

Phenomenological Properties of Perceptual Presence

Supplementary Materials B: Research designs

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0. Introduction

In this supplementary material, we elaborate on the research design for each individual phase. These elaborations include aspects of research designs that are not essential for the understanding of the paper proper, but refer to methodological decisions that are commonly raised.

First, we use the term *phase* to refer to each individual part of the research project in line with the so-called *multi-phase approach* in phenomenological qualitative research (Kordeš & Klauser 2016). This approach is based on sequential phases of investigation in which an ever more detailed account of the phenomenon of investigation is produced in every subsequent study (for similar concepts in broader qualitative research, consider *theoretical sampling* and *sequential analysis*; Charmaz 2004; Flick 2009). Broadly, these approaches state that the processes of data acquisition and analysis take place simultaneously and they mutually inform each other. This allows for deeper insights regarding the phenomenon of investigation to emerge.

In this research project, we aimed at discerning the phenomenological properties of perceptual presence that are a) method-invariant; and b) amenable to being operationalized in an experimental research design. We employed three observational perspectives: engaged, near-ecological, and receptive.

The three perspectives were not decided on ahead of data acquisition, but their necessity emerged during the data analysis, as some categories were suspected to be (co)constructed by the method.

The methods differ along three dimensions: attentional perspective from which experience is observed, the style of interviewing, and the depth of detail of the interview. Each individual phase of the project employs a different attentional perspective. The first phase consists of an engaged perspective. Artistic practice was used to elicit a more in-depth understanding of the object of awareness (cf. Jaspers 1997). The second phase employed a near-ecological research design. Participants were prompted via their phones at random moments during the day to write down their experience. We use the term *near-ecological*, because:

- a) Participant had to report on their experience according to a pre-specified framework; and
- b) In comparison to a purely ecological examination of experience (Heavey & Hurlburt 2008, our sampling strategy biased participants towards the experience of sensory awareness.

The third phase employed a receptive, meditative perspective that seems to be the most common among contemporary first-person methods (e.g., Petitmengin 2006).

0.1. A note on the ordering of the phases

The order of individual phases of the study was not random. We started with the engaged approach. This was the initial method used as it builds upon the findings of Aleš Oblak (2020). Thus, it was known what the overall attentional phenomenology elicited by the task might be, as well as the optimal style of interviewing. However, in the commentary to Oblak (2020), Cory Kaneshiro and Russell Hurlburt (2020) have pointed out that an engaged task may elicit radically different phenomenology to an ecological investigation of experience (cf. Hurlburt et

al. 2016). As we identified a number of experiential categories that may have been (co)constructed by the contrived nature of the task, we employed the second phase of the study. The second phase consists of a near-ecological observational perspective.

Phase	Observational perspective	Rationale
PPPP-I	Engaged	Uses a similar research design to our earlier work; allowed us to make stable assumptions regarding attentional phenomenology and interviewing style
PPPP-II	Near-ecological	According to Kaneshiro and Hurlburt (2020), contrived tasks may bias what is experienced. We use signal-contingent experience sampling to account for the possibility that some aspects of experience were (co)constructed by the contrived nature of the task.
PPPP-III	Receptive	In PPPP-I and PPPP-II, we followed the theoretical sampling approach in our style of interviewing. It is claimed (e.g., Hurlburt 2011) that using such closed-form questions and mid-interview mental exercises may bias subjective reports. To account for that, PPPP-III uses an open-ended approach to interviewing (i.e., only open-form questions are admissible). Further, based on specific findings from PPPP-II, we account for the possibility that some subjective reports in PPPP-I are biased by the highly active and engaged attentional phenomenology associated with the task.

Table 1. Ordering of phases and its rationales

1. Epistemological considerations

In this subsection, we briefly discuss why empirical phenomenology was chosen as a methodological cornerstone of the study. This may be necessary as we deviate from the standard approaches to the study of perceptual presence grounded in philosophical analysis (e.g., Husserl 1997; Merleau-Ponty 2012; Sartre 2011). We defend our choice of method from two perspectives. First, reflecting on experience by examining only one's own experience (i.e., with a sample of one, so to say) may lead to partial theories. And secondly, traditional methods of investigation describe perceptual presence on the level of embodied experience, which may be the source of the difficulties with operationalization.

Perceptual presence is a construct that originates from philosophical phenomenology, namely, Edmund Husserl's (1997) monograph *Thing and Space*. We use the term *philosophical* phenomenology as opposed to *empirical* phenomenology. The former refers to a researcher observing their own experience and then using certain logical relationships (e.g., embodiment; see Abram 2017) to address the properties of phenomenal consciousness (Kordeš 2016). The latter, however, refers to a qualitative methodology (mostly based on interviewing data; Petitmengin 2006) wherein we inquire into lived experience; that is, concrete moments of experience as lived through by specific individuals.

