

Examining the Utility of
Ecological Momentary Assessment with
Individuals Diagnosed with
Depressive Disorder

By

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Abstract

The intent of this research was to identify the response pattern of individuals diagnosed with depression undergoing psychotherapy while also examining the efficacy of the daily monitoring methodology in capturing this therapeutic experience. Further, we sought to assess participant experience while responding to Ecological Momentary Assessment (EMA), which is a sophisticated daily diary methodology.

Characteristically, depression treatment research focuses on nomothetically examining reduction of symptoms across populations of individuals receiving therapy and has yet to focus on how patterns of response to therapy may differ among individuals. Additionally, research examining the treatment of depression has primarily utilized a pre-test, post-test design that examines symptoms prior to and after treatment. Such designs, in addition to their inherent limitations (e.g., poor subject recall, etc.), may fail to capture the change in mood and symptom patterns over the course of treatment. Examination of such progression utilizing Ecological Momentary Assessment (EMA), which requires that subjects record their thoughts and experiences at different instances as they experience them (Tennen, Affleck, Armeli, & Carney, 2000), could produce information about the course of the condition or reactions to treatment.

Unfortunately the findings derived from using traditional paper and pencil formats of EMA have often been found to be distorted by participants faking

compliance by completing the diary after-the-fact (Shiffman, 2000). Therefore, it was our hope that through the utilization of an electronic diary format of EMA we might efficiently identify the underlying mood, thought, and socialization patterns associated with the reduction of depressive symptoms during psychotherapy. In order to accomplish this, the present study examined, with a pragmatic time-series case study format, the responses from a group of participants who reported their moods, thoughts and socializations utilizing a daily electronic diary format of EMA. Additionally, to gain an enhanced understanding of the experience of this methodology, participants provided weekly feedback regarding their experience responding to daily prompts. Specifically, we hoped to map the response patterns of individuals to therapy. Further, we intended to examine the utility of the EMA methodology in assessing the individual response to psychotherapy of those diagnosed with depression.

The findings within the current study applaud EMA's ability to highlight specific individual functioning, while also reducing negative influences of recall which may influence retrospective reporting. Participant's overall experience with the palm-top computers was positive. As such, one recognizes the profound utility of the daily EMA for individual case study and clinical purposes.

CHAPTER 1

Introduction

The intent of this research was to identify the response patterns of individuals diagnosed with depression who are undergoing psychotherapy, while also examining the efficacy of Ecological Momentary Assessment (EMA), a specific daily diary methodology. Furthermore, we sought to assess participant experience while responding to EMA methodology. Ultimately, information was gained regarding the functional utility of EMA methodology in investigating individualized therapeutic responses.

Characteristically, depression treatment research focuses on nomothetically examining the reduction of symptoms across populations of individuals who are receiving therapy, and typically does not focus on how patterns of response to therapy may differ among individuals. Additionally, research examining the treatment of depression has primarily utilized a pre-test, post-test design that examines symptoms prior to and after treatment. Such designs, irrespective of their inherent limitations (e.g. poor subject recall etc.), may fail to capture the change in moods and symptom patterns over the course of treatment. Examination of such progression utilizing Ecological Momentary Assessment (EMA), which requires that subjects record their thoughts and experiences at different instances as they experience them (Tennen, Affleck, Armeli, & Carney, 2000), could produce individualized information about the course of the condition or its treatment and, perhaps, allow treatment to better focus on variables that negatively impact upon patient functioning. Such variables may include malignant social interactions, perceived social role, or ecological variables such as time of day or day of week.

EMA is not without its limitations. Typically, EMAs use a paper and pencil format. Unfortunately, the findings derived from using paper and pencil formats have often been found to be distorted by participants fabricating compliance by completing the diary after-the-fact (Shiffman, 2000). Shiffman proposed that the use of palmtop electronic diaries might address this limitation of the traditional EMA paper and pencil assessments due to the palm-top electronic diary's ability to time stamp when responses occurred and prevent responding after a specified time period. Therefore, it was our hope that through the utilization of an electronic diary format of EMA, we might most efficiently identify the underlying mood, thought, and socialization patterns associated with the reduction of depressive symptoms during psychotherapy. Specifically, we hoped to map the response patterns of individuals to therapy. Further, we intended to examine the utility of the daily monitoring methodology in assessing the individual response to psychotherapy of those diagnosed with depression. In order to accomplish this, the present study examined, with a pragmatic time-series case study methodology, the responses from a group of participants who reported their moods, thoughts, and socializations, utilizing a daily electronic diary format of EMA. Additionally, to gain an enhanced understanding of the efficacy of this methodology, we asked the participants to provide weekly feedback regarding their experiences, as they responded to daily prompts.

