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COMPARING TWO METHODS FOR EXPLORING CONSCIOUSNESS: DESCRIPTIVE EXPERIENCE SAMPLING AND MICRO-PHENOMENOLOGICAL INTERVIEWS

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ABSTRACT

Methods are arising in first-person research aimed for deeper understanding of lived experience. Here we compare two of the most frequently used methods – Descriptive Experience Sampling and the micro-phenomenological interview. Both look at short episodes of experience. Both have safeguards to limit biases and distortions from first-person reporting. But these methods are still different in terms of how they deal with memory, questioning, and analysis.

We report on an exploratory study that used both methods in the context of a common task. Four participants were interviewed about their experience of a mental imagery task using both methods. Descriptive Experience Sampling results focused more on fine-grained details of visual experiences. micro-phenomenological interview results focused more on how experience extended over time, and how participants engaged with the task. These differences in results demonstrate how the applied methods differ in their focus and scope, and present a direction for future comparison, investigation and potential integration of first-person methods.

KEY WORDS

empirical phenomenology, descriptive experience sampling, micro-phenomenological interviews

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INTRODUCTION

It is possible that as you are reading this you feel an itch somewhere on your body. Or you start to form a sensory impression – say, of a white sandy beach, with clear blue water, the smell of salt, and the gentle chirping of birds in the background. Even if you have resisted these suggestions, chances are that you are still having some kind of conscious experience. To give a pragmatic definition, for a conscious person, there is *something that it is like* to be that person [1].

In recent decades, new methods have been developed that aim at providing scientifically admissible descriptions of subjective experience[1] [2]. In this article, we will look at two of the most wide-spread: Descriptive Experience Sampling (DES) and the micro-phenomenological interview (MPI). DES was pioneered by Russell Hurlburt in the late 70s and refined over the course of subsequent decades [3]. It uses random beeps to direct participants towards specific, concrete episodes of experience. The micro-phenomenological interview (MPI) was adapted by Claire Petitmengin from Pierre Vermersch's explicitation interview [4]. The MPI aims to guide participants to a state in which memory becomes immediate and lived [5], taking into account the biases and errors frequent in unguided recall of experience. Both methods seek detailed descriptions of lived experience. And both want to recentralize consciousness as a worthy topic of research.

First-person research has had a rocky history [6, 7]. In the early 20th century, first-person research was a major pillar of psychology. But this was marred by a prolonged disagreement between two rival 'introspectionist' camps [4, 8]. One side argued for the possibility of thoughts without any imagery (visual, auditory, etc). The other side held this was impossible. Other disagreements compounded and eventually the domain of psychology moved on, leaving introspection behind.

Throughout the 20th century, behavioural, neural, and computational approaches to studying the human mind rose in prominence. When consciousness was investigated, this was mostly done *from the outside* – through its traces on the world – rather than *from within* – how it was experienced. An influential paper by Nisbett and Wilson [9] further kicked first-person research when it was down. It solidified the notion that first-person data is flawed and distorted by heuristics, overgeneralizations, and memory problems. People simply do not know what is in their consciousness.

You might expect us to lash back at Nisbett and Wilson but we actually do not disagree! Biases of memory and attention get in the way of accurately describing consciousness. In fact, the founding authors of both DES and MPI have directly addressed Nisbett and Wilson's critiques.

Hurlburt and Heavey [10] point out that the DES method actually complies with oft-overlooked prescriptions that Nisbett and Wilson give for how first-person research can be done right. These include: 1) interrupting a process at the moment it was occurring, 2) alerting subjects to pay careful attention to their cognitive process, and 3) coaching them in introspective procedures. Random beeps in participants' everyday life are meant to attune them to the moment directly preceding the beep.

As for the MPI, Petitmengin and colleagues [11] sought to replicate a study inspired by Nisbett and Wilson's critiques. Participants were given a choice and then tricked to believe they made the opposite choice. In the original study [12], participants were largely unable to detect this manipulation. However, in the conceptual replication, with an MPI conducted immediately after the participant made the choice, participants' ability to detect the manipulation significantly improved [11].

Both methods have guidelines to narrow in on specific moments of experience and to limit biases. They aim to guide participants away from generalisation and towards concrete lived

instances. Experience described in the abstract is an amalgamation of warped memory, self-perception, conceptual frames, and fleeting impressions. 'This morning I had breakfast and felt sleepy'. However, specific experience manifests itself as a flow of vivid *nows*. '*Now* I'm watching the cream dissolve in my coffee. *Now* I'm picturing what would happen if gravity reversed overnight and I had to rearrange my furniture on the ceiling'. These *nows*, so vivid when lived, can dissolve in memory like cream in coffee, so that we might forget their original colour. Methods of first-person research and empirical phenomenology [13] aim for that colour.

Despite similar intentions, there has been some contention between methods. Hurlburt and Akhter [14] have questioned the validity of the MPI. Petitmengin has argued about DES that "the beeper is not suitable for observing very brief or very fine subjective events" [5; p.253]. What is the nature of this disagreement? Does it imply that 'empirical phenomenology' doomed to the same fate as introspection, with unresolved differences once again disqualifying it?

Let us not be so dramatic. The founders and practitioners of each method have come to embrace a more reflective and even collaborative approach. The point of this study is to use the two methods with a common task to see which aspects of experience they reveal. The questions then are: What similarities do they reveal? What differences? And in the case of differences, how can we explain them? Might one method give valid results and the other flawed ones? Or do methods simply have different scopes, revealing different aspects [15]? Just because a thermometer and a barometer tell us different things about the air around us does not mean that any one of them is 'wrong'. But in this case, we need to precisely understand our methods and which aspects of experience they reveal. Then we will know how to apply methods and refine them.

The protocol for the comparison of the two methods involved using each method with a mental imagery task. Participants listened to audio-recorded verbal prompts like "A child holds an ice cream cone with three scoops. The ice cream falls onto the hot pavement". They were given time during which they could imagine the prompt. They were then interviewed about what was in their experience – half starting with DES and half with MPIs. After the interviews and a buffer period, the methods were switched between groups. The MPI group moved on to the task with DES interviews and vice versa.

In order to compare methods, we tried to bring them as close together as possible. Each method can itself be used in very different ways. For example, an MPI can look at experience shortly before the interview – such as feelings of surprise after viewing a series of images [16]. Or it can look at experience in the distant past – like an experience of intuition that may have occurred years before [17].

DES is less flexible in terms of how far back the target experience is. But it is still flexible in terms of research design. Typical sampling occurs as participants go about their everyday life, be it going to college classes or watching TV. But sampling can also occur during a pre-determined task, for example reading chosen book passages [18] or golfing [19].

As it was not possible to include all this variety in a single research design, we decided to adopt a task-based approach which allowed us to reduce the differences between the two conditions, minimise retrospection, and examine experiences of similar durations. By bringing the methods as close together as possible, the goal was to better see the nuances of how they differ.

In the following, we provide an outline of the interview methods we sought to compare. We then highlight the main *a priori* differences between the two methods and describe what measures were taken to facilitate comparison in the context of this study.

