

Ecologic Momentary Assessment: Perspectives on Applications and Opportunities in Research and Practice Regarding Nutrition Behaviors

Rosa K. Hand, MS, RDN, LD¹; Adam T. Perzynski, PhD²

ABSTRACT

Retrospective self-reported data have limitations, making it important to evaluate alternative forms of measurement for nutrition behaviors. Ecological momentary assessment (EMA) attempts to overcome the challenges of recalled data with real-time data collection in a subject's natural environment, often leveraging technology. This perspective piece 1) introduces the concepts and terminology of EMA, 2) provides an overview of the methodological and analytical considerations, 3) gives examples of past research using EMA, and 4) suggests new opportunities (including combining assessment and intervention) and limitations (including the need for technology) for the application of EMA to research and practice regarding nutrition behaviors.

Key Words: ecological momentary assessment, diet assessment, research methodology, nutrition, dietetics (*J Nutr Educ Behav.* 2016; ■:1-10.)

Accepted May 10, 2016.

INTRODUCTION

This perspectives piece 1) introduces the concepts and terminology of ecological momentary assessment (EMA), 2) provides an overview of the methodological and analytical considerations, 3) gives examples of past research using EMA in nutrition and related fields, and 4) suggests new opportunities and limitations for the application of this method to research and practice in the field of nutrition behaviors. The EMA methodology has potential to change research and practice by providing contextual information about causes of nutrition behaviors including triggers for eating and reasons for food choices. The EMA can improve on existing measures of these concepts by limiting the need for participant recall.

Self-report questionnaires are a widely used and efficient method for gathering information on many health behaviors, personal attitudes, and emotions. Despite efforts to improve the accuracy and reliability of recalled self-reported data, important limitations remain and are familiar to nutrition professionals, who are well aware of the challenges in obtaining accurate 24-hour dietary recalls including poor memory, social desirability bias, and systematic underreporting.¹ Food records and diaries are generally acceptable when the goal is to compare intake between 2 groups, because underreporting will affect both groups equally.² However, when the goal is assessment of absolute intake rather than a comparison, the underreporting becomes more concerning.² In partic-

ular, there are food groups and individuals that are especially likely to be affected by underreporting.² Along with systematic error in recalled data, self-report methods often rely on a summary measure of a feeling or experience that may be dynamic over a time period.^{3,4} For example, self-reported recall of pain is most influenced by peak pain and end pain but does not reflect the duration of pain.⁴ Extrapolating to nutrition, one would expect that hunger, which fluctuates throughout the day, would not be adequately reflected by an end-of-day hunger measure. Recall measures asking about the past day, past week, month, or year often consider feelings or attitudes as traits, which are consistent, whereas they may be more appropriately classified as states (varying).⁵ Similarly, researchers may errantly assume that answers to questions about a retrospective time period are an accurate reflection of the average during that time period. All of these limit the use of recalled measures of dietary behaviors, both on an individual level for research or practice and on a group level in epidemiologic studies.

When researchers are interested in quantifying habits rather than an individual time point, summary measures of behavior are needed. Understanding the characteristics of well-accepted measures of dietary intake can help

¹Dietetics Practice Based Research Network, Academy of Nutrition and Dietetics, Chicago, IL

²Center for Health Care Research and Policy, MetroHealth Medical Center/Case Western Reserve University, Cleveland, OH

Conflict of Interest Disclosure: The authors' conflict of interest disclosures can be found online with this article on www.jneb.org.

Address for correspondence: Rosa K. Hand, MS, RDN, LD, 120 S Riverside Plaza, Suite 2000, Chicago, IL 60606; Phone: (312) 899-4720; Fax: (312) 899-5344; E-mail: rhand@catright.org

©2016 Society for Nutrition Education and Behavior. Published by Elsevier, Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jneb.2016.05.004>

differentiate between the concepts of summary and single-time-point measures. The Food Frequency Questionnaire (FFQ) is a summary measure that assesses a period of time spanning months instead of days and attempts to describe habitual dietary intake, sometimes far in the past.⁶ Summary measures of non-nutrition habits have been shown to adequately correlate with measures at single time points, just as FFQs correlate with dietary recalls and records.⁷ Statistical adjustment approaches have been developed that extrapolate habitual intake from single versus repeated dietary recalls. These statistical approaches can help overcome some biases of recall methods,⁷ but their focus is on nutrient intake rather than the event of eating.

