second, a review of the list of affective features (above) indicates that these negative affective states are fairly common in clinical settings. That is, they cut across a number of diagnostic categories and, therefore, are unlikely to discriminate those with BPD from those without BPD. So, the mean levels of these negative affects may not provide much differential diagnostic information. Additionally, there is also the issue of comorbidity. BPD is rarely an "orphaned" diagnosis----it is highly comorbid with a number of Axis I and Axis II conditions. This makes it more likely that similar affective profiles will be found in those with or without BPD.

What does appear to better, and perhaps uniquely, characterize the BPD negative affective states from those observed in other disorders is their unstable, reactive, and intense nature. That is, a core feature of BPD is **affective instability**, the experience of going from baseline mood (which may be a general state of negative affectivity) to intense negative affective states. These acute, intense states may last hours or a day, and are assumed to be triggered by environmental events (APA, 2000): *affective instability due to a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days).*

So, rather than search for the "affect" holy grail (i.e., a particular affect) that will distinguish BPD from other diagnoses, a more promising line of investigation might be to

better characterize affective instability, to determine how best to assess this core feature, and to see whether it indeed does help us identify a process that is unique to BPD. Another reason to pursue this line of inquiry is that it seems likely that emotional reactivity or affective instability has some biological and genetic basis (e.g., see behavior genetic studies of Livesley's DAPP Affective Instability subscale; Livesley et al., 1998). Thus, this may be a case in which a core feature, that we can hopefully measure well, may serve as an endophenotype for BPD leading to better theories and treatment.

Assessing Affective Instability

So, how does one assess affective instability? As with other constructs, there are several available approaches. First, once again there are *questionnaires* that attempt to assess affective instability (AI), affective lability, or emotional reactivity (e.g., the PAI-BOR AI subscale [Morey, 1991], Affect Lability Scales [Harvey et al., 1989], Affect Intensity Measure [Larsen et al., 1986]). Second, major *structured interviews* for BPD also attempt to assess AI, typically through a series of questions (e.g., the SIDP-IV, DIB-R, SCID-II). Third, although not routinely used, there are *physiological indices* relevant to AI (e.g., Heart Rate, Skin Conductance, Startle/EMG, EPs). Finally, there may be *biological markers* of this trait (e.g., serotonin functioning, neuro-imaging results).

In this paper, I focus on an additional possibility that combines a questionnaire-based approach to measuring negative affect with the methodology of **ecological momentary assessment (EMA)**. EMA, a type of experience sampling methodology, involves real-time assessment in one's natural environment. A similar approach has been used previously to assess aversive tension in BPD patients over a 48-hour period (Stiglmayr, Grathwol, Linehan, Ihorst, Fahrenberg, & Bohus, 2005). The use of

electronic diaries in clinical assessment is discussed in Piasecki, Hufford, Solhan, and Trull (in press).

We are currently conducting a study in which we assess mood states in patients with BPD (and affective instability) and in patients with current major depression or dysthymia (but no BPD or affective instability). Diagnoses were assessed at the beginning of the study via structured interviews. These patients carry around electronic diaries (palm pilots) for 28 days. Each day, during waking hours, they are randomly prompted 6 times to complete a short survey administered by the palm pilot that asks them to rate their mood state (31 PANAS items; Watson & Clark, 1994), events that have happened since the last assessment, use of substances, and other behaviors or events that may vary with mood state. At the beginning of the study, before being assigned a palm, and at the completion of the study, each patient completes a number of questionnaires that are used to assess affective instability, or affective intensity (e.g., PAI-BOR, Affective Lability Scales, Affect Intensity Measure). We can compare scores on these traditional, questionnaire measures of affective instability/intensity with indices we derive from the repeated assessments (up to 168 assessments per person) which reflect affective instability in the patients' natural environment. Here, I present some preliminary findings from approximately 50 patients (about one-half BPD, one-half MDD/DYS):

Affective states and patterns assessed via the electronic diary:

Mean levels of negative and positive affect

BPD patients and patients from the MDD/DYS group do not differ in terms of the **mean level** (across all assessment occasions) of negative affects (NA composite, as well as the Sadness, Fear, or Hostility subscales) or of positive affect. These results suggest

that there may not be particular higher or lower-order negative affects that discriminate between the groups in terms of mean levels across time (one month).

