Experience Sampling

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Experience sampling or experience sampling method (ESM) is a frequently used technique in psychology and behavioral and health-related research that is gaining importance in social science research. ESM enables researchers to measure people's behaviors, feelings, and thoughts during day-to-day activities (Larson & Csikszentmihalyi, 1983). Sometimes diary or ecological momentary assessment (EMA) studies are subsumed under the umbrella of ESM. The ESM technique collects information about people's everyday life experience (as it occurs or close to its occurrence) by requesting participants to provide self-reports multiple times a day (Christensen, Feldman Barrett, Bliss-Moreau, Lebo, & Kaschub, 2003). This "in situ" measurement approach may compensate a variety of methodological drawbacks, such as recall errors, that are associated with cross-sectional studies using retrospective reports. ESM has been used to investigate numerous research topics, including, but not limited to, diseases and disorders, communication, emotional constitution and mood, media usage, relationships, stressors, substance usage, and travelling.

This entry does not claim being exhaustive but introduces ESM and its methodology. For more detailed discussions of ESM, interested readers are referred to the literature listed at the end. In what follows, five important subject areas of ESM are outlined and discussed: ESM solutions, sampling protocols, field period, self-report collection, and future perspectives.

ESM Solutions

In early ESM studies participants were equipped with signal devices, such as electronic pagers that beep and/or vibrate, in order to notify respondents when to provide self-reports on the topic under investigation (Larson & Csikszentmihalyi, 1983). When receiving a signal participants were supposed to complete a short paper-pencil questionnaire. The questionnaires were usually in a booklet that participants carried with them during the study. At the end of the study, participants returned the signal device and the booklet with the completed questionnaires.

In the early 90s, preprogramed Personal Data Assistants (PDAs), also known as handheld computers, replaced electronic pagers and paper-pencil questionnaires (van Berkel, Ferreira, & Kostakos, 2017). These computerized devices allowed researchers to signal participants throughout the day and allowed participants to provide self-reports. For the first time, it was possible to monitor whether and how quickly participants comply with the requests for self-reports, and to set fixed time intervals in which participants had to reply. Drawbacks associated with these devices were limited screen size and battery life, unstable data storage, and high device costs (van Berkel et al., 2017; Christensen et al., 2003). Similar to the electronic pagers and booklets, the PDAs had to be returned at the end of the study.

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The all-encompassing increase of smartphone owners and (high-speed) mobile internet access have opened new avenues for ESM studies. Smartphones act as signaling and self-reporting device at the same time. Since participants (usually) use their own smartphones, this ensures familiarity with the device and increases ecological validity. There is no need for distributing and returning study equipment, which facilitates the conduction of ESM studies. Smartphones also support the collection of a variety of additional data, such as Global Positioning System (GPS) and acceleration data, that may be used as a supplement to self-reports, potentially reducing participants burden (van Berkel et al., 2017; Dennis, Yim, Garrett, Sreekumar, & Stone, 2019).

In general, smartphones support two main approaches for ESM studies (Hofmann & Patel, 2015): The local application (APP) approach and the short-message-service (SMS) approach. The APP approach requires participants to download an APP on their smartphone. The signaling and providing of self-reports are conducted through the installed APP. The SMS approach, in contrast, uses cell phone text messages for signaling participants. The text messages include a hyperlink that forwards participants to a browser-based web questionnaire. Both approaches have several merits and limits that should be considered when planning and designing ESM studies (see Hofmann & Patel, 2015, p. 238 for a more detailed discussion).

Sampling Protocol

The sampling protocol is an important aspect of ESM studies that must be well-considered. In general, there are three different types of sampling protocols (Christensen et al., 2003; Hektner, Schmidt, & Csikszentmihalyi, 2007): Interval-contingent protocols, signal-contingent protocols, and event-contingent protocols.

The interval-contingent protocol implies that participants receive signals (or requests for self-reports) following a predefined and reiterating schedule. More specifically, participants are either supposed to provide self-reports at fixed time points (e.g., 8 AM, 12 PM, 6 PM, and 9 PM) or in accordance with specified time intervals (e.g., every 90 minutes). Interval-contingent protocols are useful when investigating experiences that frequently occur during a day (Christensen et al., 2003). In addition, they are less burdensome than the other two types of protocols because participants can adjust to the signaling schedule.

Signal-contingent protocols, in contrast, do not follow a structured signal schedule but signal (or request for self-reports) at random times during a day (Hektner et al., 2007). The signal-contingent protocol is useful when investigating on-going experiences that are likely to occur at a given signal (Christensen et al., 2003). Participants cannot adjust to the signal schedule because they do not know when the next signal pops-up and thus this type of protocol is more burdensome.

