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## *Working Paper Series*

Working Paper

No. 62

### Experience Sampling

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## Working Paper Series of the Council for Social and Economic Data (RatSWD)

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# Experience Sampling

**Michaela Riediger**

## **Abstract**

Experience Sampling refers to the repeated sampling of momentary experiences in the individual's natural environment. Methodological advantages include the minimization of retrospective response biases and the maximization of the validity of the assessment. Conceptual benefits include the provision of insights into short-term processes and into the daily-life contexts of the phenomena under study. Making use of the benefits of Experience Sampling while taking its methodological challenges into consideration allows addressing important research questions in the social and behavioral sciences with much precision and clarity. Despite this, Experience Sampling information is still rare in the data infrastructure that is publicly available to researchers. This stands in contrast to a current thriving of the methodology in research producing datasets that are not publicly available, as is the case in many psychological investigations. Following a discussion of the benefits and challenges of Experience Sampling, this report outlines its potential uses in social science and economic research and characterizes the status quo of Experience Sampling applications in currently available datasets, focusing primarily on household surveys conducted after 2001. Recommendations are given on how an intensified use of Experience Sampling in large-scale data collections can be facilitated in the future.

**Keywords:** Experience Sampling in the social and behavioural sciences

## What Is Experience Sampling?

Experience Sampling refers to the capturing of experiences—such as events, behaviors, feelings, or thoughts—at the moment of, or close to, their occurrence, and within the context of a person’s everyday life. The distinctive characteristic that sets this methodology apart from other assessment approaches is the *repeated* sampling of *momentary* experiences in the individual’s *natural* environment (as opposed to, for example, single-time retrospective reconstructions of past experiences in questionnaires or interviews). Many labels, such as event sampling, real-time data capture, time situated method, ambulatory assessment, diary method, or ecological momentary assessment, have been used to refer to this methodology. In this report, I will use the term *Experience Sampling* that was coined by Mihaly Csikszentmihalyi and colleagues in the 1970s, and has been adopted by many other researchers since then.

The core method in Experience Sampling, and hence the primary emphasis of this report, is the acquisition of repeated self-reports of momentary experiences or of experiences that occurred during short preceding time intervals (typically covering no more than 24 hours). Assessment schedules in Experience Sampling research include (a) interval-contingent sampling (i.e., assessments at fixed points in time, such as before going to bed at night), (b) signal-contingent sampling (i.e., assessments triggered by signals that typically occur at varying time intervals throughout the day and that are given by electronic assessment devices, such as handheld computers), (c) event-contingent sampling (i.e., assessments triggered by the occurrence of pre-specified events, such as expenditures), or (d) any combinations of the above. Which assessment schedule is most appropriate in a given study context depends on the specific research question at hand, the prevalence of the particular experience under study, as well as on feasibility considerations.

Although self-report is the core assessment method in Experience Sampling and the primary focus of this report, it should be noted that other assessment techniques originating from diverse scientific disciplines can be used as complementary assessment strategies to capture the multiple facets of naturally unfolding experiences and their contexts. These techniques include the ambulatory monitoring of physiological processes or physical activities (*see expert reports on Bio-Markers*), the recording of behavioral information (e.g., performance in cognitive tasks), the recording of ambient environmental parameters (e.g., sound recordings, photographs of the environment), or the recording of the individual’s

geographical locations (e.g., geo-tracking, *see expert report on Geographical Data*).

This report is organized as follows. Following a discussion of the benefits and challenges of Experience Sampling, I will outline its potential uses in social science and economic research. I will then characterize the status quo of Experience Sampling applications in currently available datasets, focusing primarily on household surveys conducted after 2001. Based on this, I will draw conclusions regarding future developments in the contribution of Experience Sampling to a data infrastructure that can address contemporary as well as future research needs in the social and behavioral sciences.

### **Benefits and Challenges of Experience Sampling Methodology**

When compared to retrospective self-report, the most widely used assessment approach in social and economic data surveys, Experience Sampling offers compelling benefits on the one hand, both from a methodological and from a conceptual perspective. On the other hand, it is the more resource-demanding method and involves other challenges as well. Hence, careful consideration of both benefits and challenges is necessary to take full advantage of this powerful methodology.