Other attempts to overcome the limitations of short- or long-term recall include techniques that mimic the natural environment but do not completely replicate it.³ For example, a feeding study conducted in a clinical research unit with food weighed before and after a meal provides good internal validity by measuring exactly the quantity of food consumed but poor external validity when applied to a free-living individual's behavior. Another methodology to overcome these challenges is the use of a diary or record, such as a food record or an emotional diary.³ However, research on pain using electronic diaries that allow comparison of the participant's time entry to an automatic electronic time stamp indicated only 11% agreement; 75% of participants in the paper diary group had at least 1 day during which they did not make any recordings but backdated to indicate compliance.⁸ Assuming that a similar problem with timeliness would be identified in food diaries, their validity as an instantaneous versus recalled measure must be called into question.

EMA Definition and Terminology

The EMA is a group of methodologies that attempt to overcome the limitations of self-reported data.³ The term EMA was first coined by Stone and Shiffman in 1994.³ They identified 4 characteristics of EMA methodology. Observations are 1) repeated, 2) real-

time recordings of 3) momentary states 4) conducted in the natural environment.³ This means that EMA focuses on sampling multiple time points to understand a participant's state at an exact moment in time rather than obtaining a summary measure. How many measures are needed to quantify the characteristic depends on the construct being measured and the goal of the research, but, for many constructs, measurements are warranted more than once per day.⁹ Participants provide this information during their day to provide real-time data that are representative of their natural environment.³ Technologies such as smartphone software applications (apps) or text messaging are generally leveraged to ensure both timely responses and the ability of the participant to continue going about their daily activities.³

There are 6 methodologies that Stone and Shiffman³ identify as fulfilling the criteria of EMA: 1) diaries/records, 2) behavioral observation, 3) self-monitoring, 4) time-budget studies, 5) experience sampling, and 6) ambulatory monitoring. Each method has benefits and limitations. These are compared in the Table.^{2,10-18} Several of these EMA methods are familiar to nutrition practitioners as research or practice tools, although they may not have been explicitly referred to as EMA in the past.

Although EMA has many benefits, some events are still more appropriate to measure through recall.⁴ Events that are rare but salient to the participant, for example, divorce, medical treatment such as bariatric surgery, or death, are appropriate for recall reporting.⁴ These events are easily remembered and spaced too far apart to be captured in experience sampling.⁴ In addition, the first occurrence of a salient event (a first cigarette, a first attempt at weight loss) is also appropriate to measure through recall.⁴ Of course, salience will vary by participant, limiting this recall. Strategies to assist the participant in accurate recall, including probing for the context of other surrounding events, are important.⁴ Figure 1 compares the experience sampling approach to more traditional methods of obtaining diet information: the 3-day food record and the 24-hour recall. The power of EMA comes not from just 1 day but from

building a picture of an individual's habits by sampling multiple days.

Design Considerations in Experience Sampling

In designing a research study with the use of experience sampling methods, a researcher must first decide whether the construct being measured is a discrete event, for example, an eating or drinking episode, or whether it is continuous, such as level of appetite or hunger or body image.⁹ On the basis of this decision (defined by the purpose of the study), a sampling strategy can be designed.⁹ As described in the Table, experience sampling approaches may attempt to capture behaviors during an entire day or waking period (coverage approach, similar to a diary), or, more traditionally, collect data during a random sample of time points during the day.⁹ Figure 2 compares the coverage approach to a sampling approach. In the figure, the outcome of interest is the act of eating (the event) and how those events are influenced by hunger (not the nutrients consumed). Although some methodologies have been developed to use an experience sampling approach to nutrient intake measurement,¹⁹ the real value of experience sampling may be in the opportunities for assessing the choices of when to eat or the behaviors that influence the act of eating. For example, Gill and Panda²⁰ recently used a custom smartphone application to gather information on the timing of eating events and foods and beverages consumed.

If the construct being measured is an event, the experience sampling strategy may ask participants to complete the recording at the beginning or end of each event⁹ (Figure 2A). This would be similar to instructions on a 3-day food record in which participants write down each food as soon as the meal or snack (event) is finished.⁹ An event-based experience sampling strategy increases the likelihood that the event to be studied will be captured, but it becomes non-random and predictable to the participant.⁹ Event-based reporting usually requires the participant to remember to record, although technology allows researchers to use reminders (random or scheduled) to assist in this process.⁹

Download English Version:

<https://daneshyari.com/en/article/4939551>

Download Persian Version:

<https://daneshyari.com/article/4939551>

[Daneshyari.com](https://daneshyari.com)