The Time of Ambulatory Assessment

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La evaluación ambulatoria aglutina un conjunto de métodos que permiten evaluar mediante dispositivos móviles, y en múltiples momentos temporales, el comportamiento de las personas en su entorno natural y contexto diario. Permite una evaluación más precisa, dinámica, contextual e ideográfica que los métodos clásicos, abriendo nuevos horizontes con claras implicaciones para el diagnóstico y la intervención psicológica. El objetivo de este trabajo es realizar una introducción a la evaluación ambulatoria. En primer lugar, se realiza una delimitación conceptual y se comentan las cuestiones que viene a solucionar y sus posibles beneficios. En segundo lugar, se exponen aspectos relacionados con la metodología, abordando los diseños, los tipos de datos y un protocolo general de evaluación. En tercer lugar, se comentan algunas de las principales limitaciones, y se exponen las aplicaciones más relevantes. Finalmente, se comentan algunas recomendaciones para la aplicación de este tipo de metodología, y se analizan los retos y perspectivas futuras.
Palabras clave: *Evaluación ambulatoria, Muestreo de experiencias, Evaluación ecológica momentánea, Modelo contextual, Dispositivos electrónicos.*

Ambulatory assessment brings together a set of methods that make it possible to evaluate, through mobile devices, and at multiple moments in time, the behavior of people in their natural environment and daily context. It allows a more precise, dynamic, contextual, and idiographic evaluation than the classical approaches, opening new horizons with clear implications for psychological intervention. The main goal of this paper is to provide an introduction to ambulatory assessment. First, a conceptual delimitation is made and the issues to be solved are discussed, as well as their possible benefits. Second, aspects related to the methodology are exposed, addressing the designs, data types, and a general evaluation protocol. Third, some of the main limitations are discussed, and the most relevant applications are presented. Finally, some recommendations for the application of this type of methodology are discussed, and some challenges and future perspectives are analyzed.
Key words: *Ambulatory assessment, Experience sampling methodology, Ecological momentary assessment, Contextual model, Electronics devices.*

Psychology—as a science and as a profession—is in continuous change, evolution, and metamorphosis (Pérez-Álvarez, 2018). The incorporation of new psychological models, the revival of some unjustly forgotten ones, the new information technologies, and the different scientific advances are facilitating the opening up of promising horizons. As is the case in other sciences and professions, there are numerous questions that do not yet have a definitive answer, representing a challenge for the progress of psychology, and among them is the problem of assessment, which is addressed in this paper. In addition to the technological problems inherent in its application, the type of assessment that is carried out has direct repercussions on the type of models that are used to understand human behavior. The type of assessment is not neutral; it conditions, and may even determine, psychological theorizing. As will be seen below, the advances that ambulatory assessment involve will make it possible to formulate more realistic and accurate models of human behavior.

Currently, most assessment procedures in psychology are based on the descriptive analysis of behaviors, such as affects, states, traits, symptoms, etc., and are carried out through the use of pencil-and-paper tests or interviews. Furthermore, they are administered in

artificial contexts, such as consultations, health centers, laboratories, classrooms, etc. These are generally static assessments, conducted at wide time intervals and infrequently, leading to a collection of single, snapshot indicators of behavior. However, current breakthroughs in information technologies make it possible to carry out assessments with greater ecological validity, essential for accurate diagnoses, personalized follow-ups, or formulating efficacious, efficient, and effective interventions (Muñiz & Fonseca-Pedero, 2019). Coupled with a static assessment methodology, anchored in the past, and the use of the biomedical model in psychology, this can lead, in some fields such as psychopathology, to reification and tautological reasoning (Pérez-Álvarez, 2012). A paradigmatic case would be psychosis, for which— after decades of study under the lens of the biomedical model—the supposed biological alteration that generates it has not been found (e.g., Fonseca-Pedrero, 2019; McCutcheon et al., 2021; Pérez-Álvarez, 2012, Radua et al., 2018). And this is so because the signs and symptoms of psychological problems—far from constituting pathognomonic indicators of a supposed mental illness, as postulated by the biomedical model—are part of human diversity and should be understood as ways of responding to and coping with the different vicissitudes of life (Pérez-Álvarez, 2019). Human behavior is explained in terms of its particular biography, in a specific temporal moment and socio-cultural context, so it must be analyzed in the context of the person and his or her circumstances, understanding the reasons, rather than the causes (Fonseca-Pedrero, 2021a; 2021b).