Important *methodological* advantages of Experience Sampling are brought about by the immediacy of the measurement, and the fact that it takes place in the participants' natural environments. It is well known that human memory imposes limits on what people can validly report retrospectively. In most questionnaires or interviews, respondents have to rely on partial recall and inference strategies when asked to report on their past behavior or experiences. There is ample empirical evidence that this results in retrospective memory biases and aggregation effects that impair the validity of the information assessed, sometimes profoundly so. Experience Sampling provides a promising alternative by obtaining reports of experiences at the moment of, or close to, their occurrence. Furthermore, the fact that this information is collected within the natural context of the participants' day-to-day lives further enhances the validity of the assessment, offering unique opportunities to understand experiences and behaviors in their ecological context (Schwarz, 2007) Today, Experience Sampling assessment is typically implemented with the help of electronic assessment devices, such as handheld computers, which provide the added methodological benefit of allowing close monitoring of the participants' response adherence to the measurement scheme.

The prevailing emphasis in most available data collections in the social and economic sciences to date is on differences *between* individuals at given points in time. A fundamental

dimension of many aspects in human life—their inherently fluctuating nature as reflected in short-term *within*-person variations—has not yet received much attention, even though the importance of within-person processes for understanding many social and behavioral phenomena has been acknowledged in theory. Hence, a compelling *conceptual* benefit of Experience Sampling involves the fact that assessments are repeated with short time intervals between them. This makes short-term processes and fluctuations that cannot be studied with the traditional fixed annual assessment schedules accessible to scientific investigation. Another conceptual benefit of Experience Sampling is the provision of insights into the role of daily-life contexts for the target phenomena under study, such as the respective role of the individuals' educational, work, or social environments.

Despite these methodological and conceptual benefits, Experience Sampling also involves challenges that need to be considered when implementing the method. Of these challenges, three stand out. First, Experience Sampling is resource-intensive. As motivation plays a significant role in determining whether a participant will successfully complete an Experience Sampling study, close contact with the participants throughout the entire study and adequate remuneration are indispensable. Second, the burden for the participants (e.g., the necessary time commitment) is comparatively large. This creates difficulties in terms of both representativeness and attrition of the sample. The demanding nature of Experience Sampling studies could lead certain types of individuals to be over- or underrepresented in the sample from the beginning or to drop out during the study interval. Finally, repeatedly measuring a given phenomenon can cause reactivity effects. That is, there is the possibility that the phenomenon under study may change as a result of measurement or reporting. Although reactivity is a general challenge in social and behavioral research, it can be even more relevant in Experience Sampling research because the repeated assessments may lead people to pay unusual attention to their experiences and behaviors.

In short, Experience Sampling bears immense methodological and conceptual advantages. Nonetheless, it also involves a number of challenges that need to be considered. The concluding section of this report will provide specific recommendations for this. Still, Experience Sampling, when adequately applied, represents a powerful tool to tackle new questions and investigate research questions in greater depth. Next, I will describe such potential uses of Experience Sampling in social science and economic research.

## **Potential Uses of Experience Sampling in Social Science and Economic Research**

Generally speaking, Experience Sampling can provide fine-grained and ecologically valid information on

- the *Who, What, Where, When, or How* of experiences and behaviors as they occur in people's daily lives and natural environments,
- the naturally occurring *variation* and *co-variation* of experiences, behaviors, events, and contextual characteristics over time (both *within* and *between* individuals), and
- the within-person *variability* of experiences and behaviors (i.e., short-term fluctuations or changes) that, depending on the research domain under study, can be indicative either of people's flexibility or adaptability, or of their instability and vulnerability.