Mood variability

Using a multi-level modeling approach, we found that BPD patients displayed significantly more **variable scores** across time than did the MDD/DYS patients. For each PA or NA composite, the model which allowed different variances for the two groups provided a better fit to the data than did the model that specified equal variances. Once again, BPD patients displayed more variability in scores across time, suggesting (but not demonstrating) more instability.

Mood instability

Two individuals with the same amount of variability in mood may not experience as many **extreme changes** in mood across time. So, another and perhaps better way to get at the heart of affective instability is to use analytic methods to assess the number of big or **extreme mood changes** an individual may experience.

(a) One possible measure of instability using time series data, such as the data in this study, can be calculated using the difference score between a value at one occasion and the value at the previous occasion. The difference score represents change in the value from the previous occasion and the following occasion. Now, the *variability of the difference scores (D)* from one occasion to the next characterizes the instability more precisely than the *variability of the raw values (Y)*.

Using this index, our results indicate that the BPD group is more unstable than MDD group in negative affect scores but not in positive affect scores.

(b) Because BPD patients with affective instability are hypothesized to experience 'acute' or marked increases in negative affect more often than others, it is worthwhile to compare the probability of a large, acute increase in negative affect between the two groups we are studying (BPD and MDD/DYS). "Acute" increases can be operationally defined as a difference score greater than *one standard deviation unit of that mood state across all occasions* in each respondent. This is an arbitrary cutoff, but a reasonable starting point. So if the negative mood rating at an occasion is greater than one standard deviation (higher) from the previous occasion, an 'acute' or marked increase is said to have occurred. We can test the difference in the probability of acute changes in negative affect using logistic regression on the five negative affect composites.

For all negative affect composites (except one, NA-10), a significant difference in the probability of "acute" changes was observed between groups, with the BPD patients showing a higher probability in each case.

In summary, we collected affect data (up to six times a day) from each patient for a month in their natural environment. We are encouraged by our compliance rate (around 90% of all prompts are answered), but is this time-intensive data collection really necessary? This raises an important question.……

How well do these EMA indices of affective instability correlate with patients' questionnaire responses either before or after the electronic diary assessment?

Preliminary data suggest that questionnaire scores of affective instability, in general, are moderately correlated with EMA indices of mood variability and mood instability (*r*'s in the .3 to .5 range). The correlations for the BPD subsample were somewhat stronger (.5-.6) than those for the MDD/DYS subsample. The PAI-BOR AI

scores generally produced the largest correlations with the EMA negative mood variability and instability indices. So, these questionnaires appear to capture approximately 10%-40% of the affective variability and instability that is endorsed in a patient's natural environment using the electronic diary.

What about typical retrospective assessment, as in a clinical interview?

At the end of the electronic diary assessment, we ask each participant to use a calendar for the previous month to indicate how many, and on what days, large shifts in negative or positive affect occurred. So, this represents a retrospective assessment of mood shifts over the previous month. Here I present the results from only one patient, as we have just begun to analyze these data. Still, this single case is informative.

Figures 1 and 2 present frequency data on the number of mood shifts, both negative and positive, that were endorsed by a male patient with BPD during the four weeks of monitoring. In both figures, bars represent the number of mood shifts endorsed for that time period, using an electronic diary and using the patient's self-report on a retrospective calendar-based interview at the end of the four week recording period. In each figure, separate plots are given for shifts in negative and positive mood. Using electronic diary data, a *large* mood shift (affective instability) was operationalized as a $\geq$ +1.5 standard deviation change from the patient's immediately preceding report of negative (or positive) affect. The top panel of Figure 1 shows that ED data indicated eight negative mood shifts over the first week whereas only one negative mood shift was reported on the calendar measure. For all weeks but week four (the week immediately preceding administration of the recall measure), there are significant discrepancies as to the number of both negative and positive mood shifts based on the ED versus the

retrospective measure. As Figure 2 shows, however, even for Week 4 (which actually covered 8 days) there are discrepancies in the report of the dates of the shifts. For example, not only did the number of negative mood shifts derived from the two reporting methods not agree, but there was no day in Week 4 in which there was at least a single report of a negative mood shift for both assessment modes.

