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Looking from within: Comparing first-person approaches to studying experience

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Abstract

Fostering our understanding of how humans behave, feel and think is a fundamental goal of psychological research. Widely used methods in psychological research are self-report and behavioral measures which require an experimenter to collect data from another person. By comparison, first-person measures that assess more subtle facets of subjective experiences, are less widely used. Without integrating such more subtle first-person measures, however, fundamental aspects of psychological phenomena remain inaccessible to psychological theorizing. To explore the value and potential contribution of first-person methods, the current article aims to provide an overview over already established first-person methods and compare them on relevant dimensions. Based on these results, researchers can select suitable first-person methods to study different facets of subjective experiences. Overall, the investigation of psychological phenomena from a first-person perspective can complement and enrich existing research from a third-person perspective.

Keywords Introspection · First-person methods · Subjective experiences · Phenomenology · Qualitative inquiry

Introduction

In the study of psychological phenomena, researchers often take the perspective of an outside observer to gather data about their study participants. This so-called third-person perspective can be regarded as the gold-standard approach in mainstream psychological science. Here, we want to emphasize that psychological phenomena contain several layers and that each layer of a psychological phenomenon needs distinct methods with which they can be studied. Some layers are outwardly observable such as talking, responding to a question, body movements, social interactions, facial expressions, eye movements etc.. In addition, psychological phenomena also contain an internal layer which is only accessible to an internal point of view. This internal layer represents the experiential facet of psychological phenomena (e.g. How does a given experiential content arise in my awareness and how does it unfold over time?). Both the external and internal dimensions are implicated in the other to some extent. However, we assume that subtle aspects of an internal experience can possibly not be observed from an external point of view, it must ultimately be inferred or approximated through second-person or third-person measures. Note however, that whether and how a third person can observe experiential states of others, is still debated in the literature on empathy and knowing other minds (Gallagher & Zahavi, 2008). According to theory of mind for instance, understanding others is inferred through prior folk psychological knowledge and based on inferential mental operations (Baron-Cohen et al., 1985; Carruthers & Smith, 1996). In contrast, simulation theory posits that we come to know others by internally simulating others' feelings, behaviour and beliefs (Gallese & Goldman, 1998; Gordon & Cruz, 2003). Finally, embodied and enactive approaches suggest that others can be known through direct perception (De Jaegher, 2009; Fuchs & De Jaegher, 2009; Gallagher, 2008). We suggest that a person, who undergoes an experience can be aware of distinct aspects of an experience to different degrees (e.g. a person might not be aware of subtle precursors of an experience of sadness, but notice the sadness once strong bodily sensations are consciously noticeable). If a person, who undergoes a specific experience is fully aware of all aspects and components of that experience (e.g. precursors of an experience of sadness), it can potentially also be expressed in outwardly observable behaviour (e.g. describing fleeting dynamics of thoughts as potential precursors of sadness) and thus also be observed by other people or

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measures through third-person approaches. However, if a person is only partially aware of the nuances of an experience, it might not easily be possible to infer these aspects of an experience through third-person measures. Therefore, we suggest that more subtle and pre-reflective aspects of a subjective experience (e.g. the unfoldment of an experience) require that a person herself can be aware of this internal dimension of an experience. Some first-person methods and practices including mindfulness can guide people to become aware of more subtle facets of an experience (Lundh, 2020). We suggest that a person, who is either trained or guided through respective first-person methods can better grasp more subtle aspects of experiences over time and then translate these new nuances of the experience into verbal descriptions or express it through different types of behaviour.

Overall, internal dimensions of subjective experiences are usually not widely and directly studied. We suggest that the internal dimension also needs to be systematically studied and added to the existing research catalogue in the study of psychological phenomena. The so-called first-person perspective and respective first-person methods offer a fruitful way to study the internal dimension of psychological phenomena.

Therefore, the aim of this manuscript is to provide a first exploratory overview of existing first-person methods and contribute to the advancement of the study of psychological phenomena from a first-person perspective. More specifically, this manuscript covers first-person methods, which can capture more subtle, pre-reflective and fine-grained aspects of subjective experiences. This overview of first-person methods describes the core goals of each method and exemplary studies as well as advantages and weaknesses of each method. The first-person approaches covered in this manuscript emphasize different facets of subjective experiences and might have opposing perspectives on how to best study subjective experiences. Furthermore, some of the presented first-person methods can be regarded as work in progress. Thus, rather than providing a finalized strategy about how best to apply first-person methods, this overview aims to initiate a discourse about the applicability and further advancement of different first-person methods.

Generally, first-person methods can be regarded as methods, which provide first-person data about an individual's subjective experience (Feest, 2014). Furthermore, a variety of different first-person approaches can be used to produce first-person data. As pointed out by Schmidt (2018) phenomenological and introspective approaches could be grouped together because they both "*explain first-personal experience by revealing their structure, relevant tacit aspects and processes, and their experiential unfolding over time.*" (p. 4). More recently Rigato et al. (2019) suggested in a review of first-person methods that "*first-person experience has always been and is still central to investigations of the mind even if it is not recognized as such.*" (p. 1). Therefore, the questions arise how different types of first-person methods elicit first-person data and how particular types of first-person data can be used in different research frameworks. The focus of the manuscript is particularly on first-person methods, which capture more nuances of subjective experiences in contrast to shallow first-person experiences elicited through self-report questionnaires. Furthermore, we suggest that several open research questions (also see in the conclusion and Table 1) still need to be addressed to fully agree upon a final definition of a first-person method, because the field is still in its infancy.

Here, we suggest that the internal and experiential dimension of psychological phenomena are predominantly subtle, pre-reflective and dynamic. Therefore, specific methods are required to capture this degree of granularity. Furthermore, we propose that a first-person method provides in-depth and rich data about the experiential dimension of psychological phenomena from an internal perspective. First-person data about the internal perspective should ideally stem from the researcher's own mind through the application of a systematic self-observation. However, untrained participants could also be guided to perform a systematic self-observation with the help of a trained researcher.

The following example illustrates the benefit of adopting a first-person perspective and considering more subtle nuances in the study of psychological phenomena. Consider a person who suffers from symptoms of severe stress. From a third-person perspective a physician could identify the symptom of stress through measures of the activity of the sympathetic and parasympathetic nervous system, stress hormones, muscular tension or behavioral measures. To gain more in-depth insights about emotions and thoughts related to the stress symptoms, open questions could be asked or a more direct interaction could be ensured through an interview with the person.

Table 1 Overview of outstanding questions for future research about first-person methods

Outstanding Questions for Future Research
1. What should be defining features of a first-person method and what should be the proper definition of a first-person method?
2. How can first-person methods be delineated from second- and third-person methods?
3. How can first-person methods best be integrated within the confirmatory research frameworks?
4. How can first-person methods be best be triangulated with second- and third-person methods?
5. What could be guidelines for the implementation of first-person methods and should both researchers and participants be trained in first-person methods?
6. What different types of first-person methods are available, how do they differ from one another and what are their respective epistemic and ontological assumptions?
7. How can first-person methods be integrated into the open-science framework?

We suggest that it is possible to go even further and adopt a genuine first-person perspective that captures more fine-grained and subtle nuances of an experiential state – and can hence lend breadth and profundity to the characterization of psychological phenomena. In addition, it allows the affected person to become aware of a (mental health) problem earlier than at a point when symptoms are already noticeable to third-person exploration.