Obviously, these are questions that are of immense relevance and importance for a large variety of domains in social, behavioral and economic research. Potential applications that would provide new insights into phenomena are literally countless. They include investigations of life transitions (e.g., divorce, unemployment, child birth, entering the workforce, or retirement), social interactions, investment/buying behaviors, health behaviors and health care use and effectiveness, well-being and life satisfaction, family life, work life, availability, use and effectiveness of the educational system, major life events and stressors, as well as investigations of many other research domains. Despite this wide spectrum of potential applications, Experience Sampling information is still rare in the data infrastructure that is publicly available to researchers in the social and behavioral sciences. This stands in contrast to a current thriving of the methodology in research producing datasets that are not publicly available, as is the case in many psychological investigations. The following section provides an analysis of the status quo of Experience Sampling applications in the social and behavioral sciences.

### **Status Quo of Experience Sampling in the Data Infrastructure**

The purpose of the following analysis is to characterize the status of Experience Sampling information in the currently available data infrastructure. The first part of this analysis addresses the present use of Experience Sampling in Household Surveys. It illustrates the current scarcity of Experience Sampling information in datasets that are publicly accessible to



interested researchers. The second part of this analysis addresses the status of Experience Sampling in psychological research. The purpose of this part is to illustrate the present thriving of the methodology in the production of datasets that are only available to the small number of scientists directly involved. The concluding part of this report will build on this status-quo analysis to derive recommendations for future research needs and challenges.

#### *Experience Sampling in Household Surveys with Ongoing Data Collection Since 2001*

To identify contemporary household surveys employing Experience Sampling methodology, I conducted a search using the keywords “experience sampling,” “diary/diaries,” and “ambulatory assessment” in the following databases:

- Datenbestandskatalog des Zentralarchiv für empirische Sozialforschung der Gesellschaft Sozialwissenschaftlicher Infrastruktureinrichtungen, Informationszentrum Sozialwissenschaften  
(<http://www.gesis.org/Datenservice/Suche/Daten/index.htm>)
- Surveydatenbank des Deutschen Jugendinstituts  
(<http://db.dji.de/surveys/index.php?m=msa,0>)
- National statistics’ database of longitudinal studies  
(<http://www.iser.essex.ac.uk/ulsc/keeptrack/index.php>)
- Data catalogue of Economic and Social Data Service  
(<http://www.esds.ac.uk/search/searchStart.asp>)

Table 1 summarizes the household surveys applying Experience Sampling that could be identified by this search strategy and that fulfilled the additional criterion of ongoing data collection in 2001 or later (search result as of June 20, 2008). The table shows that there are only few applications of Experience Sampling in current household panels. All of the identified applications in household surveys used Experience Sampling in the form of diaries, that is, in the form of interval-contingent, short-term retrospective assessments. Table 1 also shows that the methodology is applicable in large-scale data collections and well-suited for the investigation of a wide array of phenomena. This is further demonstrated by the fact that the German Federal Statistics Office in collaboration with the statistical offices of the Länder successfully obtains household expenditure diaries in the German Sample Survey of Income and Expenditures.

It is notable that the currently most prominent international prospective household

panels—the Panel Study of Income Dynamics (PSID, USA), the Socioeconomic Panel (SOEP, Germany), the British Household Panel Study (BHPS, to be succeeded by the UK Household Longitudinal Study, UKHLS), and the Multidisciplinary Facility for Measurement and Experimentation in the Social Sciences (MESS, Netherlands)—have not yet employed Experience Sampling methodology. There are, however, clear indications of a growing awareness of, and interest in, the potency of Experience Sampling methodology. The study proposal of the Dutch household panel MESS, for example, highlights Experience Sampling as a potential method for future assessment waves. Furthermore, the German Socioeconomic Panel has recently developed a mobile-phone based Experience Sampling Technology in cooperation with Max Planck Institute for Human Development, Berlin, that makes applications of signal-contingent Experience Sampling possible in heterogeneous and widely distributed samples. The feasibility of this technology has already been demonstrated in a first model study involving a sample of  $N = 377$  participants ranging in age from 14 to 83 years. Participants were provided with mobile phones that they carried with them while pursuing their daily routines. A testing software was installed on these mobile phones, that initiated phone rings at certain points in time throughout the day and thus signaled the participant to complete an assessment instrument referring to the his or her momentary experiences. Participants’ responses were then immediately uploaded via the internet to a central server. The server interface was also used to set up the study design, to manage the data collection, and to monitor the participants’ response compliance.