Although we cannot generalize from these single-subject data to all BPD patients, what is most intriguing about the week four data is that this comes closest to mimicking the typical clinical assessment situation. Clinicians often ask their patients what has transpired over the last week, including predominant moods, symptoms, or events. Data from Figure 2 suggest that retrospective reports on mood shifts over the last week do not correspond well to real-time data provided by this patient while in his natural environment. It may be quite important to know that a significant negative mood shift occurred on Days 2, 3, 4, and 7 (the day before the calendar measure was completed!) according to reports on the ED. Of course, ultimately, these ED reports must be shown to be associated with important outcomes or treatment response. But, these data do show that clinicians at the very least should be cautious in assuming that retrospective, review-of-the-week reports are precise and "match" what might be found using EMA methods.

Future Research Directions

Affective instability is a core affective feature of BPD. In this paper, I discussed current measurement approaches to affective instability. Retrospective measures, whether obtained via questionnaire or interview, have some limitations. Further, there is little empirical evidence that these questionnaires and interview scores completely or accurately capture or characterize the phenomenon of interest. Electronic diary methods,

completed in patients' natural environments, offer a new approach to describing and characterizing affective instability in BPD. Future research is needed to determine the best quantitative approaches for analyzing times series data like these (Trull et al., in preparation), to explore the overlap between EMA indices of affective instability and those from questionnaires and interviews, to explore the antecedents and consequences of affective instability, and to use these methods to characterize the affective profiles of those with near-neighbor diagnoses (but not a diagnosis of BPD) like bipolar II disorder, depression, and anxiety disorder.