In the above example the person suffering from stress could adopt a first-person perspective and try to observe specific dimensions of his experience during the experience of stress. Novel facets of the experience of stress, which were previously unknown might come to the surface and potentially inspire further research including behavioral or physiological measures. Moreover, additional insights about the experiential dimension of stress could also be relevant for developing more targeted interventions for coping with stress.

Even though first-person approaches are crucial for an integrative understanding of psychological phenomena (Pérez-Álvarez, 2018), they are rarely used in mainstream psychological science or recognized as such (Rigato et al., 2019). Especially in the past three decades, modern neuroimaging techniques and other physiological methods have greatly influenced the study of psychological themes such as consciousness and the self. It is often assumed that neural correlates of psychological states provide meaningful insights into the workings of the mind (Choudhury et al., 2009). However, establishing such relationships is often difficult because questionnaire items usually cover a time frame of minutes, hours, days, and sometimes even weeks and months. Neuronal measures, by contrast, capture brain activity on a time frame of milliseconds or seconds. In order to for instance investigate how the subjective experience of pain is related with neuronal activity, it is important to match the temporal resolution of both measures. If neuronal activity is measured with a temporal resolution of milliseconds, the respective first-person method should also measure the subjective experience of pain with the same temporal resolution. Therefore, first-person methods need to be selected carefully in order to ensure meaningful relationships between subjective experiences and behavioral or physiological data (Bitbol & Petitmengin, 2017).

First-person methods were of crucial relevance in the founding period of empirical psychology when experiential states were studied introspectively. In recent years, first-person methods enjoy a renaissance in the scientific study of the mind and several researchers discuss novel ways to study experiential facets of psychological states (Jack & Roepstorff, 2002; Overgaard et al., 2008; Roth, 2012; Varela & Shear, 1999).

The current overview aims to provide an on overview of already existing first-person methods that are used in the study of experiential aspects of psychological phenomena and that can guide researchers to select a method for their own research. Commonalities and differences of each first-person method is characterized on five different dimensions of interest. These dimensions of interest include 1) a brief description and goal of the method, 2) the relationship between researcher and participant, 3) the type of acquired data, 4) advantages and weaknesses of the method and 5) exemplary studies and fields of application. We would like to emphasize that first-person methods are still in its infancy and that the selected first-person methods are not exhaustive. Moreover, this article aims to contribute to the advancement of a first-person science and enable a greater crosstalk between first-person and third-person research.

Selection Strategy and Dimensions of Comparisons

Selection Strategy

The authors chose to present seven approaches that they considered to be of broader relevance in the qualitative research community. The selection was mainly based on personal assessment and extensive readings and discussions amongst both authors. The final selection of the approaches is an initial attempt to present and compare existing approaches. Note that we did not include any of the classic introspective methods such as those originally used by Titchener (Titchener, 1901–1905) or the Würzburg School (Hackert & Weger, 2018), but rather focused on recently developed methods that are widely in use. And yet, these more recent methods are often based on or are even rooted in the more traditional approaches which hence – in their way – still play a crucial role in the methods discussed here. The five dimensions of interest are briefly explained.

Description of Dimensions of Comparison

Core Description and Goal

This dimension provides brief and basic information about respective methods and describes the main goal of the method. Furthermore, this dimension provides basic information about requirements, which need to be met in order to implement the method. Information from this dimension can give a first general overview of the rationale of the particular first-person method of interest. It is not possible to cover an in-depth description of the respective methods within the scope of this manuscript. However, detailed information about the presented methods can be found in the referenced articles.

Researcher-Participant Relationship

This dimension provides information about the relationship between the researcher and participant regarding the respective method. For some methods there might be a clear separation between the role of the researcher and the participant. Standard laboratory methods usually draw clear boundaries between the participant from whom data is recorded on the one hand; and the researcher, who records and analyzes the data on the other. However, there might also be methods which actively engage the participant in the research process and in some cases there might thus be no split between researcher and participant.

Acquired Data

This dimension provides information about the types of data that are acquired with each first-person method. Some methods allow a very open mode of data collection without many prior restrictions and guidelines. Other first-person methods gather data in a systematic manner and provide systematic ways to analyze and structure the data. Furthermore, it could be helpful to know whether data about subjective experiences are concurrently or retrospectively retrieved.

Advantages and Weaknesses

This category provides information about the advantages and possible caveats and weaknesses of the first-person methods.

Exemplary Studies and Fields of Application

This dimension provides information about how the respective first-person method is applied in published studies and.Furthermore, it provides suggestions for potential fields of applications.

Results

In the subsequent sections, each of the selected first-person methods will be described regarding the dimensions of comparison.

Autoethnography

Core Description & Goal

Autoethnography can be regarded as a combination of ethnographic and autobiographic research, which investigates personal experiences in a systematic way (Ellis & Bochner, 2000). Autoethnographic research can be implemented in many different ways and include the study of personal experiences of other people or the personal interaction between people. It can also place a focus on the personal experience of the researcher herself (Ellis et al., 2011). Autoethnography can for instance be implemented by studying the personal experience of members in specific cultural field or it can be applied by the researcher herself to recall or investigates a specific (often emotional) biographical event or personal experience. An analytical approach of autoethnography adopts more systematic guidelines and particularly emphasizes to gather data of several sources of observation and commit to theoretical analysis of the obtained data (Anderson, 2006). In addition, an evocative type of autoethnography makes use of the researcher's experiences and emotions regarding a personal life event such as birth, loss of a loved one or personal achievements in certain fields (Ellis, 1991; Ellis, 1999). Furthermore, evocative types of autoethnographic research aim to induce resonance in the readership through describing personal experiences in an emotional comprehensible manner. Overall, autoethnographic research should not merely represent narratives about personal experiences, but also include a systematic analysis of such experiential data and integrate the findings into relevant research frameworks (Ellis et al., 2011). Finally, to apply autoethnography, the researcher needs to be personally acquainted with the research topic by either having had a specific experience herself or by immersing herself in a specific cultural field with members who are experts in the field. When focusing on a specific social milieu, respective guidelines for conducting ethnographic research need to be considered. The researcher can also solely focus on personal experiences of other people.

Researcher-Participant Relationship

In some cases the researcher only relies on her own experiences (e.g. in the case of evocative autoethnography) – in which case there is no split. She might also focus either exclusively or in addition on the experience of others and conduct additional research, e.g. in field research or with interviews, which creates a split between the researcher and the participant (e.g. in the case of analytic autoethnography).

Acquired Data

The acquired data can rely on present observations in one's own life or field research and on retrospective descriptions of past personal experience of the researcher or his/her participants. Other relevant sources, observations from field research, data acquired from co-researchers and already existing data could also be integrated in the data recording process. Systematically analyzed data can be accompanied by e.g. personal stories, short stories or poetry.