Table 1. Applications of Experience Sampling in Household Panels with Ongoing Data Collection in 2001 or later

Country	Panel	Experience Sampling	Data accessibility
UK	Expenditure and Food Survey Start: 2001–2002 Most recent data: 2005–2006 Sample size: 6,164 households in Great Britain, and 527 in Northern Ireland Design: repeated cross-sectional	Diaries of personal expenditures, of home grown and wild food brought into the home kept by each adult for two weeks; simplified diaries kept by children aged 7 to 15 years for two weeks	Derived variables from the diary are included in the dataset, as the raw diary data are not released to the public for confidentiality reasons (access contingent upon registration)
UK	Home On-Line Survey (HoL) 1998–2001 (finished) Sample size: 999 households, all household members older than 9	7 end-of day diaries (comprehensive activity diaries)	Access contingent upon registration
UK	Scottish Household Survey Start: 1999 Most recent data: 2007 Sample size: 27,000 in 2003–2004 (diaries) Design: repeated cross-sectional	1 Travel diary on day prior to interview by one randomly selected adult of the household	Access contingent upon registration
Denmark	Time Use of Households:	Diaries kept by	Application to Danish

	A Scheduling of Danes Daily Use of Time Started: 1987 Most recent data: 2001 Sample size: 4,000 Design: longitudinal (2 occasions)	respondents and their partners for two days, one randomly selected weekday, and one randomly selected weekend day (activities, social partners)	National Institute of Social Research
Ireland	Household Budget Survey Started: 1951 Most recent data: 2004–2005 Sample size: 6,884 households in 2004/2005 Design: repeated cross-sectional	Detailed diary of household expenditure over a two-week period	From 1987 on Request to Irish Social Science Data Archive

### *Experience Sampling in Psychological Research*

The relatively rare use of Experience Sampling in large-scale data collections such as household surveys that aim to contribute to a widely accessible data infrastructure stands in contrast to a current thriving of the methodology in research activities that produce smaller datasets only available to a limited number of researchers. One example, explained in more detail below, is psychological research. Time-use and transportation research represent other fields in which Experience Sampling is frequently used. As these research fields are extensively covered in another expert reports, they are not addressed here.

The methodological and conceptual strengths of Experience Sampling are well recognized in psychological research. This has led to a recent upsurge of Experience Sampling methodology in psychological investigations. Hundreds of papers on Experience Sampling investigations have been published since 2001. As of June 20, 2008, for example, and considering only publications that had appeared between 2001 and 2008, the database “PsycINFO” yielded 355 hits for the keyword “Experience Sampling,” 175 hits for the keyword “diary method,” and 188 hits for the keyword “ambulatory assessment.” Other indications of the current thriving of Experience Sampling methodology are recent publications of several monographs and special issues in international psychology journals on Experience Sampling methodology (e.g., Ebner-Priemer et al. in press; Hektner et al. 2007; Stone et al. 2007; Westmeyer 2007) and the recent foundation of the “Society of Ambulatory Assessment” in 2008 (<http://www.ambulatory-assessment.org/>).

Although Experience Sampling in psychological research is most often applied in small samples (i.e.,  $N < 200$ ) that are investigated only once, there is also a notable tendency for Experience Sampling to be successfully included as an assessment method in comparatively larger and longitudinal research projects, particularly those conducted in the USA. Examples are

- the “National Survey of Midlife Development in the USA” (MIDUS,  $N = 7,189$ ) in

which Experience Sampling in the form of 8 subsequent telephone interviews on daily experiences was administered in a subproject entitled “National Study of Daily Experiences” (NSDE,  $N = 1,483$ ),

- the “Normative Aging Study” (NAS,  $N = 2,280$ ) in which Experience Sampling in the form of 8 consecutive daily diaries on stressful events, memory failures, etc. was administered in a subsample of  $N = 333$  participants, or
- the “Alfred P. Sloan Study of Youth and Social Development” in which signal-contingent sampling of momentary experiences was repeatedly administered in a sample of  $N = 877$  adolescents.