DESCRIPTIVE EXPERIENCE SAMPLING

DES uses random beeps throughout the day to help participants better grasp their own experience [10]. This can involve a specialised beeper or a smartphone. The participant must

have an earpiece directly in their ear throughout the procedure. The beeps are delivered at random intervals ranging between five minutes to one hour. Six beeps are delivered a day. This usually takes around three or four hours. In most studies, in service of ecological validity, they occur during the participant's daily life, not in a lab. So, a participant might be going about their day, hanging their laundry, cooking – only punctuated by random beeps.

After each beep, the participant jots down notes on their inner experience right before the beep. So not inner experience during the beep (e.g. that's annoying!) but right before. The goal is to describe the last uninterrupted moment before the beep. Usually, this moment is much shorter than what participants first have in mind, and can last a fraction of a second.

At the end of each day of sampling, participants are interviewed about the six beeps they collected. The interviews last an hour and any samples not discussed within that time are discarded [10]. Here is an example of a DES sample from the DES training period of our research:

> Eva Day 3 Sample 3
>
> Eva was talking with her brother about theatre spotlights. She was wondering how theatre spotlights can be automatic. She was unsure if this thought had words to it or not [*Demarcating uncertainty is important for DES*].
>
> What is certain is that Eva simultaneously had a mental image of her brother operating a spotlight. It was a moving image. Her brother was moving the spotlight to follow two actors. The point of view was from above and behind him, so that you could see him and the actors in one image. The image didn't have borders. It was as if she was in the scene.

Questioning and training is needed in order to apprehend DES moments. This was the third day of Eva's DES training. Often participants' samples on day 1 are much more vague. They might for instance say, "I was having a conversation with my brother. It was about theatre lighting". It can take multiple days to uncover details like if inner speaking or mental images are present. Or how these mental images appear.

Guidelines for questioning are extensive. For those who want to learn more, you can turn to a book on guidelines [10] or a useful interactive website [20]. The general premise of DES interviewing is pushing for greater specificity and evaluating the validity of any added details. For example, practitioners are wary of any generalizations ("I always have some kind of mental image"). They want to know, was a mental image definitively present at the exact moment right before the beep. If participants do confirm, then interviewers seek greater detail. Did the mental image have borders or no? Colours? Was it moving or still? Interviewers must be careful not to introduce biases. A typical question might be: "Did the mental image have colours, or no, or you are not sure?". Numerous opportunities are given for the participant to 'change the story' if they become uncertain (e.g. maybe there really was no mental image).

During this entire process, interviewers monitor for hesitation, filler words, overgeneralizing, changing narratives, and other potential markers of fabrication. The goal is to work together with the participant, both with open curiosity and skepticism, hewing to reality as faithfully as possible.

MICRO-PHENOMENOLOGICAL INTERVIEWS

MPIs aim to guide the participants towards vividly reliving and precisely describing a past conscious episode [5]. This episode is of underdetermined length, ranging from a few minutes to a few seconds. The episode can be in the recent past or have occurred many years ago. For

the sake of bringing our methods as close as possible to compare them, here we will apply MPIs to short episodes (around 10 seconds) in the recent past.

Memories can be indistinct, so the MPI method aims to guide the participant to an 'evocation state' where past experience is 're-lived' [5]. Participants have direct contact with what they saw, heard, or felt at the time of the target experience. Questions, as well as repetitions of what the participant has reported so far, aim to 'stabilise' this evocation state and maintain the participant's contact with their experience. For example, participants are periodically asked to return to the beginning of the episode. If the participant digresses, the interviewer can repeat the participant's earlier descriptions.

These repetitions serve an additional purpose, too; they give participants a chance to correct, modify, or add to their earlier description of the experience. Participants are encouraged to interrupt if the interviewer's description does not match their experience. They are also asked before starting the interview to report on their experience as faithfully as they can, without adding to it, or distorting it. Repeating participant's experience by the interviewer thus also provides an accuracy test of sorts.

To maintain a stable evocation state, MPIs also make use of 'direct reference' [21]. Participants are encouraged to use pointers – these might be generic terms like 'this thing,' gestures, or any other kind of (non-)verbal symbol – to refer to processes or experiences that are still vague or not fully stabilised. These pointers can then also be used by the interviewer to help the interviewee become conscious of, or attend to the referred-to process or experience.

Once participants are in a stable evocation state, interviewers can ask about the unfolding of the experience and how different elements change over time. Individual elements can then be examined in turn. As in DES, participants are asked for greater specificity about the elements they reveal; attention is directed from what appears in the participant's experience to how it appears. For example, if a participant has a mental image, an interviewer might ask, "Is it in colour or in black and white? Is it detailed or fuzzy? Is it dark or light?" [5; p.251]. These questions serve to direct the participant's attention inwards, to the processes they are describing, in order to obtain a deeper understanding of the described experience.

The MPI method aims for nuance. Questioning can often focus on subtle emotional shifts of even shifts in body or posture that contribute to experience. There are no firm guidelines for how long an MPI should last. However, it is not uncommon for short segments of experience to elicit hour-long interviews. The aim of MPIs is to uncover the complexity and nuance of the experiential episode both at a particular moment (synchronic dimension) and its development over time (diachronic dimension), with the focus of the interview depending on the research question of the particular study.

MAIN DIFFERENCES BETWEEN THE METHODS

In what follows, we will look at the main differences between DES and the MPI with regard to their typical target experiences (their duration and the timing of their occurrence), as well as their attitude in dealing with retrospection, directing the participant's attention and focus, and validity issues.

Time

MPIs typically deal with longer periods of time. Researchers observe how experiential elements change. Petitmengin writes, "To enter into contact with one's experience, it is necessary to respect its fluid and dynamic character" [21; p.59]. Exact length of target experience can vary. For example one study looked at experience for the 20 minutes after the

administration of the drug DMT [23]. Another study looked at experience while listening to sound samples lasting just a few seconds [24]. So, the length of the target experience depends on research goals.

DES always deals with the moment right before the beep. This length depends on the particularities of the participant's experience. For example, say during that moment, the participant was innerly speaking "I need to call mom". They may define the moment as comprising this entire sentence rather than just "mom". However DES is agnostic if this division represents any real division in the participant's experience. The use of 'moments' is a tool to reach greater specificity. To give a rough idea of how long moments typically last, Hurlburt and Heavey at one point speculate around 2 seconds [25].

As mentioned, for this study we brought the methods close together to invite more nuanced comparison. DES looked at the moment before the beep as it always does. MPIs looked at experience during the 10 seconds after a prompt was given. This interval maintains the temporal unfolding crucial to the MPI method but keeps it relatively constrained to allow comparison with DES. The question then is: even with temporal intervals quite close, what differences in methods can we observe?

Retrospection

MPIs, in general, involve substantially more retrospection. The target experience could be years before the interview [22]. In DES, the target experience is a few seconds before the note-taking and less than 24 hours before the interview. There are still memory demands but they are fewer. However, as mentioned, MPIs can also be used to investigate a target experience that occurred shortly before the interview [16]. This is the case for our comparison study.