Advantages and Weaknesses

One advantage of this method is that the insider perspective of someone experiencing a certain psychological phenomenon of interest can provide more rich details in contrast to studying the phenomenon from an outsider perspective. In addition, autoethnography can help to unravel complex relationships between the self and societal factors, which are sometimes not visible beyond a specific ethnographic field (e.g. patients suffering from specific illnesses and their experience in a specific cultural field). Furthermore, adopting the evocative approach of autoethnography, the researcher or participant can freely express the relevant aspects of a particular experience. Therefore, it is particularly useful to explore rare and often emotional (perhaps even flashbulb) experiences which not many people share but which demonstrate novel aspects on the spectrum of human experiences. A weakness of the method is the vulnerability of the researcher, who openly shares personal experiences, which might attract criticism or might not be taken seriously from the research community. In addition, autoethnographic studies investigate idiosyncratic experiences, which cannot be generalized to a larger audience or triangulated with third-person measures, because certain life events (e.g. the loss of a loved one) might not be reproducible in a laboratory setting. Finally, personal perceptions and memories could be distorted in a variety of ways and therefore bias findings from an autoethnographic study.

Exemplary Studies and Fields of Application

In a study by Ritchie (2019) autoethnography was used to describe the author's personal experience with posttraumatic stress disorder (PTSD) and how more global factors influence the daily experience of living with PTSD. The author illustrates how the activity of grocery shopping could induce flashback memories and then clarifies how specific socio-cultural structures play a role in the everyday life of navigating the lifeworld of someone living with PTSD (Ritchie, 2019). The study indicates that healing is not just a matter of individuals suffering from PTSD, but also calls for a transformation of more global structures including social, cultural and political structures. In another autoethnographic study Spieldenner (2014) provided an insider perspective of what it is like to undergo clinical treatment for HIV and belonging to a racial minority. Spieldenner (2014) used diary entries and personal notes as a primary source and complemented his personal experiences with challenges in the medical system using studies and other relevant references "…*to explicate these moments beyond the personal*." (p. 13). Findings form his personal observations and relevant studies uncovered particular challenges with stigmatization of racial minorities suffering from HIV in the public health care domain and can help to inspire changes to overcome these challenges. Other topics that have been studied with autoethnography include the loss of a close relative (Ellis, 1993), the experience of patients suffering from depression (Karp, 1996), the professional lifeworld of poker players (Hayano, 1982) and relational autoethnography with a holocaust survivor (Ellis & Rawicki, 2013).

Overall, autoethnography is of interest to researchers who aim to investigate personal experiences within a given cultural setting or in relation to a specific biographic event of interest. Therefore, it can be applied to research questions related to the interplay between personal experiences and cultural factors or to unique biographical events.

Descriptive Experience Sampling

Core Description & Goal

The descriptive experience sampling method (DES) was developed by Russell Hurlburt (Hurlburt & Heavey, 2001, 2004; Hurlburt & Heavey, 2006) and allows to study pristine inner experiences in a natural environment. Pristine inner experiences refer to directly apprehended and naturally occurring phenomena. In order to capture pristine inner experiences, participants must wear a beeper and directly write down whatever they experienced prior to the beep. After the primary phase of data collection is completed, the researcher conducts an expositional interview within 24 hours to help participants to describe their pristine experiences at the moment of the beep with high fidelity. The core question that is asked is "What was there (if anything at all) in the moment of the beep?" (Hurlburt, 2017). Furthermore, a team of co-researchers prepares characterizations of the pristine experiences within 24 hours after the interview. In addition, the characterizations are reviewed by the co-researcher and recirculated in order to reach an agreement with regard to descriptions of salient features of the sampled experiences. It is important that the researcher is able to bracket the presuppositions about the participant's experiences. Overall, the goal of the method is to grasp pristine experiences during the natural occurrence without any artificial interruptions and to focus on the specific and idiographic experience of an individual instead of focusing on universal aspects of an experience. According to Hurlburt (2015) descriptive experience sampling can be regarded as a "first-person plural method" (p.13).

Researcher-Participant Relationship

The researcher and the participant are different individuals. Whereas the participant provides the data, the researcher guides the participant through an interview to aid the participant to provide high-fidelity descriptions of pristine experience. The data are analyzed by the researcher.

Acquired Data

Raw data collected through this method encompass notes from the participant's observations of pristine inner experiences shortly after their occurrence. In addition, data from audio or video recordings from the interviews are retrieved. After the analysis of the data an idiographic description of the participant's pristine inner experiences is produced.

Advantages and Weaknesses

One advantage of the method is that it is a very open approach and can help to uncover novel facets of first-person experiences. Furthermore, it can be easily implemented in a natural environment and thus allows for a good ecological validity. The method can also be used by naïve participants without an expertise in introspection. A weakness of the method is that the researcher can potentially bias the participant through the way questions are being asked. Because researcher and participant are different individuals and the researcher looks from outside, more subtle aspects of subjective experiences might be neglected. However, it should be noticed that it is not the goal of the approach to uncover subtle aspects of experiences (Hurlburt & Akhter, 2006). Another implication of the method is that the participants become more accurate with describing one's experiences. What is more accurate is difficult to assess, however. Furthermore, the method is time consuming, because a participant will typically undergo four to eight sampling days, which need to be followed up by the expositional interviews (Hurlburt, 2015).

Exemplary Studies and Fields of Application

In a sample of 30 participants, who followed the protocol of descriptive experience sampling Heavey and Hurlburt (2008) found that common inner experiences include inner seeing, inner speaking, feeling, unsymbolized thinking and sensory awareness. Moreover, inner speaking was associated with less psychological distress and also seems to be dissociated from unsymbolized thinking (Heavey & Hurlburt, 2008). This study provides insights about the quality and structure of inner experiences in an ecologically valid setting and for instance demonstrated that inner experiences do not always include inner speaking, but also experiences beyond words such as unsymbolized thinking. In another study by Hurlburt et al. (2016) functional brain activation was investigated by comparing elicited and spontaneous inner speech. Functional brain activity of participants was measured during elicitation of inner speech (Hurlburt et al., 2016). In addition, participants were trained to become acquainted with descriptive experience sampling in the natural environment before functional brain activity was measured while inducing spontaneous inner speech through random beeps (Hurlburt et al., 2016). Overall, findings from this study showed differential patterns of brain activation during elicited and spontaneous inner speech and raise the question whether patterns of brain activation measured in the laboratory always correspond to brain activation in natural settings with spontaneous behaviour. In addition, descriptive experience sampling has been applied to study patients suffering from schizophrenia (Hurlburt, 1990) or more generally the pristine experiences of feelings (Heavey et al., 2012) and experiences of athletes in the context of competition (Dickens et al., 2018).

Overall, researcher can utilize descriptive experience sampling to study salient aspects of inner experiences in natural environments. More specifically, researchers can specifically study concrete slices of experiences, which are temporally constrained by the randomly occurring beep (Hurlburt & Akhter, 2006). Descriptive experience sampling is suitable for exploratory studies, which seek to discover novel features of experiences instead of conforming to a priori constructed hypotheses. Therefore, researchers might use descriptive experience sampling in order to investigate how raw and untouched inner experiences are structured. The approach is descriptive and idiographic and mainly applied to single individuals but can also be used to study common aspects of pristine inner experiences across subjects.