Taken together, this recent thriving of Experience Sampling in psychological research underscores the methodological and conceptual strengths of the methodology and demonstrates its applicability in a variety of populations. However, these applications in psychological research have not yet contributed to an enrichment of the data infrastructure that is available to the community of interested researchers at large. Rather, access to Experience Sampling datasets in psychology typically remains limited to a narrow group of researchers within the network of those who were involved in the conceptualization of the study and the collection of the data. Release of those data to the research community is not yet common practice in psychological research.

### **Recommendations for Future Developments and Challenges**

To summarize, Experience Sampling is a promising research tool that has profound methodological and conceptual benefits compared to standard survey methodologies of retrospective or general self-reports, and that can provide important and ecologically valid insights into a large array of research domains within the social and behavioral sciences. Although Experience Sampling is currently thriving in psychological research, only few applications of Experience Sampling in data collections that feed into the publicly available data infrastructure are currently available. There are, however, indications of a growing awareness of the potential of Experience Sampling in the international research landscape.

A general conclusion that can be drawn from these analyses is that making use of the benefits of Experience Sampling while taking its methodological challenges into consideration will contribute to the provision of a data infrastructure that will make it possible to address current as well as future research questions with much precision and clarity. Below, I will give six concluding recommendations on how an intensified use of Experience

Sampling in large-scale data collections can be facilitated in the future.

*Recommendation 1: Strengthen the multi-method approach in large-scale surveys.* Experience Sampling is a potent methodology to supplement standard survey methodology (e.g., global or long-term retrospective self-reports). Its methodological advantages (e.g., minimization of response biases and maximization of ecological validity) allow the investigation of current research questions in great depth. Its conceptual advantages (e.g., accessibility of short-term fluctuations and change, both within and between individuals, and the respective role of contextual characteristics) offer opportunities to tackle new research questions.

*Recommendation 2: Consider “study-within-study” solutions in large-scale data collections.* Experience Sampling is resource-intensive. Theory-driven applications in selected subsamples of participants will therefore increase the feasibility of Experience Sampling in large-scale data collections.

*Recommendation 3: Make use of technological advances in Experience Sampling applications.* Technological advances can be used to (a) increase the feasibility of Experience Sampling in large-scale and heterogeneous samples and to (b) decrease the burden of Experience Sampling for the participants. Particularly promising for large-scale data collections is the use of mobile technology. Among its advantages are (a) the potential use of the participants’ own mobile phones as assessment devices, (b) the central control of study content and assessment schedules via web-interfaces in server-client systems, (c) the immediate upload of data to central servers, which allows the monitoring of participants’ response compliance, (d) the relative unobtrusiveness and feasibility of measurement completion in daily life contexts (provided assessment instruments are of adequate length), and (e) the easy combination with follow-up interviews or other assessment strategies stemming from diverse scientific areas (e.g., ambulatory bio-monitoring, see expert report on Bio-Markers, or location-tracking, see expert report on geographical data).

*Recommendation 4: Address the methodological challenges of Experience Sampling.* Study designs should take measures to address the methodological challenges of Experience Sampling. Control group designs are necessary to assess potential reactivity effects (i.e., changes in the phenomenon under study that are caused by its measurement). Careful sample recruitment strategies are needed to minimize potential self-selection biases (i.e., limited

sample representativeness). Potential sample attrition (i.e., participant drop-out) can be minimized both by maintaining close contact to the participants during the study interval and by implementing reasonable study characteristics, such as those regarding the number of measurement occasions and the length of the assessment instruments.

*Recommendation 5: Increase the accessibility of Experience Sampling datasets.* To increase the availability of Experience Sampling datasets in the data infrastructure of the social and behavioral sciences, release of datasets to the larger research community needs to be fostered. One viable opportunity for this is to make research funding grants contingent upon the researchers' consent to release the obtained dataset to the scientific public after a reasonable amount of time (e.g., after 7 – 10 years).

*Recommendation 6: Advance Research on Experience Sampling methodology.* Methodological research will help advancing the implementation of Experience Sampling methodology in survey designs. One approach to advance research on Experience Sampling methodology could be to include it as a research topic in the Priority Programme on Survey Methodology of the German Research Foundation.

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