Therefore, alternative models are needed that capture the dynamic and contextual nature of human behavior, in real everyday life, considering the specific individual (Borsboom, 2017; Fonseca-Pedrero, 2018; Myin-Germeys et al., 2016; Pérez-Álvarez, 2018; 2020; Pérez-Álvarez & García-Montes, 2018; Trull & Ebner-Priemer, 2020; van Os et al., 2013). These new conceptual approaches also require a change in assessment methodology, which goes beyond traditional assessments, and which receives the generic name of ambulatory assessment (AA). The idea of AA is not new conceptually, but it has received a great boost with the development of new technologies such as smartphones, mobile devices, and apps, which facilitate remote assessment in natural contexts. The use of this technology is enabling new forms of assessment and intervention of psychological phenomena, enhancing the incorporation of models, tools, and procedures that allow the implementation of contextual, dynamic, idiographic, adaptive, phenomenological, functional, and multicausal psychological approaches.

This paper aims to provide a comprehensive introduction to AA. First, a conceptual delimitation is presented, and the issues it addresses as well as the potential benefits are discussed. Second, aspects related to methodology, such as designs, types of data and a general evaluation protocol, are presented. Thirdly, some of the main limitations are discussed, then some applications to the field of psychology are explained, and a recent platform developed for use in the Spanish context is introduced. Next, some practical recommendations on how to implement this type of methodology are introduced, and the paper ends with a recapitulation section, where some challenges and future perspectives are analyzed. In this short paper, the intention is not to carry out an exhaustive exposition, and so we refer the reader to more specialized works (Carpenter et al., 2016; De Moor et al., 2009; Hektner et al., 2007; Hirschtritt & Insel, 2018; Mehl, 2012; Myin-Germeys et al., 2018; Myin-Germeys & Kuppens, 2021; Russell & Gajos, 2020; Stone & Shiffman, 1994; Torous et al., 2021; Trull & Ebner-Priemer, 2013, 2020).

CONCEPTUAL DELIMITATION

AA can be conceived as a systematic and structured procedure of observing the behavior (affect, cognition, experiences, processes, mental states, etc.) of a person in the natural and real context, using a device, usually electronic, such as a PDA, smartphone, diaries, etc. AA encompasses a wide range of assessment methods that attempt to study the experiences of people in their natural environment, in their daily lives. According to Trull and Ebner (2013) the term AA is used to represent a conceptual and methodological umbrella that includes experience sampling methodology (ESM) (Csikszentmihalyi & Larson, 1987), ecological momentary assessment (EMA), or simply momentary assessment (Stone & Shiffman, 1994), as well as psychophysiological, biological, and behavioral recordings. Historically, ESM has been associated with the use of paper-and-pencil diaries, EMA is generally implemented using electronic diaries or cell phones, and psychophysiological records are obtained using sensors or actigraphs. Some authors coming from the mental health field have termed this field as digital phenotyping (Insel, 2017; Torous et al., 2017).

In summary, it can be said that AA is basically characterized by:
a) Constituting an idiographic approach that allows the examination of multiple individual processes (e.g., emotional, behavioral, psychophysiological, mental states).
b) Collecting information from the person in real-world environments, in people's daily lives, in their natural habitat.
c) Assessing the current (or very recent) behaviors or real time ones (as they occur, from moment to moment) of individuals (i.e., their states, experiences, psychological processes, etc.)
d) Collecting information through multiple (intensive) assessments of each individual over time (typically several times a day, several times a week).

As noted above, AA attempts to address certain limitations of classical psychological assessment by incorporating the idiographic nature of behavior, the everyday context in which people's behavior occurs, the contextual nature of behavior (physical environment, social environment, culture), and the dynamic nature and etiological mechanisms of human behavior.

Therefore, AA aims to evaluate:
a) Individuals, taking into account their biographical and contextual circumstances, via a personalized approach.
b) The person in relation to and interdependence with the context of his or her daily life as his or her behaviors occur in the daily flow. The possibility of evaluating relevant factors of the context where the psychological phenomena of interest occur, as well as the person's responses to them, is of great interest. It is understood that, in order to explain people's behavior or experiences, it is necessary to analyze them in interaction with the context.
c) The behavior of individuals in its full breadth, complementing self-reports with hetero-reports and psychophysiological, biological, and behavioral records. And not only from a quantitative perspective, but also qualitative or mixed methods (e.g., the type of thoughts, form, and content of hallucinations or delusions, the nature and severity of suicidal ideation).
d) The evolution and dynamics of behavioral change over time. The aim is to capture temporal variability through the momentary assessment of moment-to-moment fluctuations in behaviors (mental states, experiences, etc.), i.e., changes and evolution at the micro level.

