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Initial feasibility of a researcher configurable computerized self-monitoring system

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Abstract

This study sought to evaluate the feasibility of a researcher configurable self-monitoring program. An initial prototype of the program was developed as a Windows-based drag and drop flow chart interface for the researcher to construct the self-monitoring or diary protocol to be scheduled and displayed to the subject on a Pocket PC. The usability of the desktop researcher interface was evaluated in a small sample of medication trial researchers whose ratings of the prototype were generally positive and provided directions for improvement. The subject interface was then evaluated in an "analog" drug trial of 49 smokers using nicotine gum. These subjects were randomly assigned to either paper-based log or Pocket PC self-monitoring for 3 weeks. Pocket PC subjects were significantly more compliant than the log subjects on recording in the second (65% vs. 39%) and third (69% vs. 39%) weeks of the trial but did not differ from the log condition on total recording entries, likely due to the restrictions on retrospective recording in the Pocket PC program. This study provides support for the feasibility of a researcher configurable electronic diary system which should substantially reduce the programming barriers to electronic self-monitoring and increase the use of real-time monitoring in clinical and research venues.

Keywords: Self-monitoring; Self-observation; Behavioral assessment; Computers; PDAs

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Self-monitoring or self-observation assessment methods are used extensively in clinical research and play an important role in the measurement of contextual, predictor, and outcome variables in human behavior research (Cone, 1999; Stone, Turkkan, Bachrach, Jobe, Kurtzman, & Cain, 1999). Self-observational strategies are also widely used in clinical settings, particularly among behaviorally oriented practitioners, for a wide variety of clinical needs including differential diagnosis, target behavior selection, functional assessment, and treatment outcome assessment (Elliot, Miltenberger, Kaster-Bundgaard, & Lumley, 1996).

Self-monitoring or self-observation methods were derived from independent observational methods primarily to provide a more practical and cost-efficient method of observing and recording behavior *as it occurs*. Self-observation also allows for the monitoring of private events such as thoughts, emotions, and other internal states which can not be observed independently. Although "liberal" forms of self-monitoring exist in which subjects provide summary ratings and estimates over periods of days or weeks (Craske & Tsao, 1999), the core distinguishing feature of most self-monitoring methods is the minimal time lapse from the behavior to the recording of that behavior (Cone, 1999).

This prospective or real-time nature of self-monitoring is its primary advantage over retrospective self-reports. Self-monitoring reduces the effects of forgetting or memory bias as well as demand characteristic biases typically found with most self-report methods (Barton, Blanchard, & Veazey, 1999; de Beurs, Lange, & Van Dyck, 1992). The real-time nature of self-monitoring also provides for a more refined and accurate appraisal of the contextual elements of behavior than possible with retrospective self-report (Shiffman, 1993).

Although self-monitoring is potentially more accurate than self-report, particularly if targets are well-defined and subjects are adequately trained and rewarded for accuracy (Korotitsch & Nelson-Gray, 1999), compliance to self-monitoring remains a significant problem that limits the usefulness of this assessment approach. Self-monitoring frequently produces incomplete or unusable data, particularly if the self-monitoring protocol is too demanding on the subject (Foster, Laverty-Finch, Gizzo, & Osantowski, 1999). In addition to the problems of partial data, noncompliance also can result in data fabrication. Although most occurrences of fabrication appear to be limited to retrospective completion of the monitoring form (e.g. fabricating the *time* of the recording), fabrication of the actual content of the data also has been reported (Hermann, Peters, & Blanchard, 1995; Lipinski & Nelson, 1974; Mazze et al., 1984).

To improve accuracy and address the compliance difficulties of pencil-and-paper self-monitoring procedures, a range of technologies have been applied to self-monitoring methods in recent years. Csikszentmihalyi and Larson (1987) developed the experience sampling method (ESM) in which a pager or other timing device is used to prompt the subject to observe and record the presence or absence of the target behaviors. The cue or prompt to record improves subject compliance while also reducing monitoring burden since the behaviors are sampled instead of being continuously monitored. More recently, Stone and Shiffman (1994) developed the Ecological Momentary Assessment (EMA) method which delivers the self-monitoring