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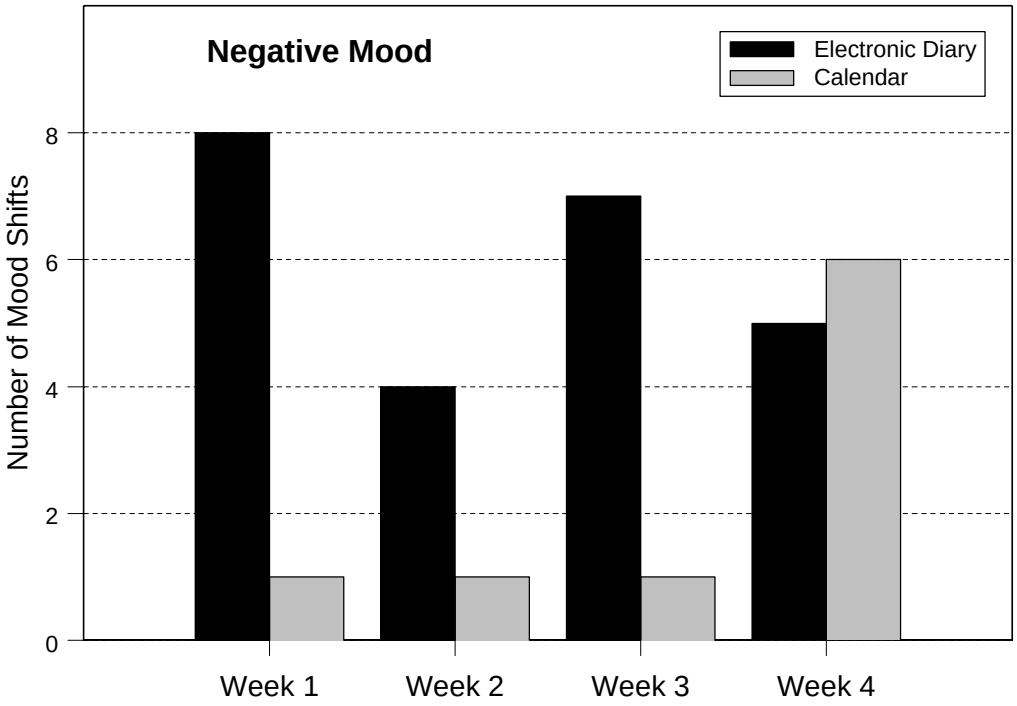
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Electronic Diary
Calendar
Number of Mood Shifts
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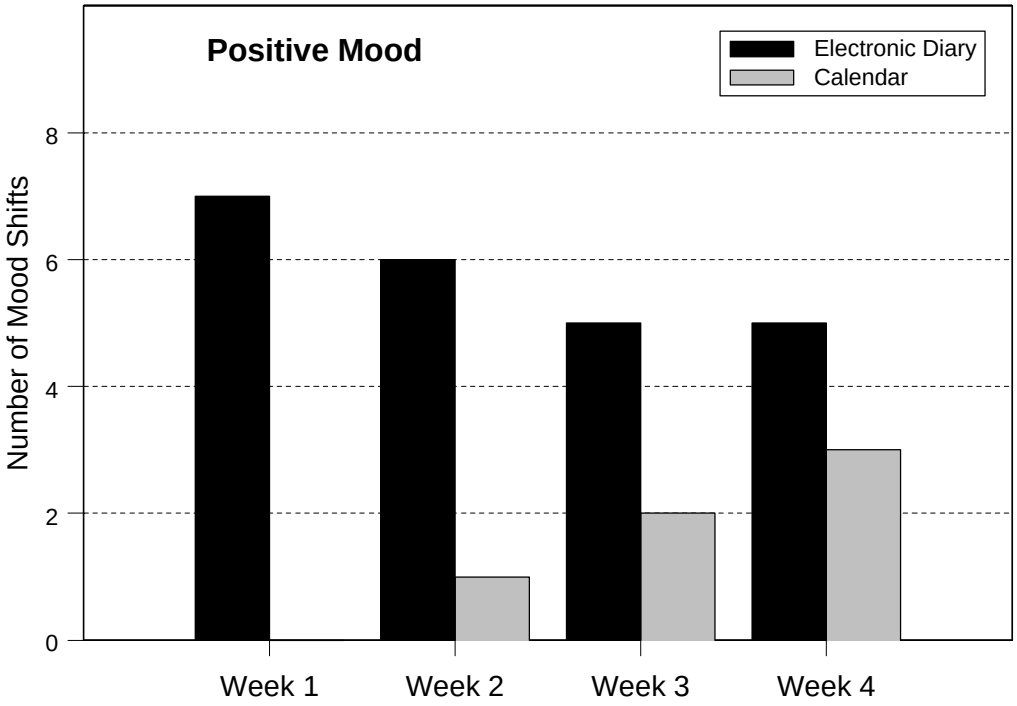
2
4
6
8
Week 1
Week 2
Week 3
Week 4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Electronic Diary
Calendar
Number of Mood Shifts