Theoretical Foundation

Depressive disorder is a common malady that can often be quite debilitating. Epidemiological studies have reported lifetime prevalence of major depression as high as 17.1% in sub-clinical populations (Ingram, Scott & Siegel, 1999). When both sub-

clinical and diagnosable levels of depression are tallied, women are almost twice as likely as men to be found to be depressed (Culbertson, 1997; Ingram, Cruet, Johnson, & Wisnicki, 1988; Nolen-Hoeksema, Larson, Grayson, 1999). Estimates for lifetime prevalence vary from 10% to 25% for women and 5% to 12% for men (DSM-IV). Many individuals experiencing depressive symptoms do not seek counseling, suggesting strongly that the incidence and prevalence of depression, whether sub-clinical or clinical, are even greater than statistically estimated. Some not seeking assistance when experiencing depressive symptoms may inappropriately dismiss the symptoms as temporary reactions to stress or as weakness of will, yet others may simply be uncomfortable seeking professional assistance. Despite one's choice to seek or not seek therapeutic assistance, depressive symptoms typically have a significant impact on one's daily living and life satisfaction.

While any type of diagnosable depression, by definition, significantly impairs individuals' functioning, depression is experienced differently in each individual. In some, depressive symptoms are less evident and may be manifested only in reduced energy levels and in a lack of willingness to, or interest in, interacting with others. For others, depressive symptoms are more apparent and are evident in frequent crying, heightened irritability, and in self-injurious behavior. According to DSM-IV (American Psychiatric Association, 1994), a diagnosis of major depression requires that an individual experience, throughout at least a two-week period, at least five symptoms, including depressed mood for most of the day, noticeable reduced interest or pleasure in most daily activities, a significant unintentional weight loss or weight gain, insomnia nearly every day, consistent psychomotor lag, stagnant feelings of worthlessness or guilt, a significantly diminished

ability to think or concentrate, or repeated thoughts of death (American Psychological Association, 1994). During major episodes of depression, depressed individuals experience significant impairment across key aspects of their personal and professional functioning.

Depression has been conceptualized from a number of different perspectives. For the purpose of the current study, we have chosen to examine the causes of depressive symptoms through psychosocial and cognitive lenses. Psychosocial stressors are significant singular or repetitive disruptive life events or environmental stressors; these may include discord among family or friendly relations, difficulty in the work place, and major changes in life situations, such as attending college or experiencing failure or lack of success. Psychosocial stressors do not typically include mild, isolated stressors, such as receiving a less than satisfactory grade on a quiz or not being permitted to socialize with a friend for an evening.

Some psychosocial stressors clearly influence one's cognitive processes, as is evident in the increased number of errors or misinterpretations of thoughts they produce in the individual. Cognitive misinterpretations may include negatively biased interpretations of life events, off-putting evaluations of self, pervasive pessimism, and feelings of hopelessness (Dozois & Dobson, 2001). Such cognitive dysfunctions are the core of depressive disorders, according to several cognitive theories. In these theories affective and physical changes and other related components of depression are consequences of cognitive misconceptions and dysfunctions

In Beck's cognitive theory, depression is the outcome elicited from the activation of a negative self-schema. "Self-schemas are described as organized representations of an individual's prior experiences," (Ingram, Scott, & Siegel, 1999, p. 213). Theorists have postulated that non-depressed youths possess positive self-schemas that are lacking in depressed youths. Therefore, the lack of positive self-schemas may be a developmental precursor to negative self-schemas (Stark et al, 2000). Self-schemas may be considered to be formed at a young age and remain latent until conjured by a stressor in one's life, (Dobson & Block, 1988). Once manifested, they influence one's cognitions and actions with negative schemas leading to maladaptive consequences. Beck, for example (1987), proposed that depression is the result of the activation of a noxious cognitive triad in which individuals think more negatively about themselves ("I am worthless"), their world ("Everyone hates me"), and their futures ("Nothing will ever go well for me") (McIntosh & Fischer, 2000). The lack of positive self-schemas or the existence of pervasively negative self-schemas, is hypothesized to lead to a negative bias in information processing that serves to confirm the depressed individual's less positive or increasingly negative sense of self, world, and future (Stark et al, 2000). While the self-schemas of depressed individuals may, and often do, incorporate positive elements, because of their distorted negative processing biases, such positive content is not accurately activated (Dozois, & Dobson, 2001). Furthermore, although positive affect and positive self cognitions are typical in depressed individuals and are potentially available within the schematic organization of their thoughts, in practice, they are less accessible than

negative elements because of the depressed individuals' "lack of cognitive interconnectedness for positive information" (Dozois, & Dobson, 2001).