Experience is always observed from a particular vantage point. This observational perspective then (co)determines the outcome of observation (Kordeš & Demšar 2018, 2019). For example, Mogi (2013) has investigated how authors of different scientific theories of meta-cognition experience meta-cognitive feelings. It turns out that the differences between theories can be partially explained by the differences in how their authors experience meta-cognition itself. Thus, rather than relying on our own speculations about the

phenomenological properties of perceptual presence, we recruit a larger number of individuals trained in observing and reporting on their experience to provide us with subjective reports. This is why we employ the methods of empirical phenomenology. Further, three different observational perspectives are used to minimize the probability that specific experiential categories are artefacts of an individual method.

The second reason as to why empirical phenomenology was employed has to do with the phenomenon of perceptual presence being articulated at different levels of description. Recently, perceptual presence has become of interest to neuroscience of consciousness (Seth 2014; 2015). However, other than rare attempts (e.g., Suzuki et al. 2019), experimental investigations of perceptual presence (i.e., research designs exploring causal relationships by means of dependent and independent variables) are scarce. Based on our own attempts at constructing such a research design, we suggest that current theoretical conceptions of perceptual presence are not amenable to experimental operationalization.

In cognitive science, we can distinguish between three levels of description of experience: *personal* (i.e., the level of experience); *sub-personal* (i.e., the level of neural mechanics), and *embodied* (i.e., the intermediate level of mappings between basic functions of the body and higher cognitive functions) (Noë 2015). Anil Seth (2014) proposes an account of perceptual presence on the level of description of embodiment through the notion of *sensorimotor contingencies*; that is, we experience those objects as veridical for which we possess sensory predictions in responses to some motor change.

Sensorimotor contingencies, however, need not be accessible to conscious reflection. It may be that part of the difficulties of operationalizing perceptual presence stems from theories about perceptual presence being articulated at different levels of description. Originally, perceptual presence was articulated on the level of experience, whereas now, it is being theorized on the level of embodiment. It may be productive to seek refinement for the concept of perceptual presence on the same level of description at which it was first articulated: the level of experience. We opted to investigate lived experience (i.e., experiential episode that happened to concrete individuals in specific moments) using interviewing methods.

2. PPPP-I:

In the first phase (coded as PPPP-I), we drew on naturalistic-laboratory neuroscience (Matusz, Dikker, Huth, & Perrodin 2019; Gozli 2020): rather than relying on contrived psychological tasks, we operationalized an everyday activity that relies on our phenomenon of investigation (cf. Frake 1982; Hutchins 1996). We operationalized a drawing task. Drawing has been previously used to explore a number of cognitive phenomena, ranging from long-term memory (Bainbridge, Hall & Baker. 2019), working memory (Oblak 2020), developmental phenomena, neurological impairment and parapsychological phenomena (Puglionesi 2016)), and the symbol-grounding problem (Steels, 2008). More broadly, much in the same way as psychological tasks use behavior as a performance measure today, Karl Jaspers (1997) writes that drawings can be used in the field of descriptive psychopathology. Further, it has been proposed (Haun et al. 2017) and demonstrated (Valenzuela-Moguillansky 2013) that drawing can be a useful instrument for gathering subjective reports. More than just a task that aims at eliciting the desired object of investigation (cf. Morrison et al., 2019), artistic practice provides a particular kind of understanding of perceived objects (Bleichmar 2012; Anderson 2017; Dupre

2015; Noë 2015). Based on findings from Oblak (2020), this perspective is highly engaged, attentive, constructive, and tied with constant stream of mental acts and gestures.

2.1. Participants

12 participants (nine females) gave their oral and written informed consent to participate in the study, have audio recordings of the interviews taken, and to verbatim quote our conversations. The participants had normal or corrected-to-normal eyesight. The average age of the participants was 26.7 (SD = 1.8). The participants on average had 19.1 years of education (SD = 1.8). All except for three participants had formal education in mind sciences (psychology, neuroscience, or cognitive science). The participants on average self-reported 67.0 hours (SD = 145.1) of experience with phenomenology. Because Study 1 uses a drawing task to investigate perceptual presence, data on participants' self-reported level of drawing skills was gathered: three were classically trained artists, six were hobby artists, and three had no significant experiences with drawing.