Directing attention

The MPI aims for an evocation state in which participants re-live the original experience. DES takes a more sceptical approach. DES questions encourage the participant to doubt if reported elements were really part of their direct experience. DES acknowledges that this scepticism might lead it to miss out on elements of experience, but holds this as preferable to reporting elements that were not there [10]. The MPI method prefers having as full an impression of experience as possible. It offers participants opportunities to revise and clarify their reports, but in service of maintaining an evocation state, does not 'grill' participants to the extent that DES does. For our study, we stuck to method guidelines, and the DES portion did indeed involve more skepticism. More on this in the results section.

Questioning

MPI questioning is "non-inducive but directive" [5; p.252]. DES questioning is non-inducive and non-directive. For example, in MPIs the specific sensory modalities may be asked about in turn, i.e. 'Do you hear anything?' It holds that this is often necessary to elicit greater detail since participants may not know where to direct their attention. DES would instead ask, 'Was there anything else in your experience?'.

In general, the MPI method is more trusting of participant reports. DES places a greater emphasis on skepticism, training participants in order to get greater fidelity. For example, the first day of training is always discarded with DES. This is not the case with MPIs. Training interviews are occasionally used but optional.

Validity

There is agreement between methods about how to judge validity. Both acknowledge that rules and explanations of the method make their own case for validity. A successful

sample/interview then depends on these guidelines being followed, and questions being suitably content-neutral and non-leading.

Other points of agreement include situating methods in a net of third-person observables – for example, can first-person data link with behavioural data? Can correlations be found with neuroimaging? Studies have been done with DES and fMRI [25, 26] and with MPIs and EEG [22, 27]. No one correlation can address validity but networks of connections can help lead to first- and third- person methods informing each other through 'mutual constraints' [28].

Differences in validity criteria include differing methods for judging veracity. Both methods rely on both verbal and non-verbal cues. But DES leans more heavily on verbal cues, like subjunctification [10]. Is the participant saying "umm", "I think", "kind of", "maybe", "sort of", "I guess"? Then it's likely they're not describing direct experience. The MPI method, compared to DES, relies more on non-verbal cues – for example a participant's gaze defocusing or their speech slowing down might indicate that they are in an evocation state.

Petitmengin also advocates checking a participant's reported experience against the researcher's own experience, calling this the "kingpin of all validation" [5; p.255]. Is it similar or at least plausible? Hurlburt and Akhter [14] see this as harmful – a participant's experience may be radically different from the researcher's and so should be 'bracketed' as much as possible.

METHODS

PARTICIPANTS

This study involved four participants – a small sample size aimed at highlighting and comparing certain method contours rather than generalising or making claims of statistical significance. All four were female students studying at the University of Ljubljana, aged 23 to 26. All participants gave informed consent and are referred to here using pseudonyms. They received course credit in exchange for their participation in the study.

DESIGN

Each participant underwent both the DES and the MPI procedure. However, two started with MPIs and two started with DES, to limit biassing. There was a break of at least six days before switching methods. Participants were divided into two groups. Figure 1 gives a rough overview of the procedure, before we launch into the specifics.

MATERIALS

The task slightly differed between the DES and MPI portions. However, the prompts remained of the same format. Each prompt consisted of two recorded sentences, played back on headphones for participants. They were recorded by an English native speaker trained in performing arts. The full list of 34 prompts can be found in the Appendix. After each prompt, participants were given 10 seconds during which they could imagine what was described.

Only seven prompts were followed by DES beeps and interviews or MPIs. This was to give greater latitude for comparisons. None of the participants heard the same prompt twice. The seven prompts followed by interviews were:

1) A child holds an ice cream cone with three scoops. The ice cream falls onto the hot pavement.
2) A candle flickers in a dark room. A person sits down in front of it.
3) Three children skate on a frozen pond. Birds chirp in the trees.

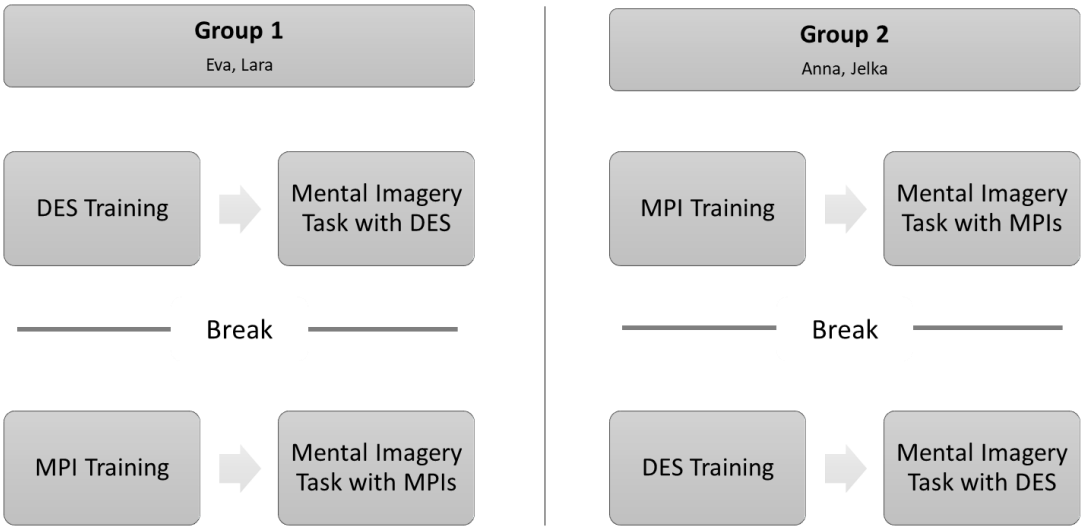

Figure 1. Outline of the procedure for each group.

4) A cat sits outside a shop window. It stares at its reflection.
5) A storm cloud gathers over a city. A lightning bolt strikes.
6) A family gathers around the dinner table. The father starts serving food.
7) A girl sits on the bus. She takes out her headphones

PROCEDURE

The DES training and interviews were led by J.L. Bass-Krueger. The MPIs were conducted by E. Wiedemann. E. Demšar led a workshop teaching the basics of both methods and further assisted E. Wiedemann with training in conducting MPIs. There was no communication between the researchers concerning their respective results until after the analysis was complete.

DES Procedure

Before the task came training. For DES, this involved three days of DES sampling during the participants' everyday life – going to class, work, cafés, etc. Participants received six beeps a day. After each beep they jotted down their inner experience in the moment before the beep. They received hour-long interviews within 24 hours of sample collection. Any beeps not discussed in that hour were omitted. Quality over quantity was key for training and it could take up to 25 minutes to discuss one beep (although sometimes as short as 5 minutes). This collection and interview process was repeated for three days. Interviews followed guidelines as described above (and in referred literature). They were instructed that any beep they do not want to discuss they should omit entirely.