Finally, the event-contingent protocol (usually) does not signal participants to provide self-reports. Participants are required to report experiences when they occur or as close to their occurrence as possible (Côté & Moskowitz, 1998). Therefore, this type of protocol is useful when investigating comparatively scarce experiences that are not likely to occur at a particular signal. Compared to the other two types of protocols, event-contingent protocols are relatively burdensome for participants and require clear instructions and reporting criteria. One way to reduce participant burden is to signal participants at regular intervals to remind them to not forget about the experience reporting (Côté & Moskowitz, 1998; Hektner et al., 2007). A further

way is to signal participants based on their geolocation or motion level; both information can be gathered via the built-in sensors of smartphones and other smart devices or wearables.

Field Period

A further important aspect of ESM studies is the field period. According to Christensen et al. (2003, p. 61) the field period of ESM studies depends on four aspects: The number of observations needed for a stable parameter estimation (many ESM studies use multi-level modeling; see Gabriel et al., 2019), the actual occurrence of the target experience, the expected compliance with the self-report requests (or response rate), and the participant burden. Taking a closer look at existing ESM studies, it is observable that there is some variation with respect to the field period. Van Berkel et al. (2017), for instance, conducted a comprehensive literature review and found that most of the ESM studies lasted less than one month with a median field period of 14 days (min = 1 day and max = 365 days). The authors also found that the number of participants varied from 1 to 1,013 participants with a median of 19 participants. Response rates (i.e., the ratio of self-reports provided to the ESM signals across the study population) were about 70%; however, about 40% of the studies did not report any response rates. In their review article, Gabriel et al. (2019) additionally reported that ESM studies offering monetary or quasi-monetary incentives obtained higher response rates than ESM studies with no incentives.

In order to come up with an appropriate field period for ESM studies it seems recommendable to conduct power analyses in advance that help determining the required sample size for stable parameter estimations (Gabriel et al., 2019; Hektner et al., 2007). In addition, it seems wise to conduct field pretests or soft launches that help estimating the daily occurrence of the target experiences, the response rates, and the burden of participants. A comprehensive review of previous ESM studies concerning similar research topics may also help determining appropriate field periods.

Self-report Collection

The decision about response formats for providing self-reports in ESM studies should be well-considered and in line with the necessary information. It is also important to keep in mind that response formats can have a profound impact on participants' communicative and cognitive processes (Sudman, Bradburn, & Schwarz, 1996), which in turn can affect the self-reports obtained. In general, ESM studies use the same response formats as cross-sectional studies. They can employ questions with open response formats providing text fields for entering self-reports or questions with closed response formats including predefined lists of response categories (or symbols, such as emoji). Even though open response formats may support richer data than closed response formats, they are frequently avoided because the ensuing coding and analysis have long been conducted manually. This makes the process comparatively time-consuming and expensive. However, enhanced automated text transcription, coding, and analysis tools facilitate a proper handling so that open response formats may gain popularity in future ESM studies.

New technological developments and the increasing use of smartphones in ESM studies also allow collecting alternative self-reports in the form of audio, video, and image files. For instance, participants can record and upload an audio file in which they describe their "in situ"

mood. This is possible via APPs (APP approach) as well as via browser-based web surveys (SMS approach). The sound of participants' voice may provide an additional source of information that can be used for a more accurate determination of emotional conditions. Advances in automated speech recognition and processing allow researchers a proper handling of large-scale audio data.

Future Perspectives

Despite the use of new forms of self-reports, such as audio and/or visual inputs, there are two potential avenues that researchers can pursue in ESM studies (see also further readings listed at the end). On the one hand, it is possible to make use of wearables and smart devices, such as activity trackers or smartwatches. Such devices may not only reduce participant burden but also enrich ESM data obtained from traditional self-reports. For instance, wearables frequently consist of accelerometer informing about physiological states and motion levels. Data from accelerometers (i.e., acceleration data) can be used to create activity profiles of participants and thus they represent a supplement to common fitness and health measures. On the other hand, it is possible to develop digital platforms to build experience-sampling databases that include information of participants' daily activities. One example is the APP-based platform "unforgettable.me" that records activities and events of everyday life and that enables participants to retrieve them via a search engine. The unforgettable.me platform also consists of functions that may allow researchers to conduct experiments and to analyze existing data.

Future developments in ESM studies highly depend on the creativity of researchers and the way they make use of new technologies. A further important point for future developments is the willingness of participants to engage in ESM studies and to share the required information. The use of new technologies in research makes it indispensable to find appropriate ways to protect the privacy of participants.

Further Readings

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