In short, it is an intensive, micro-longitudinal assessment that a) minimizes the bias associated with retrospective assessment, b) allows the analysis of personal patterns of variation (intraindividual, interindividual, and contextual) and the understanding of how they develop and unfold (or do not do so) over time, c) improves aspects related to the accuracy (reliability) and validity of the scores, and d) allows the analysis of possible behavioral mechanisms, an aspect that contributes to a deeper and more thorough (radical) understanding of human behavior.

Briefly, AA allows for a more precise, dynamic, contextual, and idiographic assessment, capturing more accurately and rigorously the complex nature of human behavior. Its objective is to understand dynamic psychological processes as they develop in daily life and as a function of the (necessarily contextual) circumstances of individuals (see Figure 1). It also makes it possible to inquire into the possible mechanisms of change, beyond the mere clinical or topographical

description. These aspects allow us—in the field of clinical psychology, for example—to predict the recurrence or appearance of experiences of distress in the future, monitor the intervention, control the side effects of the treatment, predict the success of the treatment, prevent possible relapse, or provide individualized treatment where and when necessary.
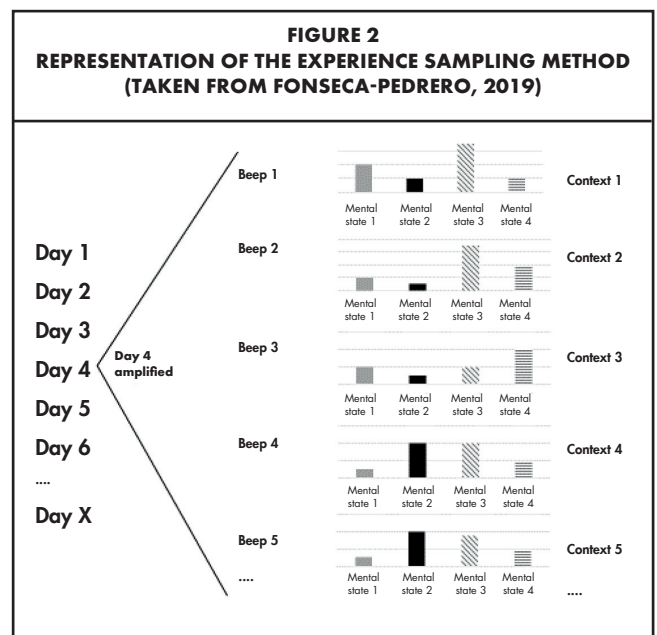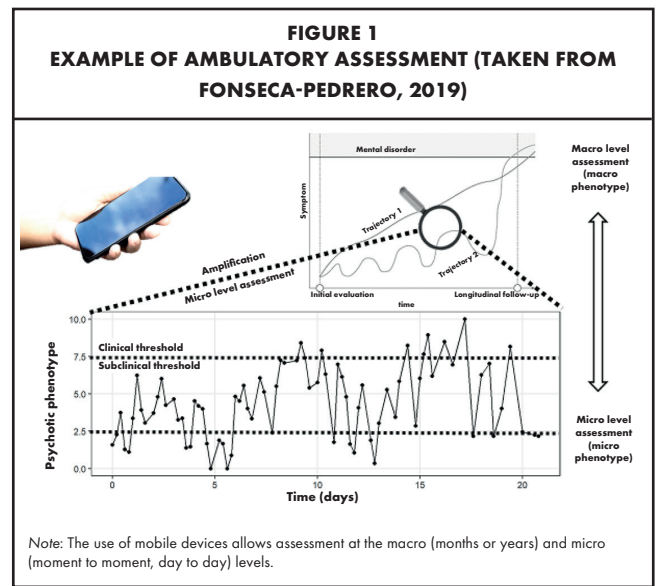
DESIGN AND PROCEDURE

AA consists of a systematic and structured procedure for observing human behavior. The variability in terms of types of research designs, types of data obtained, and possible ways of formulating items and questions is enormous. The use of one or the other will be determined by the objective and the phenomenon studied, as well as by possible related variables (availability of the participant's response, access to the Internet, etc.). For example, if the interest is to assess suicidal ideation in adolescents attending school, it might not make sense to conduct the AA while they are at school or doing an extracurricular activity, and instead leave it for other contexts such as family or leisure time.