Figure 2 shows the procedure. For the mental imagery task, the DES portion involved 32 pre-recorded prompts. 10 seconds followed each prompt, allowing for mental imagery formation. Five beeps were semi-randomly interspersed throughout the task, ranging between 1-10 seconds after the prompt concluded. This length was chosen with a random number generator. The beeps were edited directly into the audio track with the prompts. There was a DES interview after each beep, conducted by J.L. Bass-Krueger. Interviews were recorded with an audio device.

MPI Procedure

For the MPIs, participant training was much shorter. Participants received an overview of the procedure and an oral communication contract telling them no statements would be associated with them and that they were free to refrain from answering any questions. They were then interviewed about a simple task to give them some practice and familiarity with the MPI method

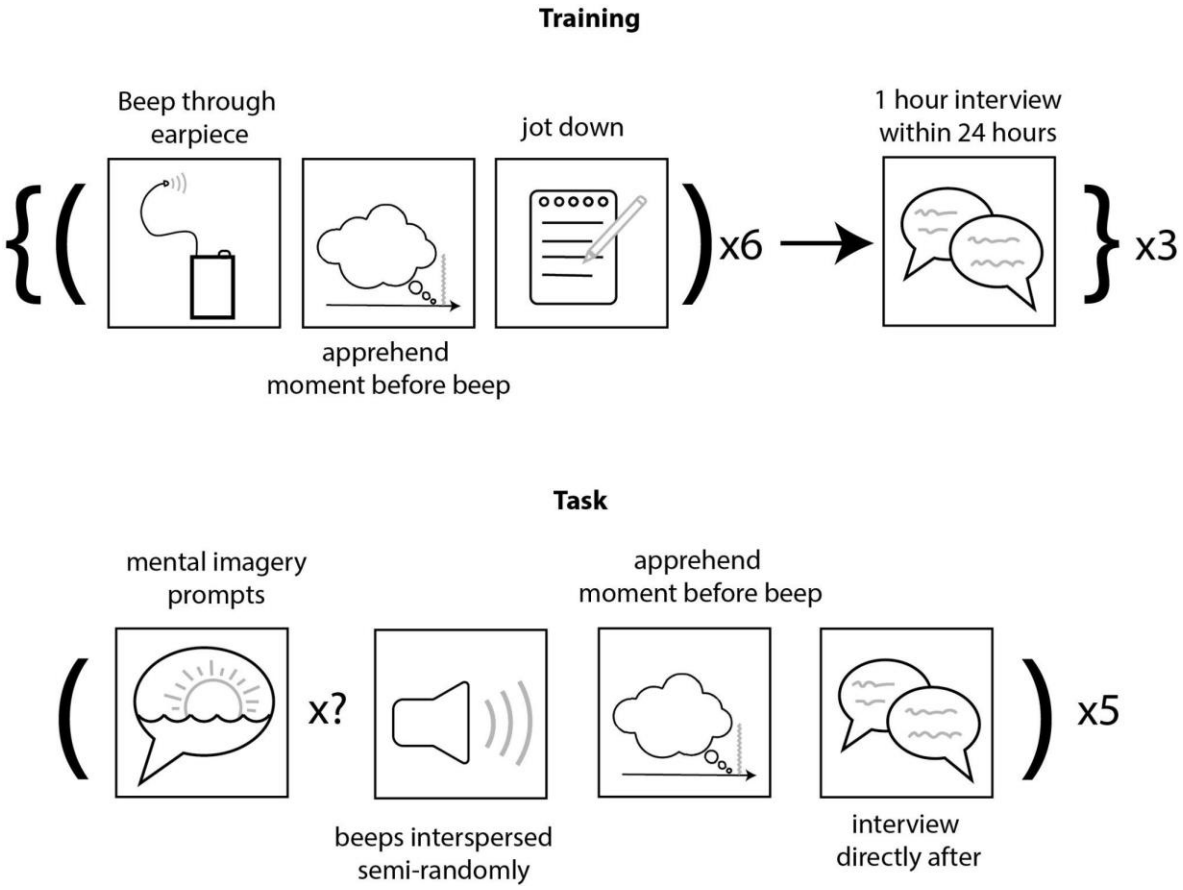

Figure 2. DES training and task.

and the interview procedure. The task consisted of closing their eyes and spelling the word octopus in their mind. Interviews lasted up to 15 minutes. They followed guidelines as outlined previously in this subsection and in the referred literature.

The MPI task involved two prompts. These were given on separate days, Figure 3. Participants had 10 seconds after each prompt to form mental images, then they were interviewed about their experience following the MPI guidelines. The experience that was explored during the interview was defined as starting at the moment when participants first began to imagine what was described. This was either while the prompt was still being played or after it was finished. The target experience ended 10 seconds after the prompt. Interviews were recorded using either audio or video recording devices, depending on availability and participants' consent. They lasted 23 minutes to one hour.

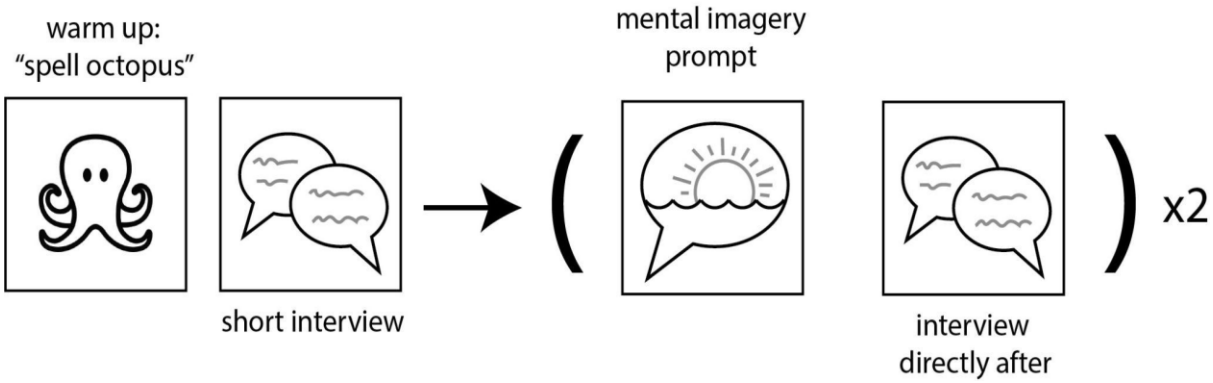

Figure 3. MPI training and task.

DATA TREATMENT

DES Analysis

J.L. Bass-Krueger carried out DES sample analysis. Salient features were extracted from DES audio recordings. Each sample was then analysed, and a summary drafted, denoting which features were certain and which were speculative. Samples were also coded. DES analysis is idiographic and follows the contours of each individual's experience. Often no clear code can be found. However, at other times codes can be applied that recur throughout DES research. For example, inner speaking, images, and feelings are common [30]. Percentages of codes were calculated, for both the training period and the task. Training period codes were not used, since we had no analogue from the MPI portion to compare them to. Codes from the task were occasionally used in our analysis, although as a supplement to qualitative analysis which offered the clearest comparisons with MPI results.

