Perceptual Presence as Enactive Inference

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> Abstract • I reflect on the notion of lived space and affective resonance as discussed in the target article in the light of the theory of active inference. Interpreting perceptual presence as a form of enactive inference could link the findings presented in the article to a richer theoretical framework that allows for quantitative modelling and neurophenomenological extensions of the present study design. Implementing mutual constraints from complementary neurological or behavioral data could validate or adapt the categories derived in the article.

« 11 » Neurophenomenological methods aim at closing the explanatory gap between phenomenological data of subjective experience from the first-person perspective and neuroscientific or behavioral data from the third-person perspective (Varela 1996). Aleš Oblak, Asena Boyadzhieva and Jure Bon elaborate on the different stages of their study design, which investigates multiple facets of the experience of perceptual presence. While mentioning their neuroscientific inspiration briefly (§13) they leave open what quantitative measures could be used to further evaluate their conclusions. Neurophenomenology envisions the enrichment of both neurological and phenomenological data by *mutual constraints* between these complementary perspectives (Olivares et al. 2015). Constraining the acquired experiential data with novel neurological data and vice versa would provide a deeper description of the phenodynamic structure of perceptual presence.

« 12 » Even though the authors' study design is clearly explained and builds on important work in empirical phenomenology, the following question remains unexamined: How can neuroscientific and behavioral data be integrated to validate the proposed categories of perceptual presence in a quantitative manner? Q1 Adding a third-person perspective to the categories derived from the gathered experience samples would reduce the ambiguities involved in coding transcribed data and test the reproducibility of the findings given the small sample size of 8–12 participants (§§14–16). For example, studies on the rubber-hand illusion include measures of skin conductance response and fMRI to investigate the neuronal activity during a period of experiences of agency and ownership of a dummy hand (Limanowski & Blankenburg 2013). Comparing experiential and physiological measures can then be used to correlate brain activity and subjective experience, which would help to identify phenomena that are generalizable to other participants. Given the authors' expertise with EEG, the design could be similarly extended by a third-person perspective during the experience of perceptual presence to complement the phenomenological interview data.

« 13 » To derive concrete, quantitative hypotheses from the sampled experiences, computational modelling would additionally be useful to interpret the categories of perceptual presence from an enactive perspective. In their paper "A Tale of Two Densities: Active Inference Is Enactive Inference" Maxwell Ramstead, Michael Kirchhoff and Karl Friston (2020) describe the computational model of active inference as compatible with enactivism and present a possible quantitative description of enactive processes. Oblak and colleagues situate themselves in the enactive perspective. They refer to Evan Thompson saying "scientific knowledge of the mind should be based on the direct access we have to the world" (§68), but they miss the opportunity to formulate a computational model and to derive quantitative hypotheses from their findings for follow-up studies. A computational theory of perceptual presence would not only make many implicit assumptions explicit, since computational templates make limitations of scientific theories visible (Humphreys 2002), butwould also enable thorough testing of the conclusions drawn from experiential data. Such an iterative application of mutual constraints between neurological and experiential data is what neurophenomenology envisions to close the explanatory gap.

« 14 » The investigation of perceptual presence is a fitting objective for phenomenological interviews, but Oblak and colleagues do not present any explicit hypothesis for follow-up studies that could validate their experiential categories. For example, the derived category of structure of lived spaced is described as "how space is organized in and around an object of perception" (§38). This is further explicated in the sense of Maurice Merlau-Ponty (§39) and leads the authors to find a "solidity of space" as described in phenomenology. By continuously adapting the questions asked in the interview to the participants' reports, it remains unclear how the authors' assumptions about what to find in the experiential data construct the categories that have been derived from subjective reports. To avoid circular reasoning in the analysis of the findings, it would be helpful to evaluate the significance of the acquired category again, in a different task or with a neurological or physiological measure, such as EEG or skin conductance response. Concrete testing of the findings presented in the article could also cast light on how these categories can be generalized to cover a diversity of different people and socio-cultural backgrounds, or whether there are specific experiences that are not shared across the participants.

« 15 » Similarly to the structure of lived space, the category of affective resonance is presented as a fundamental property of perceptual presence (§56). The notion of affective resonance goes back to Martin Heidegger's description of presence-as-absence, or the perception of something if the object does not fit the predicted behavior (§56). From the point of view of radical predictive processing and active inference (Clark 2015; Friston et al. 2015), one could reframe this negative description of fundamental experiential processes and think about what role perceptual presence plays in interaction. Instead of claiming that we only consciously perceive things if they do not follow our expectations, active inference enables us to identify this prediction as a prior that helps to plan more complex actions and to develop novel policies. Contrary to presence-as-absence, meditation, mindfulness and other cultural practices demonstrate how perceiving automatic and fully functioning bodily processes, such as breathing and looking, in open awareness, can help us deal with stressful situations without caring about a Heideggerian lack or absence that we must attend to.

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« 16 » The points made about the structure of lived space (§38) and affective resonance (§56) show that active inference or related approaches could not only extend the authors' approach from a quantitative perspective but also improve the enactivist interpretation of their findings. This leaves me with the following question: Do we have to understand the structure of lived space and affective resonance as fundamental properties of subjective experience or can we explain them as priors of the participants constructing the notions in enactive inference? Q2

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Vividness, Conceptual Knowledge, and Perceptual Presenting

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> Abstract • I focus on two observations made in the target article, wherein certain aspects of the phenomenology of perceptual presence are contrasted with the phenomenology of mental imagery. I offer additional context in light of the so-called mental imagery debate, provide additional empirical support for the mentioned observations, and identify what might be a blind spot in the research design presented by the target article.

« 1 » In order to better understand the phenomenology of perceptual presence, it can be useful to examine its negative space – i.e., the phenomenology of that which is not perceptually present. In particular, keeping in mind that perceptual presence is defined as pertaining to the observer-independent world as opposed to our imagination (§1), visual imagery[1] is an appropriate (and popular) candidate to contrast with the perception of physical objects (also referred to as "subjectively veridical" by Aleš Oblak, Asena Boyadzhieva, and Jure Bon). Indeed, in their target article, they themselves juxtapose and compare the two on several occasions. However, some of these comparisons are made in passing and warrant elaboration. In particular, I focus on the following two observations made by the target article:

A Physical objects are experienced as more vivid in comparison with mental images, while mental images tend to be richer in conceptual knowledge (§36).

B While both physical and imagined objects are characterized by a fractal structure of detail, in the case of physical objects, the detail is experienced as discovered, whereas in mental images, the detail is experienced as constructed (§§28f).

« 2 » First, I provide context that shows why observation A is important for the ongoing discussions involving mental imagery and what contributions the target article and other empirically phenomenological studies bring to that debate, specifically on the relationship between vividness and contextual knowledge in mental imagery. Then I focus on and conclude with observation B, and how it, together with Evan Thompson's (2007) account on visual imagery, emphasizes the importance of understanding our mental acts if we want to understand the phenomenologies of both visual imagery and perceptual presence.

« 3 » Observation A is relevant for the mental imagery debate, which concerns itself with the central question, put simply, of whether mental imagery is more akin to seeing a picture with the mind's eye, or whether it is rather a propositionally stored description of a picture. The pictoralist view maintains the former, while the descriptionalist view insists on the latter (for a summary see Kind 2006 or Thompson 2007). The authors of the target article have already identified that their subjective reports do not quite line up with pictoralist conceptions (§36), though, upon closer inspection, we shall see

1| Visual imagery is also referred to as mental image(ry) or imagined object (manifesting itself in a visual manner).