Recently it has been shown that individuals exert significant control over their own phenomenology (Dienes, Palfi, & Lush 2020). This so-called phenomenological control has been linked to a number of cognitive phenomena being constructed as demand characteristics (Lifshitz et al. 2013; Lush 2020; Lush et al. 2020). To control for the possibility that participants constructed aspects of their experience, their level of phenomenological control was determined using the *Sussex-Waterloo Scale of Hypnotizability* (SWASH; Lush et al. 2018). We defined suggestibility based on the data provided in Lush et al. (2018) where average SWASH score 2.67 (N = 418; SD = 1.23). We defined low suggestible participants as falling in range between 1.44 and 2.67; moderately suggestible as falling in range between 2.67 and 3.9; and highly suggestible as scoring 3.9 or higher. On average, participants' SWASH score was 2.07 (SD = 0.74), meaning that, on balance, participants were low-suggestible. One participant was moderately suggestible, scoring 2.97. Her data were removed from analysis.

Two participants were lost to attrition (one interview was conducted with one participant, and two interviews were conducted with another participant). Their data were not used in the analysis.

2.2. Materials

Participants were asked to observe and draw one of six possible stimuli. The stimuli differed on a theoretical basis in their degree of counterfactual richness. Typically, discussions of presence focus on subjectively veridical, three-dimensional, graspable objects. A distinction is then made between such subjectively veridical objects and imaginary objects (Husserl 1997: §4; Sartre 2010). Further, we wanted to observe the difference between subjectively veridical objects and two-dimensional pictures (cf. Marini, Breeding, & Snow, 2018). As a limiting case of perceptual presence, Anil Seth (2015) proposes the experience of observing the sky (cf. Haun & Tononi 2019). Finally, Alva Noë (2012: 22) offers a nuanced account of counterfactual richness: it is not only that the “perceiver’s movements produce changes in the character of the standing motorsensory relation; it must also be the case that changes in the object itself would manifestly perturb the character of the standing relation that the perceiver has to the object.” Phenomenologically marked character of perceptual presence of processes may be suggested by a number of conceptual metaphors, such as *problem is a body of water*; and *light is a fluid* (Lakoff, 1994). Thus, we aimed at disclosing the experience of processes as well; i.e., objects undergoing rapid change visible in time.

To reiterate, the stimuli were: a) a subjectively veridical, three-dimensional, graspable object (an apple); b) an imaginary object (a pear); c) a digitally-presented, two-dimensional object (a

hand, seen in Figure 1); d) a subjectively veridical background (blue sky on a clear day); e) a subjectively veridical predictable process (a stream of water); and f) a subjectively veridical unpredictable process (a wisp of smoke and/or flame).



Figure 1. Digitally-presented, two-dimensional object (a hand)

The interviewing sessions were conducted via video conference (Skype or Zoom). Interviews were recorded using Olympus WS-852 audio recording device. The SWASH test was administered online (Palfi et al. 2020).

2.3. Protocol

Data acquisition took place between March and June 2020. As the Covid-19 pandemic was ongoing, all the communication between researchers and participants was done through telecommunication or video conferences (Skype or Zoom). Participants were invited to six interview sessions. Participants were instructed to observe a randomly selected stimulus and draw it. As the interviews were conducted via video conference, the control over the stimuli was loosened (e.g., there is a variability in the types of apples the participants had at the ready). Participants were asked to copy or imitate the stimulus as closely as possible. They were allowed to do so to the point where they feel the drawing is complete. They were asked to observe their experience of the stimulus while drawing. When the participants informed the researcher that they had completed the drawing, they were guided through an in-depth interview on their experience. During each session, the participants were asked to draw the stimulus from three perspectives:

- a) the side that is facing the participant;
- b) the side that is turned away from the participant), and
- c) how they imagine the inside of the stimulus.

An interview followed the drawing of each individual perspective (except for the sky stimulus as the second and third perspective were deemed impossible by the participants).

The interview was structured as follows: First, the participants provided an initial overview of their experience. Then, the researcher guided the participants towards a more detailed report on all events they initially overviewed in a chronological order. Each event that occurred in participants' experience was explored in detail until its description was grounded in

- a) sensory experience;
- b) mental gestures;
- c) bodily feelings; and
- d) attitudes.

During the interview, the researcher guided the participants away from descriptions of folk-psychological theories (cf. Ratcliffe 2006), scientific theories about the mind, including references to phenomenological concepts, their beliefs about experience, and generalities. Throughout the interview, the participants were allowed to continually observe the stimulus.

Whenever uncertainties or difficulties in reporting arouse during the interview, the researcher assisted the participant by a) asking them to engage in mental exercises (e.g., prompting them to report by saying *if you imagine that I never experienced X, how would you describe it to me? Or If I asked you to teach me X, how would you instruct me to do that?*) and b) asking closed-form questions relating to experiential categories constructed during the process of data analysis (which was conducted in parallel with the data acquisition).