MPI Analysis

Interviews were transcribed and anonymized. Transcripts were used to extract participants' descriptive statements, which were then reordered to follow the chronology of the experience. In this, we followed the guidelines put forward by Petitmengin and colleagues [31]. The analysis remained close to these reports and followed the general guideline of qualitative analysis [32]. Participants' experiences were summarised to make them comparable to the results of the DES part of this study. The MPI analysis was conducted by E. Wiedemann.

RESULTS

This section presents the main findings of the study. We were interested both in the findings about participants' experience during the mental imagery task, and, more centrally, in how these findings might converge or diverge across the two methods. In what follows, we first look at the similarities in the findings – i.e., which features of the target experience were revealed by both methods. Then we turn to the differences – i.e., findings about experience that were revealed or emphasised by only one method, but not the other.

SIMILARITIES IN FINDINGS

Image Characteristics

Both methods uncovered common visual phenomena. One example of this was the GIF-like repetition found in both MPIs with Anna (prompts 1 and 2), but also in her DES samples. Think short moving mental images that loop from the beginning every few seconds. You may have seen some scrolling on social media sites.

Other commonalities between method findings include visual elements changing over time. Different elements could be added to mental scenes, or scenes could be switched entirely. Sometimes new visual elements entered all at once. For example, in an MPI about prompt 5, Lara described an abstract mental image of a Z-shaped lightning bolt which appeared "from nothing but altogether" – immediately fully formed.

Sometimes new visual elements formed gradually. For example, in an experience examined with an MPI, Anna first formed the image of a floating ice-cream cone before adding it to a child's hand (prompt 1). In an experience examined with DES, she formed images of children's faces before adding them to three children skating on a frozen pond.

The findings that we got with DES showed that not only can images not arise fully formed but the visual space of the image, itself may take time to form. For example, in some DES samples,

Lara described being in the process of forming a 3D screen overlaid on the actual room she was in. Her prompt-inspired visuals then appeared on this 3D screen.

Both methods revealed that images could either be moving or static. For DES, sometimes the image subject was moving. And sometimes the visual space itself – for example zooming in. In MPIs most elements changed over time. One exception was Jelka's image of a bookstore (prompt 4). It stayed static, unchanging.

With both methods, mental images were described as having differing levels of detail. Images were sometimes clear. Sometimes they were fuzzy, indistinct, ghostly, or blurry. Visual elements were sometimes realistic and sometimes cartoonish.

Interactions with Other Modalities

Mental images were the primary components of experience for all participants and for both methods. But these images were often concomitant in experience with other elements. For instance, both methods revealed the experience of words and images interacting. MPIs revealed participants sometimes innerly repeating words from the prompt. For Eva, these repetitions seemed to mark a change in the scene (a new figure entering in prompt 6; a new perspective in prompt 7). To give one example from DES, for one prompt, Eva misheard the word 'chirp' as 'gerb.' At the moment of the beep, she was innerly repeating it, wondering what it meant.

Images could also interact with feelings – experiences with emotional valence. DES found that one fifth of samples involved feelings. These were sometimes positive in valence ('calm') or sometimes negative ('dislike'). Certain prompts were more frequently related to feelings – like the prompt "A family gathers around the dinner table. The father starts serving food". Anna had a feeling of antipathy, from not liking the father in the image. Lara had a feeling of cynical amusement, since her father would never serve food.

The MPIs also found feelings. For prompt 3, about two children skating on a pond, Jelka added a mother to the scene and described projecting feelings of worry onto her. Lara had a feeling of nervousness in her chest, present throughout the session with this prompt, but not elicited by it. Some positive feelings were reported as well. Anna described feeling relaxed (prompt 1). Eva felt happy (prompt 6) and a "good feeling" (prompt 7).

DIFFERENCES IN FINDINGS

Differences between the two methods' findings spanned various dimensions. Here, we focus primarily on differences in describing visual experience (typically more detailed descriptions with DES), describing how experience evolved in time (typically more detailed descriptions with MPI), as well as describing participants' feelings or attitudes towards the mental image or the activity of forming it (typically more detailed descriptions with MPI).

Particularities of DES Results

DES findings were able to provide more details on the nuances of the visual experience. With DES, for Jelka, all five prompt samples involved imagery with a dual vantage point. She described both looking at the image from a distance but at the same time having another vantage point of being surrounded by the scene. Think of simultaneously watching a movie on a screen and being in the movie as the main character.

DES findings focused more on characteristics of mental images. MPI findings also dealt with these characteristics, but for DES, differences in mental visual space between participants were the driving salient findings:

- Images can have borders, no borders, or focus can be on the centre so the participant is unsure of whether or not the image has edges.
- Images can be experienced in a separate mental space or as positioned over the real world, for instance on a "3D screen".
- Two simultaneous visual spaces can be present at the same time. For example, Anna had one visual space of children skating on a frozen pond, and a separate space where she was creating a face to add to the children.
- Visual aspects can be sensed without yet being visually present. For example, areas can have some visual attributes (brightness) without colours yet being present (seen in samples by both Anna and Eva). Eva also sensed some attributes of the word "gerb" (misheard from "chirp") like length and a large size. But she was not yet clearly innerly seeing anything.

Particularities of MPI Results

The MPIs revealed more information on how experience evolved over time. The findings showed changes of imagery over time and showed the broader experience of the task including how participants interacted with prompts, referring back to them, and playing with them.

MPIs revealed that while some mental images (or elements of them) were experienced as coming naturally, others required some effort. Elements that came easily include an image of a candle for Anna (prompt 2), the pond with three children and their mom for Jelka (prompt 3), or the headphones for Eva (prompt 7). An example of an element requiring effort was Jelka's image of a tree with birds in it – "my mind didn't do that for me" (prompt 3). Lara also reported having to invest effort to form mental images for this prompt – "I really tried to imagine it".

Some findings from MPIs further differentiated elements of the mental image that would either "fit" or be disproportionate with the scene. For example, Jelka imagined a tree with birds that did not fit with the rest of the scene (prompt 3). It was too big, and a different colour. Another example, for the same prompt, is Lara's image of a skate flashing over an image of a pond. The skate did not fit with the pond at all. It was too big. It had different colours and was in a different visual style. Both the pond and the skate were cartoonish, but the skate was more 'retro'.

MPI findings also suggested that mental imagery tasks could involve constrained freedom or constraint. Jelka felt constrained at times. She had to imagine things she was not interested in. Anna felt freedom (prompt 2). She could imagine whatever she wanted. Anna also played with the prompts. For example, given a prompt about a boy with three scoops of ice-cream, Anna imagined three ice-cream scoop tools (prompt 1). She engaged with the task, testing how far she could push the prompts.

DISCUSSION

In this section, we consider different aspects of this comparison study in turn. First, we will discuss some of the reported findings, aiming to put them in context. Next, we discuss how experience with one of the two methods affected participants' approach towards the other. We then touch on some more general considerations related to our research design, before discussing how best to deal with discrepancies between the findings with these two methods, and finally broadening our perspective to consider future directions in this field of research.