Heuristic Inquiry

Core Description & Goal

Heuristic inquiry was developed by Clark E. Moustakas (Douglass & Moustakas, 1985; Moustakas, 1990) and seeks to explore questions that arise from a personal experience of the researcher. The goal of this person-centered approach, which is grounded in humanistic psychology, is to immerse into a self-searching process in order to find a deeper meaning and insight about one's personal "present-moment ongoing living human experience" (Sultan, 2018, p. 7). Furthermore, the approach also invites personal growth and transformation of the researcher and could therefore be relevant for the therapeutic domain. According to Moustakas (1990) the process of heuristic inquiry is accompanied by six phases. First, the researcher needs to have had a personal experience and motivation to further comprehend this experience. In a second phase, the researcher fully immerses in the selected experience of interest by e.g. recollecting past experiences, journaling or interacting with co-researchers, who have encountered the same experience. In a third phase, the researcher distances himself from the close engagement with the experience so that gathered data can come to fruition. In a fourth state of illumination the researcher can gain new insights and perspectives about the research question. In a fifth state new insights in relation to the research question are explicated and synthesized in a final phase. It should be noticed that

heuristic inquiry as proposed by Moustakas (1990) involves the additional study of co-researchers. In contrast, Sela-Smith(2002) suggested that heuristic inquiry should only comprise the researcher's self-search and not include additional co-researchers. Overall, heuristic inquiry can be regarded as an open-ended and autobiographical process, which unfolds in a non-linear way and often leads to accidental discovery of novel aspects of experiences (Sultan, 2018).

Researcher-Participant Relationship

For the primary act of exploration there is no separation between the researcher and participant: the researcher explores her own experiences. However, the researcher can also include additional data gained through literature research and interviews.

Acquired Data

The data gathered with this method can stem from various sources, for example personal memories, diary entries, introspective observations, interviews with co-researchers, media documents and more. It is important that the data represent a deeper meaning that the researcher can discover throughout the exploration. Data of subjective experiences are usually retrospectively collected.

Advantages and Weaknesses

The advantage of this method is that it is open-ended and allows to potentially illuminate in-depth aspects of subjective experiences. Through the flexible and non-restrictive nature of this method it can be used to address all kinds of psychological phenomena and particularly experiences, which are otherwise difficult to measure (Sultan, 2018). The research method could potentially be extended to include third-person data. A challenge for the successful implementation of this method is that the researcher needs to be willing to immerse into a deep process of discovery and that the research topic is personally relevant to the researcher. Thus, heuristic inquiry is only suitable for researchers who experience a personal connection and motivation to enter into such a process. Another weakness of the method is that the research might in some cases share personal and vulnerable information, which could potentially be criticized by the academic audience.

Exemplary Studies and Fields of Application

In a study with 13 co-researchers Mihalache (2012) investigated the experience of forgiving the unforgiving. Interviews were conducted with a group of co-researchers, which included people with different experiences of forgiving (e.g. cases of murder and other traumatic events) that also had a transformative impact on the participants (Mihalache, 2012). Findings generally showed that the process of transformative forgiveness is non-linear and common themes included sense of shared humanity, unity and compassion (Mihalache, 2012). Furthermore, specific steps of the experience of transformative forgiveness were summarized to inspire psychological interventions. In another study (Ozertugrul, 2017) applied heuristic self-search inquiry to investigate his own experience of suffering from obsessive compulsive disorder (OCD). Ozertugrul's in-depth self-dialogue allowed him to explore his psychological landscape, which ultimately had a transformative and healing effect, which was also published in a book available for the lay public (Ozertugrul, 2015). Applying heuristic self-search inquiry to study psychopathological conditions can provide a client-based perspective of a disorder and provide new avenues for therapeutic interventions. Further studies applied heuristic inquiry to investigate the experience of loneliness after a major crisis (Moustakas, 1961), the role of embodiment in body psychotherapists (Sultan, 2017) and the transformation of problematic eating habits (Shelburne et al., 2020).

Generally, researchers can use heuristic inquiry to study the meaning and tacit dimensions of a personal experience, which is otherwise not easy to measure. Often the phenomenon of interest is based on intense or deep autobiographical encounters the researcher had herself had with this phenomenon (Sultan, 2018). Heuristic inquiry can be regarded as an exploratory approach and person-centered, which aims to uncover tacit and novel facets of subjective experiences. Therefore, it cannot be used to test a-priori hypotheses, but rather to inspire the construction of novel hypotheses with regard to a phenomenon of interest.

Micro-Phenomenology

Core Description and Goal

The micro-phenomenological approach is based on the elicitation interview, which was first introduced by (Vermersch, 1994) and later adapted by Claire Petitmengin et al. (2006). Recently the term "micro-phenomenological interview" is used to describe the approach (Bitbol & Petitmengin, 2017; Petitmengin & Lachaux, 2013). The interview technique is based on the core concepts of Husserl's phenomenology, the explication technique (Vermersch, 1994), the approach of focusing (Gendlin, 1969), the use of Ericksonian language and partly also on neurolinguistic programming and aims to describe very fine-grained and rich details of subjective experiences (often in the range of seconds or less). It is assumed that a large part of lived experience is not available to conscious awareness and thus requires a specific guidance to get in contact with internal processes and to be able to verbally describe this experiential domain. More specifically, the micro-

phenomenological approach tries to tackle pre-reflective aspects of lived subjective experiences, which are either invoked from the past (e.g. an experience of connectedness with nature) or provoked shortly before - interview procedure (e.g. the experience spelling a word). Fine-grained phenomenological descriptions are gathered through a specific way of asking questions, which focus on procedural aspects of the experience (the "how" of an experience) instead of on the content of the experience (the "what" of an experience). Questions are posed so that interviewees can rediscover specific sensorial aspects (e.g. images, bodily feelings or sounds) associated with concrete moments of an experience, which then makes them feel like reliving the experience. Furthermore, questions are asked iteratively and without evoking content so that interviewees get in contact with the process of their lived experience. If interviewees describe theoretical knowledge or contextual information about their experience and evaluate their experience or describe motivations associated with the experience it displays that interviewees are not directly reliving the experience. In contrast, if interviewees use presence tense, slow down their speech or display specific gestures, it can indicate that the interviewee is in contact with the pre-reflective aspect of their lived experience. With the help of a professionally trained interviewer, participants can be guided to reorient their attention from the content of the experience to the more subtle micro-dynamics of an experience. The fine-grained descriptions obtained through the micro-phenomenological interview are analyzed with regard to a representative generic structure of the investigated experiences.

Researcher-Participant Relationship

In the standard approach the researcher and the participant are different individuals. The participant provides rich details about his experience whereas the researcher interviews the participant and analyzes the data. There is also the possibility of a self-administered variant in which a trained researcher performs a micro-phenomenological self-interview (Sparby, 2020).

Acquired Data

The interview data of retrospectively retrieved lived experiences are gathered through audio or video recordings. Through a systematic data analysis written categories are extracted, which provide detailed descriptions of the experiences (Valenzuela-Moguillansky & Vásquez-Rosati, 2019).

Advantages and Weaknesses

The advantage of the micro-phenomenological method is that it provides very fine-grained and rich information about a subjective experiences, which can also be mapped onto fine-grained third-person data – a process also proposed by the neurophenomenological framework (Varela, 1996). The data can be used to uncover novel patterns in third-person data on a micro-level and identify potential precursors of psychological or medical illnesses (Le Van Quyen & Petitmengin, 2002). Furthermore, the method can be applied to both past experiences or newly evoked experiences. Finally, through careful guiding and specific questions it is possible to uncover aspects of an experience, which were previously not accessible to conscious awareness.