The interview was based on the *method of empathy* used in the field of descriptive psychopathology (Oyebode 2008). Both open and closed-form questions were used to inquire into experience. Throughout the interview, the researcher attempts to empathize with the participants. Summary statements (i.e., recapitulations of experiential descriptions) are used to check whether the researcher's understanding of the participant's experience is correct. If participants expressed discomfort regarding their experience (e.g., exclaiming that what they experienced is weird), normalizing statements were used (e.g., stating that others have experienced a similar phenomenon).

The final part of the interview were two direct queries: a) how do you experience the stimulus as being part of the world? (which aimed at recapitulating the experience of perceptual presence); and b) what is the volume of the stimulus? Then, concluding statements were used to ascertain whether all aspects of experience were inquired into, and to afford participants the possibility of expressing any reservations regarding their subjective report.

On average, the interviews lasted for 61 minutes (SD = 18 minutes).

2.4. Preprocessing of the data

In total, 63 interviews were conducted. First, interviews that were deemed of low quality were removed. Interviews were evaluated based on the extent to which participants were able to describe their experience in terms of sensory information, bodily feelings, attitudes, and mental gestures, and avoid descriptions of folk-psychological theories, scientific theories about the mind, including references to phenomenological concepts, their beliefs about experience, and generalities. In total, 10 interviewing sessions were removed all together. This includes participant PPPP-I-04 whose data was removed entirely.

Second, data from one participant (PPPP-I-03), whose SWASH score was higher than 2.67 (i.e., what we consider moderately suggestible) was removed. Further, another participant (PPPP-I-11) declined from taking the SWASH test and subsequently, his data was removed.

The admissible interviews were then transcribed verbatim (for transcription conventions, consider SM-A, section 2.).

During drawing, the aim was to make participants feel as comfortable as possible to minimize demand characteristics in the form of test anxiety. This, however, yielded drawing times of varying lengths. As extant phenomenological literature has shown that subjective reports are

heavily influenced by retrospection (Hurlburt 2011: Chapter 1), a more precise time frame had to be discerned. On average, participants spend 163.8 seconds ($SD = 176.6$) per perspective. Outliers, defined as drawing periods exceeding the mean by 1.0 SD , were removed. In total, 14 samples (i.e., subjective reports of drawing a single perspective) were removed.

Following the preprocessing of data (i.e., the removal of samples that were of low quality, individuals who were, on the basis of their SWASH scores, considered moderately or highly suggestible, and removal of the samples that fall too far outside of the normal duration), 90 samples were considered admissible (on average, 12.85 per participant). We obtained 33 admissible samples of the forward-facing perspective, 28 admissible samples of the occluded perspective, and 29 admissible samples of the internal perspective.

3. PPPP-II:

It has been noted that accounts of cognitive phenomena obtained from a laboratory setting markedly differ from accounts obtained in a naturalistic setting. To this effect, the second phase of the study (coded as PPPP-II) consists of a near-ecological investigation of experience.

3.1. Participants

Nine participants (six females) gave their oral and written informed consent to participate in the study, have audio recordings of the interviews taken, and to verbatim quote our conversations. The participants had normal or corrected-to-normal eyesight. The average age of participants was 27.55 ($SD = 3.4$). The participants had on average 20.2 years of education ($SD = 2.5$). All except for one participant had formal education in mind sciences. The participants on average self-reported 60.78 hours ($SD = 93.4$) of experience with phenomenology. Average SWASH score for participants was about 1.78 ($SD = 0.72$), meaning that all participants scored low on the scale of suggestibility. Two participants declined from taking the SWASH test. Their data was not used in the analysis.

Some difficulties in recruiting participants are to be noted. In total, four declined participation after the introductory session. In all cases, the reason was that they find the protocol too intrusive. This raises the possibility that only individuals with a specific personality structure are willing to participate in sampling studies.

3.2. Materials

Participants were sampled via a phone call. They were instructed ahead of study that when they receive the researcher's call, they are not to respond to it, but rather report on their experience immediately before the prompt according to a pre-specified template. The calls to the participants were randomized within the interval of time that was agreed upon a day before the sampling day. At any point during the sampling day, participants were able to contact the researcher and inform them that within a specific time frame, they will be unavailable, or that they wish to conclude the sampling day.

The template according to which the participants were to sample their experience consisted of the following elements:

1. *Description of the context:* This element does not constitute subjective reports. Rather, it amounts to the description of the objective properties of the situation in which the participants were sampled (e.g., what, if any, was the activity they were performing, were they alone or in a social setting, etc.)