The GIF-like repetitions uncovered by both methods present an interesting finding in their own right. This characteristic of mental images might not sound too exciting, as we are used to seeing these in our daily lives, but such phenomena have not been described (or at least rarely) in the DES or MPI literature so far. This may be because this kind of experience is specific to our current digital age. There are other examples in the literature of age-specific technologies

potentially shaping our perception and perceptual cognition. For example, many older people in DES sampling have mental images in black and white [33]. This may present further evidence that the technologies of our age shape our perception and perceptual cognition.

Another interesting finding, particular to the DES results, was Jelka's dual vantage point, which was present throughout her DES samples during the mental imagery task. This vantage point is impossible in real physical space. However, past DES research indicates that 'impossible' vantage points should be taken as seriously as possible in consciousness [6]. Since this dual vantage point was found in all of Jelka's samples, one might expect it to be a generalizable feature of her mental images.

Yet, interestingly, the MPIs did not find it. The MPI about prompt 3 may have included hints of this, however. Jelka described seeing children skating on a pond as if on a TV screen (with no borders) from about a 10m distance ("it looked like if I would want to walk in there I would have to […] do some steps not like walk for 2 km"). She was visually focused on the children but emotionally she was more focused on their mother's worry – "I kind of felt it for her". After the MPI, she said she did not feel like her description was complete, as some details were left unexplored. This might suggest that the dual vantage point was present but not explored. It may also have been present but not yet apprehended. Or it might only have been present in the DES task. As there was no communication between researchers until after the analysis was complete, we did not ask Jelka about this in any of the interviews.

Some noteworthy findings, particular to the MPIs, are the experiences of elements being proportionate or not, and the experiences of freedom and constraint. These dimensions came up in several of the MPIs but were not described in any of the DES samples. This may be because experiencing an added element to be (dis-)proportionate presumably involves comparison with previous elements. Differences in temporal scope between the two methods may make these elements easier to uncover in MPIs than in DES samples.

Similarly, Anna's testing out different versions of the prompt (imagining different visual components) was only possible due to the greater temporal scope of the MPI method. While DES could not have revealed this entire sequence, it is interesting to note that feelings of freedom or constraint in participants' engagement with the task were not featured in any DES samples. This may be because the beeps happened to fall onto moments when these feelings were simply not part of their experience. But this might also be due to MPIs allowing for more in-depth descriptions of participants' experiences.

It is also interesting to point out that there were some commonalities among the experiences elicited by certain prompts. For instance, prompt 6, the family at dinner, elicited feelings in three of our participants. Similarly, prompt 3, the children skating, was associated with negative feelings for both Lara and Jelka. They also both reported on *trying* to imagine certain elements of the prompt (i.e., having to invest effort to imagine what was described, with varying success), and they both formed mental images with disproportionate elements in response to this prompt.

The difficulties both Lara and Jelka had in imagining what was described in prompt 3 may be related to a switch in modalities in the prompt itself. The first sentence reads, "Three children skate on a frozen pond". This part of the prompt came naturally for Jelka, it describes a (visual) scene. However, the second part of the prompt, "Birds chirp in the trees", refers to something occurring in a different modality – auditory, not visual. Jelka picks up on this, saying that "the sound came more naturally than the actual birds".

Finally, before turning to some broader considerations about our design, it should be noted that the reported results were the outcome of analyses that did not perfectly follow the guidelines for either method. The deviations were minimal for the DES part, but more substantial for the

MPI analysis. The MPIs were not analysed in terms of their synchronic and diachronic structure as proposed in [31], and no codebook was created. The findings also were not graphically visualised, and the entire analysis conducted E. Wiedemann. This limits our ability to generalise based on the outcome of this comparison. Future studies could aim to follow the proposed analysis procedures more closely in order to conduct a more faithful comparison.

TRAINING EFFECTS

Reporting experiences with one method seemed to influence the later reports with the other method. For instance, participants who started with DES and then moved on to the MPIs were more cautious and skeptical in these MPIs than participants with no DES training. Guiding these participants into an evocation state was more challenging for E. Wiedemann, compared to the group that started with the MPIs, as these two participants were both hesitant to explore aspects of their experience that they were not immediately aware of. However, these two participants were also more confident about what was in their experience and what was not, and they were more definitive in accepting or rejecting additions or modifications of their descriptions that came up at later points during the interview. E. Wiedemann therefore relied more heavily on repetition to stabilise these two participants' attention and to test the accuracy of their reports.

Although both participants, having completed the DES training with J.L. Bass-Krueger, were not new to reporting on their experience, the practice interviews proved useful in familiarising them with the new method. Lara commented after the first MPI session that "I was like ok what [laughs] what are you asking me" but ultimately said she found two types of interviews "quite similar" (after the second MPI session). Eva felt similar but expressed that she was happy to have completed the DES training first, as the MPIs felt "deeper" to her.

Conversely, Anna who started with the MPIs and then moved on to DES was at first exasperated by the scepticism of DES. This was a sample on the first day of DES training: Anna had been watching a video of a neuroscientist presenting her textbook, and was trying to discern if she (the neuroscientist) was drunk or high. Anna described paying attention to her words, movements, pauses, and blinks. J.L. Bass-Krueger's questions were geared towards figuring out if all these elements of focus were really present at this exact moment. Or perhaps at this exact moment, one or a few of them were more prominent. Anna became somewhat frustrated and insisted they were all present. Of course, she may have been correct but the point of DES training, especially the first day, is to render participants more sensitive to the possibilities of their experience. Interestingly, no other DES participants in this research or in J.L. Bass-Krueger's other research have become this frustrated. So potentially coming from MPIs made Anna more sensitive to having her reports questioned. Note however, that in the end, no participants including Anna were disgruntled by the DES method, since its questioning is based not on adversarial denial of experience but on collaborative investigation.

Both participants who started with MPIs required at least as much training as participants with no prior experience with first-person reporting. So MPI experience did not make DES training any easier. But did it impair results? J.L. Bass-Krueger thinks not. After the DES training period (three days), all participants had enough skill with the process to give faithful reports.

RESEARCH DESIGN

Without exaggerating, there exist an infinite number of research designs for comparing our two methods. We decided on a mental (visual) imagery formation task. This choice was somewhat arbitrary, although it had some motivations. We thought that vivid prompts would induce vivid and varied experiences, but that this variety would be constrained mostly to one modality

(visual) to simplify comparisons. Other modalities were present, for example auditory or affective. This did not impede our analysis. However, for those wishing to make more emotionally neutral prompts, perhaps steer clear of mentioning 'fathers'.

Any task could be used to compare methods so long as it remains the same or similar for both conditions. We also considered canonical tasks like a mental rotation task [34]. In general this task would be interesting for first-person research, since so far the literature on mental rotation is a prime example of studies that infer experience from behaviour (like reaction times). Other widely used tasks like the rubber hand illusion [35] could be interesting as well. The many iterations of this paradigm, at its core, consist of participants feeling sensation on a rubber hand as if on their own. Experiential reports are usually elicited in the form of questionnaires determining if the illusion was effective [35, 36]. But first-person methods like DES and MPIs could give more in-depth views on the experience during this task.