One weakness is that interviewees often switch to so-called satellite dimensions (e.g. evaluations about an experience) during an interview and it requires proper training of the interviewer to guide the interviewee back to the pre-reflective lived experience. Furthermore, interviewees also need to be willing and able to get in contact with the pre-reflective lived experience (they probably also need specific attentional capacities, it might be effortful to stay in contact with this level of an experience if one is not used to it). Another weakness is that the method is mainly applied to the study of very short time frames of subjective experiences and therefore not suited for longer lasting experiences. There is also the risk that is dissects more complex experiences.

Exemplary Studies and Fields of Application

In a study by Petitmengin et al. (2006)micro-phenomenological interviews were conducted with epileptic patients in order to study warning symptoms –so-called prodromes – prior to an epileptic seizure. During the micro-phenomenological interview participants had to select a seizure from the past, which could still be remembered. Findings from the patient's descriptions showed that prodromic symptoms were associated with negative symptoms such as lack of energy, fatigue or tiredness and that some patients developed strategies to prevent or stop an epileptic seizure (Petitmengin et al., 2006). In a previous study on choice-blindness by Johansson et al. (2005) it was shown that only 27% of manipulations were detected in a decision-making task. Petitmengin et al. (2013) replicated this study by applying the micro-phenomenological interview, which lead to an increased ability of participants to detect the manipulation in the decision-making task. These findings demonstrate that micro-phenomenological interviews can also be used to train the awareness of a specific experiential phenomenon of interest such as micro-gestures during meditation (Petitmengin et al., 2017). Furthermore, micro-phenomenology was also applied to study the lived experience during meditation (Petitmengin et al., 2017), experiences of patients suffering from fibromyalgia (Valenzuela-Moguillansky, 2013) and the experience of meeting others for the first time (Ollagnier-Beldame & Coupé, 2019).

Overall, micro-phenomenology can be applied to study fine-grained structures of specific experiences of interest. In a micro-phenomenological interview, researchers need to select a concrete temporal interval of a subjective experience (in the range of seconds) and use the interview technique to uncover rich and detailed information regarding the concrete temporal experience. Therefore, micro-phenomenology is specifically suitable to study the micro-level of the dynamics of experiences.

Phenomenological Approaches

Core Description & Goal

Phenomenology is originally rooted in philosophy and aims to uncover structures of experiences and modes of appearances of phenomena in consciousness. Depending on the respective phenomenological traditions the conception of how phenomenology should be conceived can greatly vary (Zahavi, 2019b). The same holds true for phenomenological approaches, which are embedded in psychological research frameworks. A common feature of phenomenological approaches might be a grounding in philosophical traditions e.g. from Edmund Husserl, Martin Heidegger, Maurice Merleau-Ponty, Edith Stein or Jean-Paul Sartre to just mention a few. Furthermore, some phenomenological approaches suggest to include Husserl's epoché and phenomenological reduction (Giorgi et al., 2017; Van Manen, 2017). However, according to Zahavi (2019a) the epoché is not representative for phenomenological approaches and not proposed by other phenomenologists including Heidegger or Merleau-Ponty. Furthermore, phenomenological approaches do not assume an objective reality behind the appearance of phenomena (Bevan, 2014) and aim not to provide generalized statements about a research population with a specific experience of interest.

One example of a phenomenological approach is the descriptive phenomenological method as introduced by Amedeo Giorgi, which investigates psychological phenomena in an unbiased manner by interviewing participants about lived experiences of different phenomena of interest (Giorgi, 1970; Giorgi et al., 2017). The phenomenological reduction and bracketing from the natural attitude are applied during the analysis of interview data so that the researcher can identify and describe essences of phenomena by leaving out prior assumptions. Other phenomenological approaches emphasize that phenomenological principles can be applied on the structure of the interview itself (Bevan, 2014) or in the phase of designing an experiment as in the case of front-loading phenomenology (Gallagher, 2003). Høffding and Martiny (2016) propose a phenomenological research framework, which integrates knowledge about qualitative interviews and phenomenological psychology. In addition, Martiny et al. (2021) also suggest a phenomenologically inspired research framework to apply phenomenology in the process of data generation and data analysis and combine both qualitative and quantitative data. Another attempt to combine phenomenological first-person data with third-person data was also proposed in the neurophenomenological framework by Varela (1996). Some other phenomenological approaches, which are applied in psychological domains, do not emphasize on Husserl's epoché, but rather focus on existential structures and modes of being in the world (Køster & Fernandez, 2021). More generally, Van Manen (2017) emphasizes that phenomenological studies should not be confused with case studies, ethnographies or empirical studies.

Researcher-Participant Relationship

In most phenomenologically inspired approaches, the researcher and participants are different individuals. The participants provide descriptions of lived experiences and the researcher analyzes these data without further interactions with the participants. However, in some cases the researcher might also use his own source of data for phenomenological analysis.

Acquired Data

The raw data gathered through the interviews provide retrospective descriptions of lived pre-reflective experiences of participants about a particular topic (e.g. "Describe a situation in which you were happy" or "How is it like to feel absorbed in nature?"). The researcher might take these raw data and analyze them following the principles of the phenomenological method in order to uncover a common structure of the experience of focus. However, details regarding the analysis can vary with respect to different phenomenological approaches. The outcome of phenomenological research can also include "*full-fledged reflective texts that induce the reader into wondering engagement with certain questions that may be explored through the identification, critical examination, and eloquent elaboration of themes that help the reader recognize the meaningfulness of certain human experiences and events*." (Van Manen, 2017, p. 777).

Advantages and Weaknesses

The open-endedness phenomenological approaches can be useful for taking different perspectives regarding a specific topic of interest into account. Investigated experiences can range from short moments to longer durations. Therefore, the method can be flexibly adapted and potentially be combined with third-person data. Through the application of the epoché and phenomenological reduction presuppositions and prior assumptions about experiences of interest can be

overcome. A weakness of phenomenological approaches is that there are many and partly contradicting conceptions about phenomenological approaches, which can be challenging for researchers in the process of planning a phenomenological study. Furthermore, researchers need to be well acquainted with philosophical phenomenology and integrate phenomenological analysis in a research framework (Zahavi, 2019b). However, to be well acquainted with phenomenology is a complex endeavor and the application of a phenomenological approaches can be time-consuming. A solution could be to set up collaborative and interdisciplinary research teams with expertise in both phenomenology and experimental design (Martiny et al., 2021).

Exemplary Studies and Fields of Application

A phenomenological investigation by Van Manen and Adams (2009) focused on the experience of writing online and the results of the phenomenological analysis were presented in a reflective text. A specific emphasis was put on the experience of writing online in contrast to writing offline and showed several differences in the phenomenology of these two modes of writing. According to Van Manen and Adams (2009) modes of writing online "… *intensify the phenomenology of writing – they speed up, accelerate, compel, draw us into the virtual vortex of the experience of writing – while simultaneously raising questions about the potential loss of reflectivity*…" (p. 21).