2. *General description of experience*: A detailed description of the aspect of participant's experience that was most saliently present in their consciousness;
3. *Description of the visual field*: What, if any, was the experience that was present to the participant's consciousness in the visual mode. If visual experience was the most saliently present aspect of participant's experience (i.e., amounts to the *general description of experience* as specified above), they were asked to either restate it, or make it clear that this was the most salient aspect of their experience.
4. *Description of the mental space*: What, if any, was the experience of mental imagery that was present to participant's consciousness in the visual mode. If the content of the mental space was the most saliently present aspect of participant's experience (i.e., amounts to the *general description of experience* as specified above), they were asked to either restate it, or make it clear that this was the most salient aspect of their experience.
5. *Location of the mental space*: Based on the findings from PPPP-I, we inquired into where, if at all, in the field of their experience, the participants experienced their mental space.
6. *Association*: Based on findings from PPPP-I, we were interested in how, if at all, the participants experienced associations if and only if they were triggered by the aspect of experience that was present to their consciousness in the visual mode. Note, the association itself could be present to their consciousness in any mode.
7. *Empathy*: Based on findings from PPPP-I, we were interested in how, if at all, the participants experienced empathy if and only if they were triggered by the aspect of experience that was present to their consciousness in the visual mode. Note, the empathic experience itself could be present to their consciousness in any mode.
8. *Anomaly*: Does the participant find the sampled experience anomalous or deviant from how they understand their conscious life from their everyday life?
9. *Presence*: Is the aspect of experience that is most saliently present to participant's consciousness perceptually present? How do they experience that?

Participants were walked through each element during a preliminary session. They were given the opportunity to inquire into the specific meaning of each individual question, so that it was clear to them what these questions refer to.

The interviewing sessions were conducted via video conference (Skype or Zoom). Interviews were recorded using Olympus WS-852 audio recording device. The SWASH test was administered online (Palfi et al. 2019).

3.3. Protocol

3.3.1. Sampling

Data acquisition took place between June and October 2020. As the Covid-19 pandemic was ongoing, all the communication between researchers and participants was done through telecommunication or video conferences (Skype or Zoom). In an initial session that took place prior to the first sampling day, the researcher explained the nature of the study to the participants. The participants were given the opportunity to ask questions regarding the study. They were also given the freedom to drop out of the study at any point without any negative consequences. During the initial session, a mock sample was taken. The sample was not recorded.

The participants engaged in 6 to 8 sampling days (depending on their availability), each consisting of 5 to 7 samples (depending on their availability). No more than two weeks passed between two subsequent sampling days. Participants informed the researcher regarding the time interval (e.g., between 9:00 am and 10: pm) when they were able to participate in the sampling ahead of the sampling day. Within that interval 5 – 7 prompts were delivered to the participants via their phone. They recorded their experience according to the template outlined above in the section Materials.

If and only if they were able to record their experience *immediately* after the prompt, it was considered valid. After the prompt (and successful sampling), the participants informed the researcher whether the sample was valid. If, for whatever reason, the participants were unable to record their experience immediately after the prompt, the sample is considered invalid. The reason for the inability to record the experience was not inquired into by the researcher.

As a major consideration of the study (stemming from the difficulties in recruiting participants) was to make the sampling as unintrusive as possible, the participants were given the freedom to record their experience in any medium they found most comfortable. Three mediums were used: writing the experience down directly on their phone, writing it down on a piece of paper, and dictating an audio recording. The raw samples were sent to the researcher at the end of the sampling day. When the samples were written down by hand or recorded, the researcher digitized and transcribed them, respectively.

3.3.2. Follow-up interview

If the participants were available on the day after the sampling day, an in-depth interview was conducted via skype on one or two samples that were of particular interest to the researcher based on their subjective judgment. If the interview could not be performed within 24 hours from when the original sample was taken, no interview was conducted.

The style of the follow-up interview was the same as interviews from PPPP-I. First, the participants provided an initial overview of their experience. Then, the researcher guided the participants towards a more detailed report on all events they initially overviewed in a chronological order. Each event that occurred in participants' experience was explored in detail until its description was grounded in

- a) sensory experience;
- b) mental gestures;
- c) bodily feelings; and
- d) attitudes.

During the interview, the researcher guided the participants away from descriptions of folk-psychological theories (cf. Ratcliffe 2006), scientific theories about the mind, including references to phenomenological concepts, their beliefs about experience, and generalities. The interview was based on the method of empathy used in the field of descriptive psychopathology (Oyebode 2008). Both open and closed-form questions were used to inquire into experience. Throughout the interview, the researcher attempts to empathize with the participants. Summary statements (i.e., recapitulations of experiential descriptions) are used to check whether the researcher's understanding of the participant's experience is correct. If participants expressed discomfort regarding their experience (e.g., exclaiming that what they experienced is weird), normalizing statements are used (e.g., stating that others have experienced a similar phenomenon). Concluding statements were used to ascertain whether all aspects of experience

were inquired into, and to afford participants the possibility of expressing any reservations regarding their subjective report.