While the lack of interconnectedness for positive information has been theorized to result in decreased positive affect and increased negative affect, other cognitive theories distinguish a particular attributional style that interacts with and reinforces one's negative self-schema. The helplessness/hopelessness attributional style is posited to be one such (Seligman, 1975). Individuals with a helplessness/hopelessness style process information in such a way that their "specific, unstable, external attributions for positive events and global, stable, and internal attributions for negative events precipitate depression" (Ingram, Scott, & Siegle, 1999, p. 216). In this case, one's self-schema is established in a negative frame of reference and continues to be perpetuated in that manner.

Therapeutic Response

Utilizing a metaphor drawn from psychopharmacology studies, the efficacy of psychotherapy in treating depression has been frequently examined through studies in which mean symptom reduction is correlated with the average number of treatments (Kadera, Lambert, Andrews, 1996). Interestingly, little mention in the current therapeutic dose-response literature is made of individual differences in treatment response characteristics. Almost invariably, the research on general dose-response outcomes is based on the mean improvement in symptoms made by groups of patients after a given number of sessions, and fails to identify the characteristics of particular patients that influence their patterns of therapeutic response. Such patient characteristics may include how well they relate with others and how they fare in school or work. The emphasis of the current dose-

response literature follows a model in which a typical response pattern is assumed, based on general grouped findings. Existing dose-response studies do suggest, however, that it would be worthwhile to investigate the individual differences among patients that may influence the levels of treatment necessary to produce an acceptable therapeutic result (Kadera, Lambert, & Andrews, 1997). To date, for example, research has indicated that individuals reporting higher initial levels of distress, that is individuals reporting symptoms severe enough to impede daily functioning, require 25 percent more sessions to demonstrate significant clinical improvement (Lambert, Hansen, & Finch, 2001). Additionally, research has reported that the individual level of interpersonal functioning mediates the duration of treatment (Steenbarger, 1994), yet that very research does not speak of how these differences in interpersonal functioning influence and are influenced by the therapeutic dose-response relationship; that is, for example, whether individuals report more positive interpersonal relations as therapy progresses. Gaining a greater understanding of individual response to therapy may well enable clinicians to tailor psychotherapy to the individual and, in so doing, enhance therapeutic response. Such investigations, if they focused upon how ecological characteristics, such as one's social relatedness and one's subjective experiences at work or school influence an individual's response to therapy, would likely provide the treating professional with clearer expectations of how treatment might be best managed, as well as providing a clearer dynamic understanding of the factors influencing a patient's response to therapy.

Capturing Therapeutic Response

Much of the research to date has utilized between-person designs. Between-person designs examine relationships among variables across groups. Such nomothetic designs are concerned with illuminating the influence or impact of a variable (e.g. drug treatment program) across a subpopulation of individuals. Although between-person designs can provide insight into the impact of an independent variable, such a design may lack the ability to speak convincingly to the potentially continually changing thought and cognitive pattern of psychosocial attributes and information processing styles. Additionally, the between-person designs potentially may obscure individual differences that may be clinically beneficial. Within-person or idiographic designs are more effective in addressing such individualized changes and patterns. (Tennen, Affleck, Armeli & Carney, 2000). Idiographic designs are more effective in that they are able to capture true momentary functioning, such as specific behaviors or thoughts, as close to actual occurrences as possible. Such designs have been used to capture behaviors such as daily alcohol or cigarette consumption, as well as emotional status, such as recurring or frequent disturbing thoughts or moods.

Among the most commonly utilized idiographic designs are those which utilize daily diary recordings and experience sampling. These designs sample individuals' thoughts, emotions, and cognitions over an extended period of time so that their patterns of daily functioning may be discerned. In their research, Tennen et al. (2000) demonstrated that daily diary designs could offer informative cues essential for evaluating diverse concerns arising in both research and clinical settings. Through implementation of

the daily diary methodology, they were able to obtain specific information regarding situation-contingent behavior or emotions. Tennen et al. (2000) proposed that idiographic designs capture stressors, coping, and adaptations more accurately than nomothetic designs and better link change in emotional experiences to their real-time moments of change. They hypothesized that this difference was attributed to the different types of questions addressed by each of the design strategies. Tennen et al (2000) also proposed that idiographic designs minimize the recall error evident in between-subject designs, employing post-treatment questionnaires, because participants respond in closer proximity to real-time occurrences of actual experiences. When examining the difference between within-person and between-person associations, Tennen et al (2000) also found that often the within-person associations had little in common with the between-person associations.