Nature is sometimes regarded as a source of mental health and according to the biophilia hypothesis humans have an inherent bond with nature (Wilson, 1984). Based on this assumption, a phenomenological study by Baklien et al. (2016) investigated whether spending time in nature is inherently rewarding. Conversations of families, who were hiking in nature were analyzed with the method of Giorgi's descriptive phenomenological method (Baklien et al., 2016). Findings from this study revealed that in contrast to the biophilia hypotheses, spending time in nature allows families to share a common social space, which allows them to more deeply connect with one another (Baklien et al., 2016). Different types of phenomenologically-based approaches were applied, for instance, to investigate what it is like to live with a cochlear implant (Finlay & Molano-Fisher, 2008), to study the experience of musical absorption (Høffding, 2019), the experience of awe and wonder (Reinerman-Jones et al., 2013) or anomalies of self-experience and their relevance for psychopathology (Parnas & Handest, 2003).

More generally, phenomenological approaches can be used to study essential structures of lived experiences. Researchers can uncover structural aspects of experiences through different means including specifically guided phenomenological interviews, the application of phenomenological analysis or existentials.

Systematic Introspection

Core Description and Goal

Introspection aims to uncover qualitative and more subtle aspects of subjective experiencing – and do so not only in their resultant but also in their processual nature. Introspection was primarily used in the early phases of psychology, however the focus in this article is on more recent approaches. According to more recent approaches of introspection (Author & Author, 2015b; Burkart, 2018) systematic steps can be followed to study psychological phenomena from an internal perspective. Systematic introspective inquiry can be conducted by a single researcher or in groups, but it requires that the researchers engage in a systematic self-observation. The approach suggested by Weger and Wagemann (2015b) can be used to study more subtle and pre-reflective aspects of subjective experiences in a systematic manner by the researcher herself while experiences naturally occur in everyday life. This type of systematic introspection can also be conducted with co-researchers, which however observe their individual experiences. Moreover, through a process of continuous refinement specific questions and hypotheses an experience of interest can be tested during the introspective trial, which often lasts several weeks or months. Dialogical introspection as another type of systematic introspection as proposed by Burkart (2018) is grounded in prior work by the Würzburg School of introspection and by Gerhard Kleining. Dialogical introspection provides a systematic framework for how to study current or retrospective consciously available experiences usually in a group-based format. In the case of dialogical introspection, co-researchers collectively observe their subjective experiences, which are induced through a certain stimulus or situation (e.g. watching a film together in a group).

Researcher-Participant Relationship

In the approach by Weger and Wagemann (2015) there the researcher and participant are the same individual. The researcher observes experiences in a systematic way, scrutinizes them and compiles and analyzes the data. The researcher-participant relationship can vary in the dialogical introspective approach (Burkart, 2018), where the investigation is either done in a heterogenous group or alone. The process typically takes several weeks and it ends when the individual makes no more new observations and theoretical saturation is achieved.

Acquired Data

The data gathered through the method of introspection are typically written notes that are usually taken directly after the observatory phase or as soon as an opportunity emerges. The act of observation takes place during or shortly after the

experience of interest. The documentation of the introspective observation is then often discussed in a structured manner in a group-based setting of co-researchers and the analysis of data can vary in relation to the specific introspective approach.

Advantages and Weaknesses

The advantage of the introspective method is that it can provide additional information about psychological phenomena, which occur on a more subtle layer of psychological phenomena. Such information could be used to guide additional research and can then be combined with third-person data. The information gained through introspective observations could also be used for identifying precursors of certain psychological states and help to develop more targeted interventions to treat for instance psychological illnesses. A weakness of the introspective method is that a sufficient degree of attention to internal mental processes is required. A targeted training to be aware and overcome cognitive distortions could be helpful to train introspective observation. Also, it can be a lengthy process that often stretches over several weeks or even months.

Exemplary Studies and Fields of Application

A study by Weger and Wagemann (2018) applied a systematic introspective approach to study the experience of mind-wandering from a first-person perspective. In this study a team of three co-researchers individually observed a paperclip and noticed subtle aspects of either focused attention on the object or states of mind-wandering. Findings from the introspective observations revealed that facilitating factors of mind-wandering (e.g. switching attention) and strategies to inhibit mind-wandering (e.g. voluntary commitment to a specific task) (Weger & Wagemann, 2018).

The approach of dialogical introspection was applied by to study the experience of shock induced in a group-based setting (Witt & Kleining, 2010). Informed and uninformed participants waited together in a room while listening to talk until suddenly an alarm clock went off and served as a trigger to induce a mild form of shock. Directly after the trigger participants had to introspect on their experience, which was then shared and analyzed. Overall, findings from this group-based introspection revealed different patterns of experiencing and coping with the induced shock. Further studies, using integrated systematic introspection, studied nuances of decision-making(Burkart, 2008) and processual and more subtle aspects of the self (Weger & Herbigr, 2019). Furthermore, aspects of dialogical introspection have been integrated in interventions to improve awareness about sustainability (Frank & Stanszus, 2019) and the applicability of systematic introspection is also discussed in the domain of experience-driven design (Xue & Desmet, 2019).

Systematic types of introspection can be applied to study both the structure and content of subjective experiences in a wide range of settings (e.g. in natural settings, but also laboratory-based conditions). It can be applied by the researcher himself or in group-based settings with a heterogenous group of co-researchers as in the case of dialogical introspection.

Thinking Aloud

Core Description and Goal

This method was first introduced by Ericsson and Simon (1980) and aims to provide verbal reports about how participants solve a particular task. The participant is merely asked to articulate out loud things that come to mind to the extent that they are accessible. In addition to qualitative data that are gathered about a task, third-person data of task-performance are often also assessed. The concurrent recording of verbal reports and behavioral data allows to investigate the consistency of the verbal data (Ericsson & Fox, 2011; Ericsson & Simon, 1980). The difficulty of a specific task of interest should be selected so that participants can provide concurrent verbal reports and are not distracted by this additional demand. The verbal descriptions obtained through thinking aloud protocols can be analyzed with qualitative content analyses.

Researcher-participant relationship

The researcher and participant are different people. The researcher records and analyzes the data and the participant performs the task and provides verbal reports.

Acquired Data

Both qualitative and quantitative data are recorded through this method in a systematic and pre-defined way. Qualitative data are collected during the experience of a specific task.

Advantages and Weaknesses

An advantages of the method is that it allows a direct comparison between subjective verbal reports and objective task-performance. Furthermore, the method is easy to implement and does usually not require an extensive prior training of the participants. As a type of real-time measure of subjective experience the method of thinking aloud has the benefit to circumvent problems of memory decay, which are problematic with retrospective methods. The method is restrictive and an emphasis is placed on how participants solve the task. This can be beneficial, if specific hypotheses need to be tested. However, if novel patterns of solving a task should be

explored, the approach of thinking aloud might be too restrictive. Another weakness of the method is that the data recorded through this method do not provide fine-grained information about additional facets of subjective experiences that are involved in the process of solving the task. In some cases, participant's workload of solving a task and describing it might be too high for participants and thus the method might not be suitable for certain clinical populations (e.g. certain clinical populations).