On average, the follow-up interviews lasted for 40 minutes (SD = 10 minutes).

3.4. Overview of data

In total, 266 valid experience samples were gathered (on average, 38 per participant). 36 follow up interviews were performed (on average, 5.14 per participant). Among the valid samples, 133 were detailed enough for phenomenological properties of perceptual presence to be discernable in them.

There is a possibility that providing participants with a framework of questions according to which to specify the samples biased their experience. In order to evaluate how generalizable the data are, provisional deductive coding was applied on the total pool of 266 samples. We followed the coding scheme provided by Christopher Heavey & Russell Hurlburt (2008). The study follows the principle of *pristine inner experience*, according to which the sampled experience is neither provoked in a laboratory setting or framed within a pre-specified framework. Rather, the experience is sampled in a purely ecological setting, and in the subsequent interviews only the aspect of experience that is in the forefront of one's consciousness is examined. In the study, the authors coded sampled experience in the following categories: *inner speech*, *inner seeing*, *unsymbolized thinking*, *feeling*, and *sensory awareness*.

To establish the generalizability of our data, we deductively fitted our data to those five categories as well. Table 2 presents the comparison of relative frequencies of experience between this study and the results from Heavey & Hurlburt (2008).

Form of experience	Relative frequency in PPPP-II	Relative frequency in Heavey & Hurlburt (2008)
Inner speech	13	26
Inner seeing	14	34
Unsymbolized thinking	4	22
Feeling	25	26
Sensory awareness	43	22

Table 2. Comparison of relative frequencies of experience between PPPP-II and Heavey & Hurlburt (2008)

We can see that *feeling*, i.e., the experience of emotion, remains stable across the two studies. *Inner speech*, *inner seeing*, and especially *unsymbolized thinking* are under-represented in PPPP-II. Conversely, *sensory awareness* appears in almost half of all the samples. A possible interpretation of these findings is that the focus on visual consciousness in our study prompted the participants to pay greater attention to experience that is presented to their consciousness in the visual mode. Therefore, we cannot claim to have investigated ecological experience. Rather, the term *near-ecological* is used to signal that a) the experience was sampled outside of a laboratory setting; and b) that the framework according to which we asked the participants to specify their experience is biased them towards *sensory awareness*.

4. PPPP-III:

In contemporary first-person research, many have argued that a meditative practice may be used as an instrument for exploring conscious experience (Depraz 2019; Kordeš et al. 2019; Petitmengin et al 2019; Markič & Kordeš 2016). Thus, Phase 3 (coded as PPPP-III) employs a meditative perspective. A subset of eight participants was invited to six interviewing sessions.

At each session, participants were asked to observe a different object with a receptive attitude, open attention, and without performing any mental gestures upon the objects.

Sequential analysis has been criticized as closed-form questions may preclude emergence of novel categories (Kanishiro & Hurlburt 2020) or unwittingly bias participants towards what they perceive to be the desired descriptions (Gozli 2020). To account for this possibility, Phase 3 did not rely on insights from Phases 1 and 2, and employed a completely open-ended approach. Further, we lowered the possibility of unwitting participant collaboration by only admitting data from non-suggestible individuals.

4.1. Participants

Eight participants (six females) gave their oral and written informed consent to participate in the study, have audio recordings of the interviews taken, and to verbatim quote our conversations. The participants had normal or corrected-to-normal eyesight. The average age of participants was 25.4 (SD = 1.4). The participants had on average 18.9 years of education (SD = 1.5). All participants had formal education in mind sciences. The participants on average self-reported 73.4 hours (SD = 133.1) of experience with phenomenology. PPPP-III employs a receptive, meditative perspective for the observation of experience. Skill with meditation may be an indicator of validity in such research designs. Thus, five participants regularly (i.e., on a daily basis) engage with contemplative practice (meditation, yoga, prayer), and three semi-regularly (i.e., at least once a week). Average SWASH score for participants was 2.35 (SD = 0.93). One participant ranked as moderately suggestible, and one participant ranked as highly suggestible. Their data was eliminated from the analysis.

4.2. Materials

Participants were asked to observe one of six possible items from a receptive observational perspective (defined as open attention and passivity of mental gestures). The objects were the same as in PPPP-I.

The interviewing sessions were conducted via video conference (Skype or Zoom). Interviews were recorded using Olympus WS-852 audio recording device. The SWASH test was administered online (Palfi et al. 2019).