In terms of research design, one can find event-contingent designs, temporal designs, and mixed designs. In event-contingent designs the "activation" of the response to the questions is determined by the occurrence of an event (e.g., the person begins to have obsessive thoughts, and this causes him/her to respond to the questions). In temporal designs, the "activation" is time-dependent, i.e., time is used as the sampling unit. In this case, the individual responds at certain times throughout the day (e.g., randomly, every 90 minutes, questions are triggered on the person's phone). Mixed designs consist of a combination of event-contingent and temporal designs. The data can be active/passive as well as objective/subjective. Active data could include self-report or test responses, while passive data could include information from GPS, hours of sleep, heart rate, etc. With regards to objective/subjective data, objective data would be those such as heart rate, number of steps, etc., while subjective data, as the name suggests, would be those collected by self-report. Other classifications consider whether the data are self-reported, observational, psychophysiological (e.g., electrodermal skin activity), biological (e.g., cortisol), or behavioral (e.g., motor).

Heterogeneity is the rule when designing a study that implements AA (Smyth et al., 2021). Here we will only refer to a prototypical example of an AA study. In a study, assessments can be conducted several times a day for a given period (approximately 6-8 times per day for 7 days). Questions are triggered by setting a specific time interval (e.g., between 10:00 am and 10:00 pm) and are presented randomly at predetermined time intervals, e.g., every 90 minutes. This set of questions is usually completed in approximately 1-2 minutes. The questions are established according to the object of study, with the Likert-type scale being the most used format. An example of the experience sampling method is shown in Figure 2. Figure 3 shows two items as an example. Often, the items that are formulated comment on or include the expressions "*At this moment...*", "*At this instant...*", "*Right now...*", "*Since the last beep...*" (note that the possibilities in the construction of items are almost unlimited). In any case, given that, ultimately, what is being constructed is a test, international guidelines for item construction should be followed, as well as issues concerning

test quality and use (Haladyna & Rodríguez, 2013; Hernández et al., 2016; Lane et al., 2016; Muñiz et al., 2020; Muñiz & Fonseca-Pedero, 2019). The issues related to both item and test construction are not a trivial matter and should be carried out with rigor. Likewise, this form of evaluation allows us to go beyond a quantitative perspective and incorporate a clearly qualitative and phenomenological perspective. Specific questions could be formulated for each individual to gather information about experiences, i.e., for people to write down what they are thinking, feeling, or doing. This question could be applied, for example, in collecting information about the type of psychotic experiences that are happening in the moment (Raugh et al., 2021), the type of suicidal

FIGURE 1
EXAMPLE OF AMBULATORY ASSESSMENT (TAKEN FROM FONSECA-PEDRERO, 2019)

Note: The use of mobile devices allows assessment at the macro (months or years) and micro (moment to moment, day to day) levels.

FIGURE 2
REPRESENTATION OF THE EXPERIENCE SAMPLING METHOD (TAKEN FROM FONSECA-PEDRERO, 2019)

thoughts (Rath et al., 2019), or the nature of thoughts regarding substance use (Burgess-Hull & Epstein, 2021), to cite just three cases. As can be seen, this is valuable, detailed, and in-depth information coming from multiple levels, and it allows an understanding of the study phenomenon, capturing behavioral patterns that are not easily visible, and designing and monitoring treatment.