Exemplary Studies and Fields of Application

In a study by Swettenham et al. (2018) the experience of stress and strategies of coping with stress were investigated during the performance of playing tennis. Participants were asked to verbalize their thoughts between points during the practice or competition of playing tennis. A content analysis with predefined categories regarding coping and stress responses was applied to the transcribed data. Results from this study showed that a type of problem-focused coping with stress was most frequently used during the competition and practice condition. Another study utilized thinking aloud protocols to study how participants fill out and interpret items of the Brief Illness Perception Questionnaire (IPQ)(Van Oort et al., 2011). Participants from two clinically distinct samples were asked what they were thinking during filling out the IPQ without interpreting or commenting on their thoughts. Findings showed consistent patterns of challenges while filling out the IPQ in both clinical samples and included misinterpretations of the items or questioning the content of the items. Overall, this study can identify specific problems with scales and also guide the revision of scales. Additional studies using thinking aloud investigated for example the process of decision-making(Moxley et al., 2012), strategies applied when filling out a questionnaire of compensatory health beliefs (Kaklamanou et al., 2013) and usability testing (McDonald et al., 2013).

Thinking Aloud protocols can best be applied to study processes of problem-solving in various domains. The study of experiences and cognitive processes during problem-solving situations can be conducted concurrently during the task performance itself or retrospectively. Thinking aloud protocols can be applied in controlled laboratory settings or also in natural environments.

Guideline for Researchers

In addition to the above presented results, Fig. 1 provides a decision flow chart of the different aspects of an experience covered by the different first-person methods. The decision flow chart can help to differentiate which aspect of a subjective experience is emphasized by each first-person method. Furthermore, this overview could guide researchers in selecting a first-person method for a study with the focus of a specific aspect of a subjective experience. A first step in the selection of a given first-person method is whether the research goal aims to investigate personal and biographical aspects of a subjective experience or rather the structure and more fine-grained dimensions of first-person phenomena. Autoethnography (Anderson, 2006; Ellis et al., 2011) and heuristic inquiry (Douglass & Moustakas, 1985; Sela-Smith, 2002) are first-person approaches, which are suitable to explore personal aspects of a subjective experience regarding a specific life event or cultural setting. Autoethnography can be best applied, if the research question focuses on highly salient personal experiences or on a personal experience within a specific cultural milieu. Moreover, heuristic inquiry is particularly suitable to investigate the meaning of a personal experience and the application of heuristic inquiry can feed back to researcher and thereby lead to transformative or even therapeutic effects (see Ozertugrul, 2017).

If a research goal is to investigate the structure and layers of subjective experiences, first-person approaches, which focus on the phenomenon-side of the experiences can be utilized. A distinction can be made between first-person methods, which focus on lived experiences or experiences of e.g. strategies applied during task-performance. A first-person method of the latter category is thinking aloud (Ericsson & Simon, 1980) and investigates subjective experiences, which are already available in consciousness without further need to uncover more subtle and pre-reflective levels of experiences. More specifically, thinking aloud protocols can best be applied to investigate strategies applied to the performance of tasks in various domains (e.g. problem-solving during a cognitive task, strategies during reading comprehension or strategies employed to compete in sports or work settings).

Depending on the particular focus of interest different methods can be applied to study lived experiences. A first distinction can be made between first-person methods, which differentiate between researcher and participant or overcome a split between researcher and participant. Systematic introspection can for instance be used, if the researcher investigates her own internal dimension of lived experience. Furthermore, systematic introspection is flexible regarding the time range of experiences and it can either be conducted in a single-case setting or group-based setting with several co-researchers(Weger & Wagemann, 2015; Burkart, 2018). First-person methods, which differentiate between researcher and participant can be further sub-divided regarding a focus on concrete temporal experiences or the application of phenomenological analysis. Phenomenological approaches can be used to study the structure and essences of experiences, which are mainly consciously available and can be verbalized during a phenomenological interview. Phenomenological analysis including e.g. the bracketing of the natural attitude

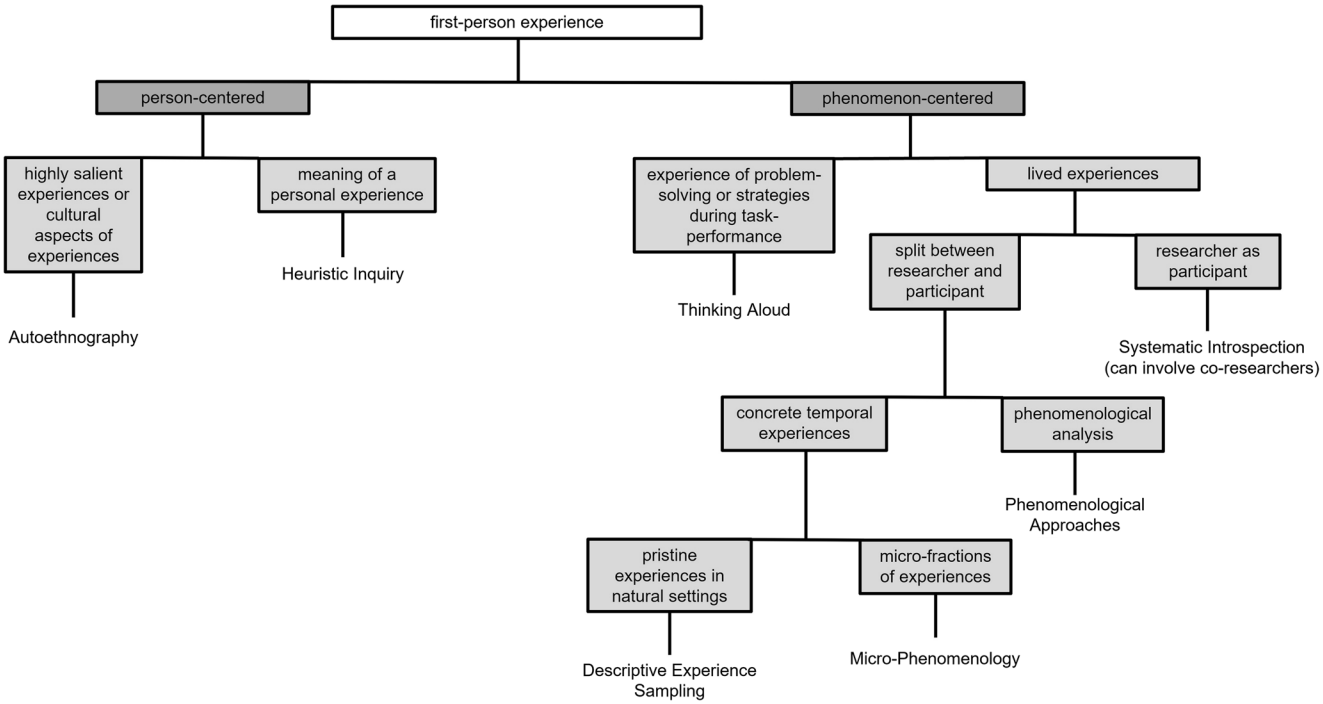

Fig. 1 Displays a decision flow chart of the first-person methods, which demonstrates the different aspects of subjective experiences measures with each first-person method. The grey-colored boxes provide information about different facets of first-person experiences, which can be studied with the respective method

are applied by the researcher either solely during the analysis of the interview data or additionally also during the conduct of the interview (Bevan, 2014). However, other phenomenological approaches suggest to disregard the epoché (Zahavi, 2019a) or instead focus on existentials (Køster & Fernandez, 2021).