4.3. Protocol

Participants were instructed to observe one of six possible stimuli with a meditative attitude, an open attention, and passivity of mental gestures. After a randomized period in the range between 163.8 and 340.4 seconds (based on the average drawing time from PPPP-I), they were stopped and prompted by the interviewer to report on what was present in their experience in the moment immediately preceding the prompt. Note, the relatively short amount of time was meant to equalize the observation period with PPPP-I. Our goal was further *not* to elicit a meditative state, as this would amount to an altered state of consciousness, and the goal of this study is to determine the boundary conditions of perceptual presence in normative perception.

Empirical phenomenological studies have reported that in meditative practice, individuals engage in a number of attentional and experiential gestures (Kordeš et al. 2019). Thus, it was impossible to construct a research setting that would elicit a complete passivity of mental

gestures. By comparison to PPPP-I and PPPP-II, this study contains the fewest participants. The reason for this is that recruitment proved challenging. Individuals who do not engage in contemplative practice were not able to observe the stimuli without performing any gesture. Thus seven individuals were recruited, however, they were dropped after the first session, and their data was discarded, as their experience of the research setup was too different from proficient meditators as to make the data incomparable. By comparison, participants who engage in contemplative practice regularly or semi-regularly, exhibited a pattern where they performed an initial gesture of attending to the stimulus. This gesture was never observed in the moment immediately preceding the prompt.

During the interview, the researcher guided the participants away from descriptions of folk-psychological theories, scientific theories about the mind, including references to phenomenological concepts, their beliefs about experience, and generalities. The interview was based on the method of empathy used in the field of descriptive psychopathology (Oyebode 2008). Only open-ended questions were considered admissible. Throughout the interview, the researcher attempted to empathize with the participants. Summary statements (i.e., recapitulations of experiential descriptions) were used to check whether the researcher's understanding of the participant's experience is correct. If participants expressed discomfort regarding their experience (e.g., exclaiming that what they experienced is weird), normalizing statements are used (e.g., stating that others have experienced a similar phenomenon). Each modality of participant's experience (visual, auditory, bodily, affective, social, and spatial) is explored in detail. Concluding statements were used to ascertain whether all aspects of experience were inquired into, and to afford participants the possibility of expressing any reservations regarding their subjective report.

On average, the interviews lasted for 42 minutes (SD = 6 minutes).

4.4. Overview of data

In total, 48 interviews were performed. All interviews (i.e., 12 interviews) from two participants were removed on account of their high SWASH scores. Audio recording of one interview was corrupted due to an audio error. In total, 35 interviews, each containing one sample of experience, were performed.

5. Analysis

The subjective reports were analyzed according to the *constructivist grounded theory* approach (Charmaz 2004). First, the interviews were anonymized and transcribed verbatim (see SM-A; section 2. for transcription conventions used). The removal of non-experiential data (i.e., descriptions of folk-psychological theories (cf. Ratcliffe 2006), scientific theories about the mind, including references to phenomenological concepts, their beliefs about experience, and generalities) followed. Further, instances of leading questions were removed. Instances where participants were not certain in their reports (e.g., when using expressions such as “maybe”) were removed. In transcripts from PPPP-III, closed-form questions were removed.

Following constructivist grounded theory, coding was the main instrument of analysis. Coding refers to the process of assigning a more general tag to sections of subjective reports that share descriptive similarities (Flick, 2009). Initially, line-by-line coding was used: in order to avoid bias, the analyst assigned a meaningful code to each line of transcribed and preprocessed text. Rather than a formal step in the analysis process, line-by-line coding was used as a means for the analysts to familiarize themselves with the data. For an example of line-by-line coding, consider Table 3.

Raw data	Line-by-line coding
PPPP-II-08 Well, it's as if this image is kind of unfolding. I do not have control over what I am seeing or what direction. It is going. I only have agency over the mantra that I am choosing to repeat. And then the visual aspect which accompanies it is happening by itself. Researcher: And do you focus on it? Do you engage with them with your inner seeing? PPPP-II-08 I do not engage with them, but I do focus on them. Researcher: What do you do to focus on them? PPPP-II-08 I shift my inner visual focus to elements of it. Like I, erm, at the beep, I was, I think, very concentrated on the heart area, and I was kind of zooming into the things that were happening there. Very much like actual seeing. Researcher: And so, you concentrating on the heart area, were you concentrating on the heart area of the silhouette or of your own body? PPPP-II-08 Of the silhouette when it comes to the visual [inaudible] Researcher: What do you mean by concentrating? PPPP-II-08 [Laughs] Erm, paying attention to details [pause] and just kind of [pause] selectively, erm [pause] I don't know absorbing the the [pause] erm, visual or imaginative information that was from that imagine. Researcher: What do you mean by absorbing the imaginative information. PPPP-II-08 As I said, it didn't contain any agency so it was just kind of the observation of the image. And just, you know, like me, erm [pause] devoting my attentional capacities to it.	Unravelling Active Unravelling Passive CQ CQ Focus on the image OQ Shifting visual attention Zooming into Zooming into CQ CQ Visual focus on the imagery OQ Discerning details Discerning details Discerning details Discerning details OQ Passive agency Discerning details Discerning details