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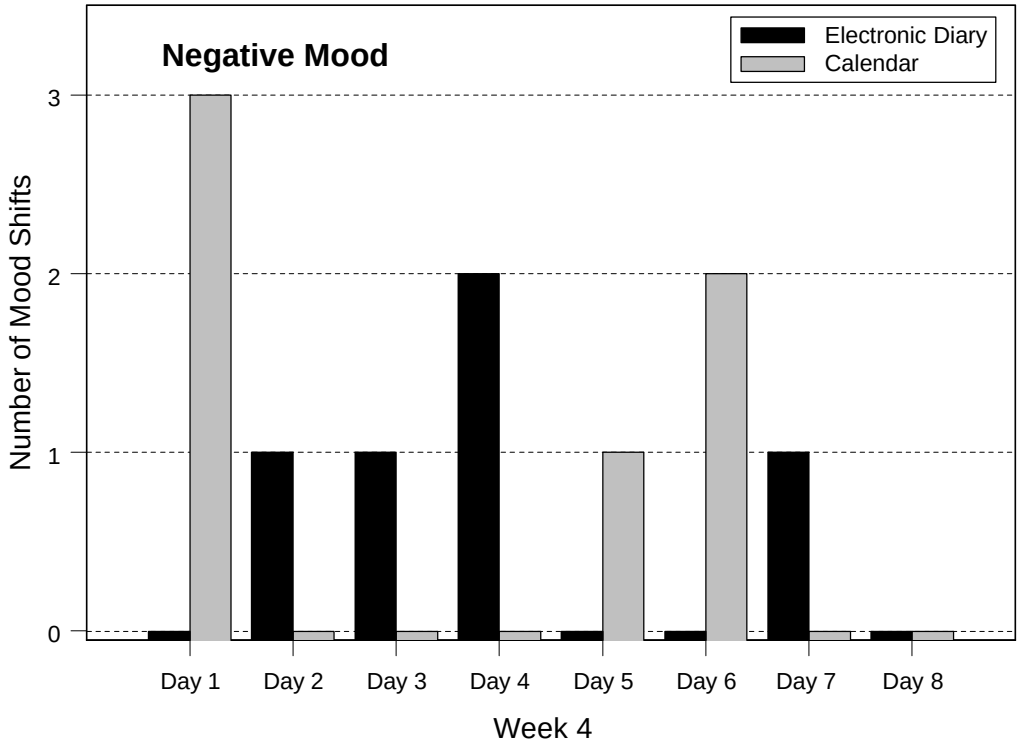
2
4
6
8
Week 1
Week 2
Week 3
Week 4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Number of Mood Shifts
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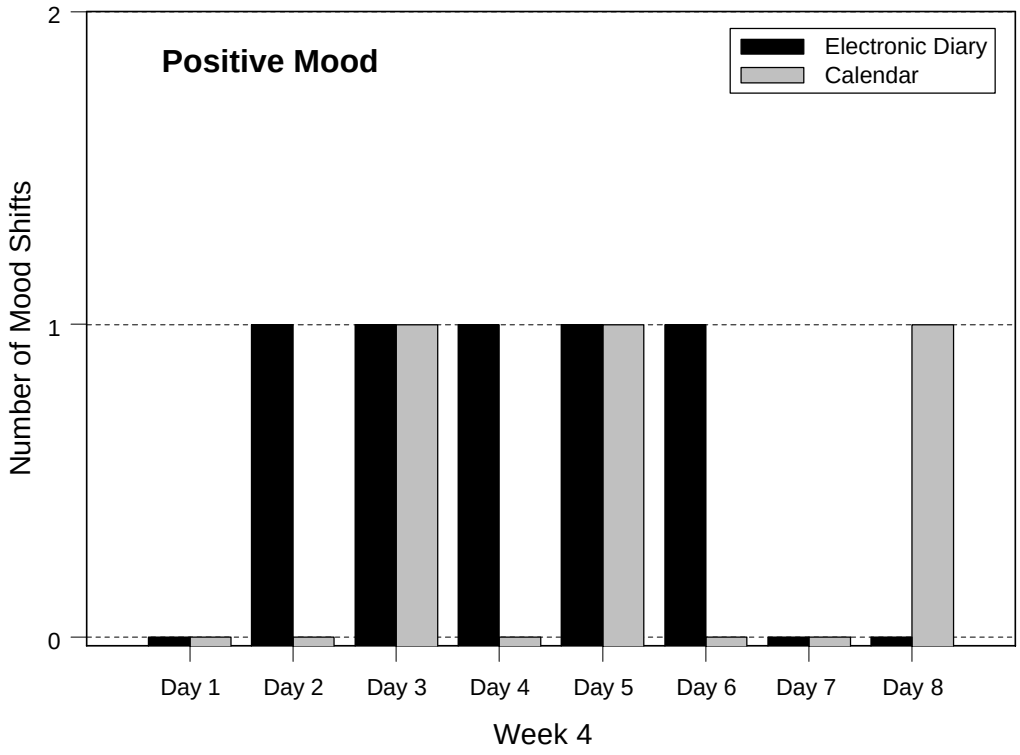
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day 7
Day 8
Week 4


Positive Mood
Electronic Diary
Calendar
Number of Mood Shifts
0
1
2
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day 7
Day 8
Week 4