Although this is not a minor issue, due to lack of space we do not address here the issues related to the types of statistical approaches and data analysis associated with AA. It should be noted that the volume of data generated is enormous, an aspect that is related to "big data", with the most commonly used type of designs being multilevel or mixed-effects designs. Perhaps the most interesting development is that AA fits perfectly with complex dynamic systems models, such as the network model (Borsboom, 2017; Fonseca-Pedrero, 2017).
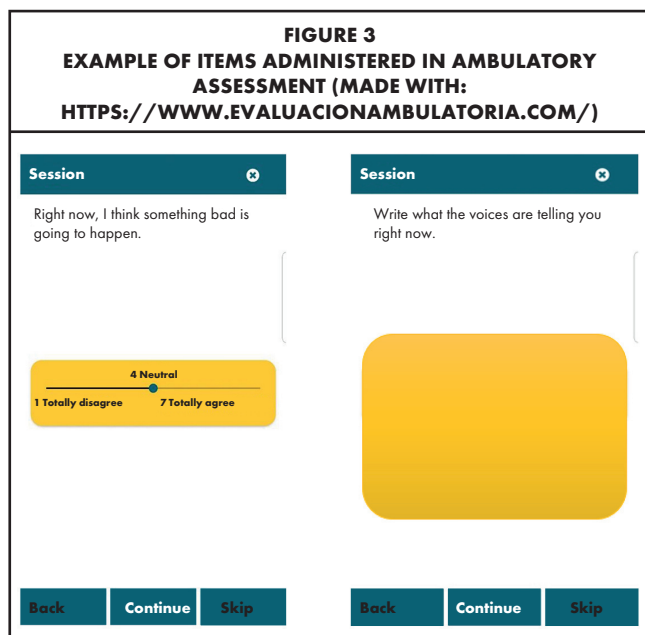
SUBSTANTIVE ISSUES

As we have seen, AA provides a response to issues and limitations that are not only practical but also epistemological, such as the extensive use of self-reporting, response biases, the limitations of the biomedical model, etc. Nevertheless, AA is not free of problems, and Table 1 shows the main advantages and limitations in the use of these methodologies. The need to motivate participants to respond appropriately and with the desired frequency, requiring a mobile device and perhaps an Internet connection, the complexity of the technology as perceived by some participants, confidentiality, data protection law, etc., are some of the disadvantages (Palmier-Claus et al., 2011). As with tele-assessment or the remote application of tests (Elosua, 2021), issues concerning privacy and confidentiality are the most important. In addition, one should not lose sight of the people who, due to the characteristics of their problems or disorders (e.g., delusional ideation) or other factors, reject the use of this technology.

Although progress has been made in recent years, we are however still witnessing the early development of this methodology and further research is needed, as there are still many issues to be analyzed and resolved.

PRACTICAL APPLICATIONS

AA has grown exponentially in recent years, gaining importance and popularity in the different areas of psychology, especially in the clinical field. This is associated with the availability and increased use of information technologies in a significant part of society. Practical applications to different fields of psychology are discussed below, particularly in the field of mental health: anxiety and depression (Hall et al., 2021), psychosis (Bell et al., 2017), suicidal behavior (Sedano-Capdevila et al., 2021), and eating disorders (Smith & Juarascio, 2019), among others.

Smartphone interventions for the self-management of anxious and depressive symptomatology have been conducted in both clinical and nonclinical populations (Hall et al., 2021; Torous et al., 2021). Potential benefits have also been found for bipolar disorder, for the management of both depressive and (hypo-) manic symptoms (Torous et al., 2021). In this regard, smartphone applications (apps) could provide an accessible, scalable, and low-cost mechanism for delivering effective self-care interventions for depressive and anxiety symptoms, particularly for nonclinical populations and those unable to access in-person services.

FIGURE 3
EXAMPLE OF ITEMS ADMINISTERED IN AMBULATORY ASSESSMENT (MADE WITH: HTTPS://WWW.EVALUACIONAMBULATORIA.COM/)

TABLE 1
ADVANTAGES AND LIMITATIONS IN THE USE OF AMBULATORY ASSESSMENT

Advantages	Limitations
✔ Method integrated into people's daily lives.	✔ Risk of lack of theoretical framework behind the procedures.
✔ *In vivo* dynamic idiographic assessment in the natural context of the individual.	✔ Lack of homogeneity in the designs. Validity problems.
✔ Collection of information through multiple assessments (intensively), moment to moment.	✔ Difficulties in adapting classic pencil-and-paper instruments that maintain their psychometric properties.
✔ Obtaining of more valid (ecological) information, solving biases of memory and loss of information.	✔ Possible superiority of other assessment methods (e.g., interview).
✔ Monitoring of psychological variables of interest (micro and macro levels).	✔ Difficulties in adherence to this method for some populations (e.g., persons with psychosis).
✔ Use of the information collected to make behavioral predictions or the evolution and dynamics of change of individuals.	✔ High variability of information sources. Biases in obtaining samples.
✔ Possibility to intervene immediately in the person's natural context.	✔ Privacy and data access.
✔ Increase in the population's access to evidence-based psychological interventions.	✔ Saturation and fatigue in the use of devices.
	✔ Potential problems associated with information technology, software, internet access and connection, or apps (e.g., notifications).