With various tasks we could build up a repository of how methods compare regarding feelings, regarding mental images, inner speaking, or a number of other modalities.

One difficulty of our study was getting the task for each interview condition as close as possible. The prompts themselves remained of the same format. But The DES task involved 32 prompts with beeps spread between them. The MPI task involved just one prompt at a time followed by an interview. It would have been possible to use a number of prompts and then only interview participants about one of them. This is not how MPIs are typically conducted however. It increases retrospection and usually in MPI studies involving increased retrospection, the participant gets to choose an especially salient moment to discuss [15, 16]. Less salient experiences may be quickly forgotten. So there are trade-offs with any research design. Should the tasks between conditions be as similar as possible? Or should methods be as close as possible to their original intent? We challenge other researchers to come up with other designs balancing this trade-off.

DEALING WITH DIFFERENCES

We saw a good deal of similarities in method results; both involved reports of new visual elements sometimes arising gradually, and reports of some images repeating in a loop, like GIFs. Despite similarities, DES and MPIs have different scopes and reveal different results.

MPIs revealed more temporal dynamics. We saw how images evolved over time and how participants interacted with the prompts. The analysis also involved a greater focus on participant's attitudes towards their mental imagery – for example if added elements "fit" a scene or were disproportionate. Reasons for this (among others) could be the MPI's greater attunement to valence and feeling. Or that just by chance participants had more of these experiences during MPIs, and none before the random beeps. Or that analysis of MPI results involves a greater pool of experiences to select from, and different conclusions to be drawn.

DES revealed more nuances of visual characteristics of images. This is contrary to Petitmengin's comment concerning DES's limited experiential detail: "I doubt whether the beep enables the interviewee to direct his attention from 'what' to 'how', unless by chance" [5; p.253]. It also goes against claims from Froese, Seth, and Gould that DES adheres only to a 'shallow' conception of consciousness [35].

Note that methods differed in revealing some fine-grained details. DES revealed dual aspect imagery and MPIs did not. Recall that with DES, all of Jelka's images had two simultaneous vantage points – as if she was looking at the image, and as if she was inside of it. The MPIs did not find this in Jelka's experiences. Perhaps Jelka's experience really was different on different interview days. Perhaps her reporting improved with practice and training. Or perhaps one or the other method was more accurate.

Methods that distort experience may lead to disagreements and stall progression of the study of consciousness. For this reason, issues regarding retrospection, memory distortion, presuppositions, and biases need to be handled carefully. Practitioners of any method need to question what its intent is, whether its guidelines are coherent, and what research questions it can and cannot answer.

It would be fruitful here to bring in different opinions on results presented, and more broadly on the utility of each method.

J.L. Bass-Krueger thinks that DES was more faithful to experience here. The fact that all five of Jelka's mental images presented with a dual vantage point showed that this was a common feature of her mental images. And MPI results hinted at this dual vantage point without making it explicit. In DES interviewing it took Jelka some time with questioning to sort through and assert her experience. This is often the case when experience goes against participant's preconceptions of physical reality.

One of the benefits of the DES beep and interview training is that participants are able to voice experiences that they previously considered impossible. J.L. Bass-Krueger noticed this for example with Eva. By the third training day she had already had multiple samples of thought with clear content but no associated words / inner speaking. Eva's third sample from her third training day partially involved her wondering how theatre spotlights can be automatic (described in p.4). Eva first described there being words to this thought. But when the researcher sought further details, Eva could not provide any. Eventually she said "Maybe it could have been a thought without words. Maybe I just was not thinking that could exist". This is an example of how misconceptions can influence experience reports and how it can take multiple days of training to sort through them. The ambiguity in that sample in question was never resolved, but the goal was to make Eva more careful on subsequent sampling days.

J.L. Bass-Krueger sees this careful, iterative as the only way to reveal certain kinds of experience. He sees MPIs as more prone to error and is especially wary of MPIs of target experience in the distant past. That being said, he is open to MPIs revealing types of experience missed by DES, and to new fruitful methods that mix components from each method.

For E. Wiedemann, it is interesting that some dimensions, such as the felt freedom or constraint, and elements appearing naturally or with effort, were only revealed in the MPIs. While it is possible that these dimensions simply were not present in the DES samples, it could also be the case that the MPIs allowed participants to access dimensions of their experience that they were not previously aware of. If the latter is true, this would suggest that the MPIs enabled a more in-depth exploration of participants' experience during the mental imagery task than DES.

Finding that the MPIs provided a more nuanced, or 'deeper' exploration of experience than DES is not particularly surprising though, given the two methods' differences in emphasis. Yet, the fact that the MPIs did not identify Jelka's dual vantage point is somewhat puzzling. Some possible explanations for this are entertained above (it might not have been present during the MPIs, Jelka might not have apprehended it, or she might not have been able to articulate it). However, if this feature was present during her experience that was explored in the MPIs (e.g., for prompt 3), the fact that it was not uncovered could also be linked to a lack of expertise on the interviewer's part – a key limitation to our study.

While only Jelka has the answers that would resolve this debate, E. Wiedemann thinks that this discussion points to a broader issue regarding differences in the application of these two methods. Whereas DES advocates training of participants, the MPI method places a stronger emphasis on interviewer expertise – the interviewer is responsible for guiding the participant into a stable evocation state, in order to then assist them in exploring and faithfully reporting on their experience. The results reported here may point towards the benefits of training both interviewers and participants to foster faithful descriptions of subjective experience.

E. Demšar thinks that a bigger study with an improved research design (e.g. relying on various common tasks, and/or focus on a task-independent phenomenon) would be needed for more conclusive findings about the differences between the two methods. This exploratory research, however, highlighted some candidate features of mental imagery experience on which the two methods either converged or diverged (including elements that were articulated or accentuated by only one of the methods). (There might have been other experiential aspects that remained unarticulated in both conditions.) She sees the project of expanding on this and similar studies as an important step forward in the maturation of the field of first person research and empirical phenomenology.

Further, she'd argue that dealing with first-person methods and their problems is not entirely different from dealing with scientific methods in general. As in any research, different research questions in consciousness studies call for different methodological approaches. With first-person methods, however, we're in the unenviable situation where participants' experience is at the same time the object as well as the instrument of research, where we have no external, third-person tool to genuinely access or "verify" anyone's experience or the accuracy of its description, and where we cannot even claim that we can measure the same "object" twice. As a result, achieving intersubjective agreement - the foundation of scientific objectivity – is less straightforward than in most third-person research fields. But that does not mean that it is impossible. A critical investigation and optimization of methods, enabled by comparing and combining different methods, is a necessary step in this process.

Comparing methods, however, is only possible if enough researchers know how to use them. Carrying out interviews about experience with either one of the methods explored here is a skill, and learning it requires researchers to have access to learning resources. For our two methods, researcher training is increasingly available for micro-phenomenology, and DES provides a large collection of training videos on the DES process and research skills on a freely available interactive website [20].