Finally, first-person approaches such as descriptive experience sampling (Hurlburt, 1990) and micro-phenomenology(Petitmengin, 2006) can be used to study processual aspects of lived subjective experience of a concrete temporal interval. Micro-phenomenology can best be applied to study the micro-level of subjective experiences, which last only a few seconds. Furthermore, micro-phenomenology aims to provide rich and in-depth descriptions of fine-grained and pre-reflective aspects of experiences. In contrast, descriptive experience sampling can best be used to study untouched pristine experiences with high fidelity in natural environments.

Discussion

Overall, this article aimed to provide a first overview and structure of different types of first-person methods. The differentiation of first-person methods based on the proposed dimensions is intended to show that different types of first-person methods vary with respect to the specific aspect of a subjective experience, which is emphasized by the respective method. Furthermore, the overview also provides exemplary studies, advantages and weaknesses of each method so that researchers could better decide which method might be suitable for their own research. We suggest that qualitative facets of subjective experiences and more subtle as well as process-like aspects of psychological phenomena can best be studied with genuine first-person methods. Behavioral types of measurements (e.g. computer-based decision-tasks) and standard self-report questionnaires require a shallower form of introspection. However, such methods do not constitute a genuine first-person approach – or perhaps more accurately: they constitute a first-person approach on the level of the dependent variable, but not on the level of the independent variable or the deliberately enquiring researcher. Therefore, the selection of suitable first-person methods should also be based on the level of coarseness or specificity at which a phenomenon should be investigated because certain effects may only appear on one level of specificity – i.e. when one particular method is used, whereas using the same method to address a question on another level of specificity might lead to null findings. Finally, we would like to emphasize that the presented first-person methods have been developed with different and sometimes opposing assumptions about how to study subjective experiences. Therefore, researchers who are interested in a specific first-person method are advised to get acquainted with the epistemological and metaphysical background assumptions of each first-person method and consider whether these assumptions meet with their own perspective about the study of subjective

experiences. The suggestions about the potential applicability of the different first-person methods provided in this overview should thus be considered as a first suggestion and attempt to open the discussion for a wider research community.

The overview shows that the different first-person methods have a range of commonalities but also differences regarding the dimensions of comparison.

The information provided along the different dimensions of comparison can help to determine whether enough resources and expertise is available to implement the method of interest. Furthermore, information about the type of data that are acquired through the different methods can help to decide whether they can be combined with other types of data gained through different methods. Finally, information provided about advantages and challenges can further facilitate the decision-making process of the researcher.

More specifically, we would also like to discuss how the different first-person methods can be selected. In line with the example of the experience of stress from the introduction, the researcher might consider which degree of specificity and resolution of first-person data he/she needs in order to address his research question and to match these data with the resolution of third-person data. As demonstrated in Fig. 2, a researcher could be interested in mapping high-resolution third-person data with first-person data of subjective stress. We suggest that in this case methods such as micro-phenomenology and systematic introspection are well suited, because they provide information about the dynamics of pre-reflective lived experience on a high resolution level and can hence be used to establish a meaningful relationship with third-person data. In addition, descriptive experience sampling could also be used to study concrete temporal experiences in natural settings with a relatively high resolution. If the researcher wants to discover more conscious and stable aspects of a subjective experience of stress, methods including phenomenological approaches, heuristic inquiry or autoethnography thinking aloud are particularly well-suited.

We hope this overview of first-person methods will help stimulate and inspire research in the field of psychology and related disciplines. Note that the establishment of a first-person science that is grounded on direct experience is still in its infancy. Even though, first-person methods are already widely used according to Rigato et al. (2019), further research is needed to investigate how different types of first-person methods can best be applied in scientific studies. Therefore, several open questions need to be answered by future research. Here we provide a preliminary list of such open questions that should be addressed. A summary of outstanding questions is also summarized in Table 1.

Some first-person methods provide data that can be quantified and intersubjectively validated. However, in some cases, first-person methods provide qualitative and autobiographical data which cannot be easily triangulated with other methods. Future research should therefore investigate how triangulation with other methods and intersubjective validation can be ensured. Moreover, not all first-person methods provide predefined guidelines regarding the documentation and analysis of first-person data. Even though it is to some extent advantageous that some first-person methods are not restricted by predefined guidelines, we suggest that - in line with recent attempts made in qualitative research (Levitt et al., 2018)- future research should discuss potential guidelines for the implementation of first-person methods and provide strategies to cope with challenges, where such guidelines are not applicable. In addition, the feasibility of first-person methods for the framework of open science should be discussed (Chauvette et al., 2019; Haven & Van Grootel, 2019). Moreover, information regarding the degree of expertise of training for the researcher or participants are needed.

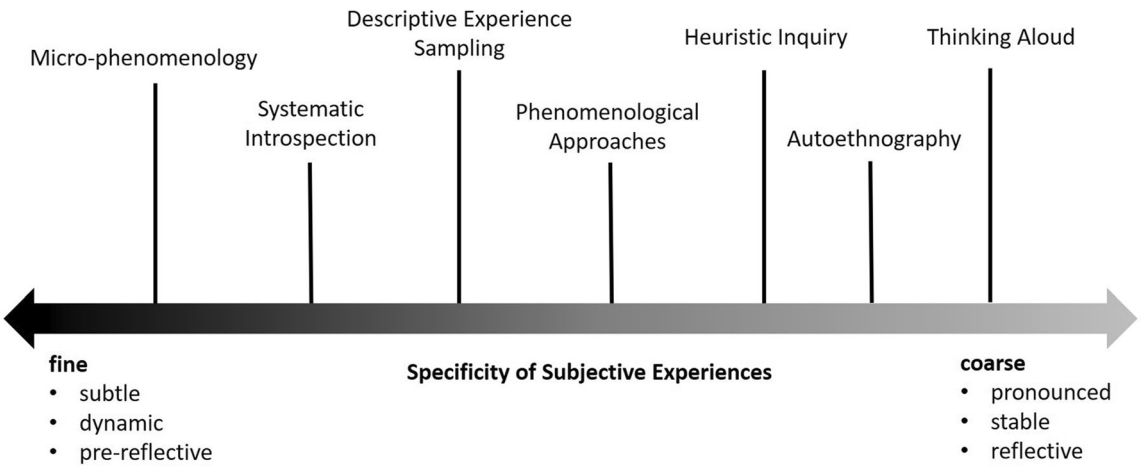

Fig. 2 Presents a classification of the seven first-person methods with regard to the degree of specificity. First-person methods, which are clustered on the left-hand side of the axis, can be classified as fine-grained, whereas first-person methods on the right-hand side can be classified as coarser

Future research should also empirically investigate which degree of coarseness of the data can be observed using different first-person methods. A potential study could examine a respective phenomenon with different first-person methods and then analyze the specificity that the data of each method conveys. Such research could help establish a model about different levels of specificity of information regarding a phenomenon. Similar differentiations are also made in biological sciences (e.g. macro level measures of brain activity and micro-level measures of brain activity). This research is particularly important because it could demonstrate that certain psychological effects can actually be investigated with the proper methods and because prior attempts failed to capture the required degree of specificity. Finally, future research should also focus on advancing existing first-person methods and the development of novel first-person methods.

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Data Availability Data sharing not applicable to this article as no datasets were generated or analysed for this theoretical article.

Declarations

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Consent to Participate Not applicable.

Consent for Publication Not applicable.

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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