AA has also been widely used in the field of psychosis (Myin-Germeys et al., 2009; Thomas et al., 2019). Despite what we may initially think, people with psychosis frequently tolerate and accept these types of procedures (between 69% and 88% complete the assessments). Some people did report negative effects, for example, becoming more aware of their symptoms or certain reactivity to the method in specific profiles of people (e.g., with paranoid symptomatology). Among its applications we have found its use focused on symptom monitoring and self-management in daily functioning (Bell et al., 2017). For example, in a study with 17 patients with psychosis and using a passive monitoring application installed on the smartphone for three months, they were able to detect deviations in mobility patterns and social behavior in the two weeks prior to a relapse (Barnett et al., 2018).

It could also be particularly useful to apply these procedures to the study of suicidal behavior, given its dynamic and fluctuating nature (Rath et al., 2019; Sedano-Capdevila et al., 2021). It is beginning to be used to assess suicidal risk at different points in time and to study possible predictor variables that allow for accurate anticipation and intervention. For example, negative affect and sleep disturbance, among others, have been suggested as short-term predictors of suicidal thoughts and behaviors (Sedano-Capdevila et al., 2021).

Overall, AA is a potentially useful tool in clinical practice and research. Early results indicate, among other things, its good acceptability and improved clinical outcomes of interventions.

A PUBLIC PLATFORM IN SPANISH PSYCHOLOGY

Within the framework of open science and with the aim of making this methodology accessible to psychology professionals and society as a whole, our working group has developed a new platform: www.evalucionambulatoria.com and an associated app, called EVAMBU. The app allows the user (e.g., a young person with ADHD) to answer questions about mental health and emotional well-being. The website is designed exclusively for use by mental health professionals. This website allows professionals to create tests, scales, and surveys to be answered subsequently by users. The platform supports any type of test (auditory, visual, etc.) and a variety of questions (Likert response, open, multiple-choice format, etc.). In addition, the questions can be adapted to people with disabilities. The data from the users' answers are saved in an Excel file for further processing by the professional. It is imperative that the user gives informed consent. The app and the website guarantee the data protection law.

GENERAL GUIDELINES ON BEST PRACTICES

Given the novelty of AA and its associated methodologies such as EMA or ESM, it is important to mention at least some general guidelines on the best available practices (Heron et al., 2017; Trull & Ebner-Priemer, 2020), which are also related to digital phenotyping (Hirschtritt & Insel, 2018; Torous et al., 2021) and the incorporation of information technologies to the field of psychology. These general guidelines may solve potential limitations in the methodology or in the way of reporting this type of study. For example, according to a recent systematic review, only 2% of studies justified the sample size, 17% explained the sample selection process and the design of the

assessment program, only 30% reported the psychometric properties of the items in the study, and 46% described the final set of data (number of participants, study duration, and rates of adherence and loss of participants or responses) (Trull & Ebner-Priemer, 2020). Following the work of Trull and Ebner-Priemer (2020) and its application to psychopathology, several best practices can be established for the development and reporting of this type of work:

a) *Sample selection and sample size*: it is important to indicate the sample size, how it has been selected, and the statistical power analysis.

b) *Type of research design*: the rationale for the sampling design (e.g., event-contingent, temporal) and the rationale for sampling density (e.g., assessments per day), and scheduling (i.e., when assessments are scheduled) must be explained. Also, technical details of the sampling should be provided (e.g., the ability to suspend or delay responses; response time in each session, branching details, number of beeps per interval, etc.).

c) *Selection of and information on the measures*: the full text of the items administered, the response time frame, and the response options or scale should be reported. Likewise, the psychometric properties of the items in the current study (intra- and inter-person) should be reported, as well as where the items come from or whether they are newly constructed.

d) *Devices and software used*: fully describe the hardware and software used in the study.

e) *Response compliance*: define valid data and missing values (both for the overall sample and for individual study participants). Also report descriptive analyses of valid data (e.g., mean per person, range, percentage of participants above and below the 80% threshold).