Table 3: An example of line-by-line coding

After line-by-line coding was completed, the data were evaluated for conceptual depth (in older literature also referred to as saturation): i.e., determining whether enough high quality-data were gathered to allow for theory-construction. A saturation grid was employed. A saturation grid refers to a tabulation where columns represent participants, and rows represent experiential categories. First and second occurrences of categories are noted in the cells. The saturation grid demonstrates a convergence towards a point where no new categories emerge, and additional interviews are therefore unnecessary. We modified the saturation grid approach to estimating conceptual depth by ranking our participants according to their SWASH scores. Experiential categories were primarily induced from low-suggestible individuals. Data from participants who were still low-suggestible but scored higher on SWASH was then fitted to those categories. Following the least suggestible participant in PPPP-II, no new categories were induced.

The main part of the analysis consisted of inductive coding: more general tags were assigned to larger sections of the transcribed and preprocessed data based only on the properties emerging from the text, rather than deducing them from the literature. During inductive coding, a number of categories unrelated to our research goals emerged. These were not subjected to further analysis (for a justification for the removal of each individual category, consult SM-C: section 5.).

The final step of analysis consisted of constructing a codebook (cf. Kordeš et al. 2019; Oblak 2020; Schwartzman et al. 2020). In qualitative research, a codebook is an instrument that

- a) makes the analysis process tractable;
- b) provides independent researchers a guide for coding similar types of data; and
- c) organizes the data by constructing meaningful relationships between the categories.

In the codebook, each category is defined by: a) a name; b) a definition; c) examples; d) potential sub-categories; and e) potential commentaries (where specific differences between

similar categories are explained). In SM-B, preprocessing is explained for each study individually, and the codebook was constructed jointly for all three studies. As the goal is a comparison across the studies, the same coding system had to be employed. An example of a codebook entry follows:

Fractal structure of information

Definition: Objects of awareness that are judged to be perceptually present have, in experience, the property that they possess fractal structure of visual information. By this it is meant that the object appears inexhaustible in the observer’s awareness. No matter how long she observes the object, there is always new information that can be discerned, either by paying closer attention to the details, or changing the focal point. By contrast, objects that are judged not to be perceptually present (e.g., imaginary objects) appear to have a limited amount of information that is available. Most notably, mental imagery has a finite level of detail inherent in it. In order for further details about the object of awareness to become apparent, the individual has to reconstruct the object, rather than observe it in more detail.

Examples:

Mental imagery VS. subjectively veridical object: The visual imagery of, say, the memory of me taking the apple from the fridge was still visual, but it was more pathetic in comparison to how it actually is. [...] It doesn't have that many details. It has less contact. It is not as present as it is when actually looking at the apple. In a way, it is like an after-image. [...] In the memory, it does not stand out as much. The colors don't pop as much. [...] And also, this mental image doesn't have as strong three-dimensional feeling. The real apple kind of stands out from the environment and the environment itself stands out much more than anything stood out in the memory. [...] The objects are somehow more whole. They carry more meaning. So, if I compare them to the memory, I can poke it, and approximate fragments of a shopping bag appear. And now I have to dig into it more, and a second apple appears. And if I dig further, there is the shelf. I have to invest additional things into the imagery in order for details to appear. Whereas here, the details are already out there for me. [...] When I actually look at the apple, the difference is huge. I don't need to poke it in order to see it better. In order to have more color or shape or three-dimensionality. And there are no hints to it as to what more it could be. It just is something. [...] It is something in all its visibility, in all its visibility. (PPPP-I-06-03)

Commentary: While the focus here is primarily on the visual modality, the *fractal structure of information* seems to apply to other modalities as well. One participant, for example, reports on the poverty of tactile and gustatory information obtained from the mental imagery of the pear:

Anything I imagine is not as good. There is not enough information. I can imagine music, but it will never feel as if I experience it with my body as well. There are no vibrations, and I don't actually get anything from it. It is not as good. I can imagine the taste of the pear, but it will not be as good as if I actually bite into it. It lacks something. [...] I can't fill it up enough with my imagination. I can't imagine all the details at once. And so it lacks magnitude. It's like imagining dreams to an orgasm. It is not real. You can feel it is not real, because something is missing. (PPPP-I-01-01)

To ensure the validity of our coding process we further employed *intercoder verification*. This refers to checking whether two independent coders reached the same types of codes on the same subset of data. To this effect, the codebook was agreed on by the two principal coders, and the entirety of the gathered phenomenal data was subsequently subjected to the same codebook.

6. References

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