One reason for the difference in results obtained using idiographic and nomothetic methods may be that forming an account of the past is typically aided by heuristic strategies for recall or reconstruction of the past (Shiffman, 2000). Differences in reporting may be due to either the respondent's own heuristic devices, intervening events acting as anterograde interference, or the respondent's psychological state at the time of recall (Stone et al., 1998). That the two methods may produce different results is especially likely when conditions such as depression are studied, due to the fact that the cognitions of depressed individuals are known to be affected by pervasive negative rumination and dysfunctional information processing. This negative rumination and dysfunctional information processing may influence participants' recall of their actual thoughts and mood

states, potentially reducing the reliability of their reports and the accuracy of self-report inventories employed in such a study. Of course, poorer recall may be the result of the information requested simply not being available in the participant's memory any longer (Shiffman, 2000).

Thus, by utilizing a nomothetic between-person design to study fluctuations in psychopathology, one may form inaccurate conclusions regarding daily functioning as a consequence of biases inherent in the methodology. However, idiographic within-subject designs, such as those using a daily diary, which repeatedly measure symptoms in the participants' natural environment, might well provide a richer understanding of the temporal dynamics of factors that exacerbate or maintain symptoms. Additionally one might gain a better understanding of the individual differences that affect these dynamics (Tennen et al, 2000). Further, the idiographic within-subject design may reduce some of the deleterious effects on the investigation's validity that are attributable to responders' recall biases (Tennen et al., 2000). At the very least, applying the two methodologies in tandem might produce results that complement each other, providing a more complete picture of that which is transpiring.

Ecological Momentary Assessment (EMA)

While retrospective reports ask participants to describe a stressful event, feeling, thought, or cognition that occurred, typically a week or month previously, Ecological Momentary Assessment (EMA) asks participants to respond to and express what is occurring at a particular time or when cued. Stone et al. (1998) hypothesized that these two methods do not provide identical information. In their study, comparing reports of cop-

ing, utilizing both EMA and retrospective recall, Stone et al. (1998) indicated that retrospective reporting may employ broader and more general retrieval strategies than reporting in repeated momentary assessments. Stone et al. (1998) demonstrated only a modest agreement between findings elicited from EMA and short-term retrospective coping assessments. Speaking of the difference between retrospective and EMA reporting of coping, Stone et al. (1998) reported that a significant number of participants' retrospective reports were inconsistent with information previously conveyed through EMA. Further, analysis of specific items revealed both false positives as well as false negatives on recall reports. Focused analyses, such as those conducted by Stone et al., support the notion that retrospective reports do not necessarily correspond to reports utilizing EMA. They also suggest that retrospective reports often do not adequately capture participants' daily moment-by-moment thoughts, cognitions, and feelings that underscore depressive symptoms; thus providing incentive for the utilization of EMA designs when examining such processes. EMA designs aim to obtain assessments in real time to minimize or eliminate recall bias. For each of the above-stated reasons, an EMA design may be most efficient for current depression research.

In implementing an EMA design, one must, of course, utilize instruments that are best suited for repeated daily application. To be useful, a design must maintain participant involvement, prevent, or, at least reduce recall bias, and capture the quality of typical daily functioning (Stader & Hokanson, 1998). Many of the EMA studies to date have utilized paper and pencil diaries. Although possessing many of the positive components attributed to EMA, paper and pencil diaries also have significant limitations (Shiffman,

2000). One such is the ease with which responders can fabricate compliance after the fact (Litt, Cooney, & Morse, 1998). If compliance is fabricated, investigators are unable to examine the momentary thoughts and cognitions, which are of particular interest to them. Utilization of palmtop Electronic diaries (ED) addresses this limitation by allowing response input over only a certain time period. When a response is made, the ED tags the entry with a date and time. Failures to respond to prompts are also tagged and stored. Further, ED does not permit participants to skip items that are components of the presented inventories. In addition to their ability to reduce limitations of other designs, ED measures are associated with high rates of compliance (Shiffman, 2000).

While it is evident that EMA can facilitate activities aimed at monitoring the effects of ongoing treatment and provide data critical to treatment design and implementation, few systematic investigations of practical issues related to the use of EMA have been reported. Additionally, much of the systematic research related to methodological issues having to do with self-monitoring is outdated. Almost all of the research was completed in the 1970s, using laboratory analogue procedures and focusing on target behaviors of little substantive interest in their own right (Foster, Lavery-Finch, Gizzo, and Osantowski, 1999). A thorough review of current research finds that interest in the examination of EMA methodology has waned; this is especially true of research which addresses the effect that EMA methodology has on the experience of the participant and the variables targeted for explanation.

Although not always of primary focus of much research, the participants' experiences utilizing an EMA methodology are a significant factor when examining the utility