f) *Participant training, follow-up, and remuneration*: describe the procedures that have been followed to train study participants (what, how, when, etc.), and the procedures used to improve compliance and participation (e.g., rewards, calls, SMS, privacy, etc.). A relevant issue in this section, as in previous sections, concerns privacy and security. Without an approach based on the privacy and protection of user data, electronic media will lack the trust necessary for acceptance.

g) *Data management and analysis*: describe the final data set referring to the number of reports (total; average number of persons; group average), days in study and retention rates, and delayed or discontinued response rates (if applicable). Regarding preparation for data analysis, it is imperative to describe the predictor variables and the level they are at; as well as to report on the covariates included in the models. Regarding data analysis, the levels of analysis must be described (momentary, day, person); it must be explained how time is accounted for in the analyses; random versus fixed effects options must be specified and justified in the models; and the data analysis must be described, as well as the statistical software used.

A relevant point in the study of AA refers to the response compliance rate (Rintala et al., 2019, 2020; Wen et al., 2017; Williams et al., 2021). A recent study analyzed the response compliance rate with an ESM protocol (Rintala et al., 2019). Results indicated overall acceptable compliance with a mean response rate of 78% (95% CI

[0.74, 0.82]) (N = 1,717 participants, 92,394 assessments). However, compliance decreased across days ($p < .001$), reaching a minimum on day 5 at 73% (95% CI [0.68, 0.77]). Compliance also varied significantly between assessments depending on the time within a day ($p < .001$), with the highest compliance between 12 pm and 1:30 pm (83%; 95% CI [0.80, 0.86]) and lowest compliance between 7:30 am and 9 am (56%; 95% CI [0.50, 0.62]). Individuals with psychotic experiences were less compliant than control participants (70% vs. 83%, respectively; $p < 0.001$). The findings suggest acceptable compliance in a 4- to 6-day study ESM protocol with a high frequency of 10 assessments per day despite fluctuations between and within study days. In another paper (Rintala et al., 2020), researchers found that participants who reported higher overall positive affect showed better adherence to the procedure. Feeling disturbed by a beep (a cell phone sound that indicates the start of the assessment time), being away from home, medication use, or a longer inter-beep interval decreased the likelihood of subsequent beep compliance. Although participants with depression tended to be more adherent to the assessment procedure, the likelihood of compliance decreased in the evenings and over the course of the study days. The results suggest that beep disturbance, being away from home, medication use, and the interval between beeps may decrease the likelihood of subsequent beep compliance.

LOOKING TO THE FUTURE
The use of AA has clear implications, both for diagnosis (more precise, contextual, dynamic, and individualized), as well as for the design of treatments and the search for explanatory mechanisms of behavior. It involves a profound change in the ways of understanding, analyzing, assessing, and intervening, and it is in line with the need for psychology to evolve towards a personalized, dynamic, intensive, ecological, etiological, contextual, and collaborative assessment. This new evaluative approach attempts to overcome some of the problems associated with traditional psychometric assessments, such as the lack of ecological validity or the biases associated with retrospective assessments. AA also makes it possible to collect data that go beyond the psychological plane, such as motor activity, sleep patterns, or heart rate. As a result of the growing evidence of its usefulness in understanding phenomenology and dynamic mechanisms of action, and taking advantage of the potential offered by new technologies in the field of mental health, interventions delivered in these real contexts are also being promoted. This strategy is called ecological momentary interventions (Balaskas et al., 2021; Heron & Smyth, 2010; Myin-Germeys et al., 2016). Ecological momentary interventions are treatments delivered to individuals during their daily lives (i.e., in real time) and in natural settings (i.e., the real world). The treatment is delivered via mobile technology and can be implemented independently or as an adjunct to the existing treatment (Heron & Smyth, 2010). Ecological momentary interventions have a wide range of features that enable, inter alia, self-management of symptoms using momentary reminders or instructions (including medication adherence), symptom management, development of daily living skills, or goal achievement. For example, apps are emerging to intervene on specific symptoms, e.g., auditory verbal hallucinations that generate discomfort (Bell et al., 2018).

These new multifaceted ambulatory methodological approaches constitute a fundamental tool for a more comprehensive understanding of human behavior, facilitating person-centered assessment, accurate diagnosis, and effective intervention. All of this will contribute to improving the quality of life of individuals and society as a whole, which is the ultimate goal of psychology researchers and practitioners.

CONFLICT OF INTEREST
There is no conflict of interest.

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