It's interesting to bring in these perspectives to show that even with set results to a study, there may be different interpretations. Comparison studies like this certainly will not give cut and dried answers. There is not yet any outside method to validate an interpretation. Any result must be integrated in different frameworks and interpreted. And those from a DES background may very well do so differently than MPI practitioners.

By bringing in different perspectives, we hope to have demonstrated the utility of a collaborative approach, engaging researchers from different backgrounds. We do not have to agree on everything in order to test, compare, and learn from other methods.

And we all believe that not every difference in results denotes issues in validity. Methods have different scopes. DES looks at more fine-grained slices of time. MPIs look at experience unfolding over longer intervals. The scope of methods can shape acquired data as much as experience itself. In this way, observation becomes a co-construction between method and target phenomenon [36, 37].

FUTURE OF EMPIRICAL PHENOMENOLOGY

Horizons are open for methods to be refined and for experimentation to conjure up new methods. Emerging research is even combining elements from MPIs and DES. Oblak, for example, combined influences from both methods for interviews investigating experience during a visual-spatial memory task [41]. Springinsfeld conducted interviews inspired by the MPI method shortly after a target experience–aiming for interviews on the same day as a bulimic individual's vomiting episodes, to minimise retrospection demands [42]. Caporusso used DES-style beeps with an interview method hewing more closely to the MPI in order to

better understand sense of self and boundaries in daily life and compare this to experiences of boundary dissolution [43]. Co-author J.L. Bass-Krueger, adapted DES to a slightly wider temporal scope to investigate what is really meant by a 'moment' of experience [44]. Co-author E. Demšar currently integrates MPI with sampling of sleep-related experience according to the best-practice guidelines for dream reporting, as suggested in [45]. Critical methodological pluralism is important going forward. We must acknowledge different avenues of exploring lived experience, while questioning where exactly these avenues lead us.

We discussed previously how first-person research was missing from psychology. Headlines and funding centre on the neuroscientific and the behavioural. But we must remember that conscious experience is still central to this field. In clinical psychology, it is still paramount. And in research, it is usually inferred or assumed. As it becomes increasingly trendy to offer neuroscientific explanations, we cannot forget the importance of experience. For example much new research seeks neurological and biochemical biomarkers for psychiatric illnesses. Researchers hope to find brain scan results that are capable of making diagnoses. While this research is useful and some correlations have been found, there are not yet any clear biomarkers for diagnosing any psychiatric illness [41, 42]. Diagnosis still depends on questionnaires and conversations that focus on experience. Advances in first-person research then have much to add to the field.

So consciousness research needs to start staking its claim to validity. Within this context, different methods giving different results could still be an issue. There is not yet a fixed outside observable that can settle differences. Comparison studies are then needed to determine if differences come from differences in scope or in validity. Results then depend not only on observables but also interpretation, theory, and argument.

This is a bit of a knock in a field that's coming to favour the quantitative over the qualitative. But we must remember not only that quantitative analysis can be flawed (regarding the replication crisis and disciplines distorted by publication bias for instance [48]), but that it often relies on theory and argument that becomes implicit. We take for granted how much theoretical scaffolding lies behind the tools we trust.

For example H. Chang gives a book-length account of the development of the thermometer [49]. We trust these things enough that if we see 35 °C, we know it is time to put on that bathing suit and head to the pool. But to get to that point, we had to first rely on rough tools with no clear theory. Then set fixed points at boiling and freezing. Then form a theory of what exactly it was that we were measuring. Then go to great lengths to ensure this definition was not circular. Then test our instruments without relying on that very same type of instruments, and so on. Theory and measurement were developed hand in hand, often with one side lagging behind the other. Once a tool is established and trusted we forget how much 'qualitative' framework goes behind our trust of its 'quantitative results'.

Tools of empirical phenomenology are new, and still have a lot of work to do to gain trust. We should continue comparing them with common tasks to see which aspects they reveal. And each method needs to work on making its own claims to validity. Partnership with behavioural and neural-level third-person approaches can help. We can also follow what Petitmengin calls the "pragmatic validity criterion" [5; p.256] if results from these methods can help people. Methods can also be combined, and new methods created.

And importantly we need to stay skeptical yet open minded. Every new method or development should be questioned, but none rejected offhand. And any practitioner must admit the limitations of their methods. It's not yet possible, and may never be possible, to uncover every nuance of consciousness. But with the right attitude towards developing and refining methods, hopefully research on consciousness from within can become as central to the scientific project as it is to our own lives.

REMARK

[1]We use various terms here like lived experience, subjective experience, inner experience, and consciousness. These can have different meanings depending on context and some are preferred in certain discourse communities. In general, though, they aim at the same underlying phenomenon – that 'something that it is like' quality.

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APPENDIX

The full list of prompts used in this study:

1) A child holds an ice cream cone with three scoops. The ice cream falls onto the hot pavement.
2) A train moves through the countryside, past mountains. The sun shines through clouds.
3) A large fish chases a smaller one. The small one escapes.
4) A business woman rides an elevator. She checks her watch.
5) A candle flickers in a dark room. A person sits down in front of it.
6) A construction crew knocks down a building with a wrecking ball. It collapses.
7) An old lady in a wheelchair watches TV. A cat jumps onto her lap.
8) A man cooks onions in a pan. They sizzle.
9) Children run around a playground. A girl stumbles and falls on the grass.
10) Three children skate on a frozen pond. Birds chirp in the trees.
11) A boat sails over water. It rocks back and forth with the waves.
12) A waiter in a café walks up to a lady. He takes her order.
13) A group of friends cook a meal together. One of them tells a joke.
14) A woman puts a glass on the edge of a table. She puts down her bag.
15) A cat sits outside a shop window. It stares at its reflection.
16) Two friends meet in a park. They sit on a bench and start talking.
17) A whale swims to the water's surface. Its head bobs out of the ocean to breathe.
18) A flower blooms in spring. A bee lands on it.
19) A kettle full of water boils. A person takes it off the stove to make some tea.
20) A family gathers around the dinner table. The father starts serving food.
21) A girl sits on the bus. She takes out her headphones.
22) A scuba diver swims through clear water. He looks at bright coral.
23) A baby sleeps. It wakes up and starts crying.
24) A man looks at jewellery in a shop. He picks up a pair of diamond earrings.
25) A group of dancers performs. They are completely in synch.
26) A singer walks on stage. She grabs the microphone.
27) A boy checks his phone. There are no new messages.
28) A mother deer and her baby wander through the woods. They eat leaves.
29) A novelist sits in a bar. She orders some whisky.
30) Two cars drive down an empty highway. One pulls to the side of the road.
31) A photographer holds a camera. He presses the shutter.
32) An old man watches TV. He picks up the newspaper.
33) A storm cloud gathers over a city. A lightning bolt strikes.
34) A marching band marches through a town. The trombonist bumps into the drummer.

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