

Review of: "On the Meaning of Psychological Concepts: Is There Still a Need for Psychological Concepts in the Empirical Sciences?"

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Potential competing interests: No potential competing interests to declare.

Psychological concepts and active inference

This multifaceted analytical paper aims at bridging the gap between philosophy and cognitive neuroscience. Specifically, the paper addresses the role of psychological concepts in the empirical sciences. The author sets off by asking why psychological concepts could be needed in philosophy when the mainstream of sciences seems to explore only physical phenomena. The author's argument focuses on three major aspects and is substantiated by a good deal of pertinent references.

First, the major claim of the author is that people become aware of a mental image or memory through introspection. He states that only external behaviour of subjects and the circumstantial conditions are directly observable, while the minds of other people and their psychological processes and phenomena are not. Although the author concedes that introspection is not suited to reveal how these psychological entities arise or what they are in essence, he posits that researchers reach their insights by comparing what they observed in others with their own experiences. Accordingly, the author suggests that empirical psychologists and cognitive scientists rely on the conscious observation of their own psychological phenomena when, for example, they are judging their perception of other subjects.

Second, the author highlights that humans have the concept of introspection because they have the ability to introspect. Also, the author states that the concept of introspection has a meaning and that psychological concepts are meaningful because they refer to existing psychological phenomena. In his view psychological language is necessary to describe psychological phenomena. Moreover, a person becomes aware of the meaning of a psychological concept through introspection that is supposed to result from brain activity.

Third, it is emphasized by the author that we believe in the existence of other people's psychological processes because we are aware of our own psychological processes. He explains that this notion will lead to a challenging contradiction, namely that when people refer to the concept of introspection, they are talking about something that is in the world. However, the meaning of the concept of introspection is an internal psychological phenomenon within a person. Accordingly, neither is external behaviour equivalent to the meaning of psychological concepts, nor is the meaning of psychological concepts equivalent to physical brain states. Therefore, psychological concepts are useful in interpreting and explaining the behaviour of others, because we cannot directly perceive other minds, but only indirectly deduce other

people's intentions from what we perceive of their body movements and physical actions.

On this background five points of discussion arise. First, information processing in the nervous system has been assessed with neurophysiological methods concerning, for example, vision, audition, somatosensation and motion, etc. There is a huge literature about the neurophysiological and neuroanatomical properties of the sensory receptors and pathways in the peripheral and central nervous system for the different modalities. Functional neuroimaging and electrophysiological methods have opened avenues to explore the brain systems allowing for neuropsychological processing (Toga and Maziotta 2000). More advanced and high resolution anatomical techniques now provide means to explore the connectivity of the brain circuits related to highly differentiated aspects of neuropsychological processing (Axer and Amunts 2022). As will be shown in the following, the author is correct that neuropsychological processes are mainly about how a person interprets a sensation from the environment including objects, events, and narratives.

Second, what is known in cognitive neuroscience about perception? There is a broad literature concerning the fundamentals of perception that to acknowledge will exceed by far the limits of this review. But, a few aspects shall be described here. Perception of objects and events in the environment is a fast process as was shown for example in vision (Sharan et al. 2014). This enables subjects to react promptly and adequately upon events in the environment, actually, before they become aware of them. Because our perceptions typically reflect our environment in a probabilistic, but reliable fashion, people are justified to trust them (Brashier et al. 2017). Furthermore, people are in the situation to interact uncountable times each day with other people of their own group and of other groups. To be able to react adequately, humans have to recognize the meaning of events in the environment and other people's actions (Seitz et al. 2017). Such subjectively plausible interpretations of other people's intentions have been shown to occur efficiently by means of empathy and theory of mind via the mirror neuron system (Bird & Viding 2014). Notably, our perceptions are not neutral but loaded in a pre-linguistic fashion with subjective cost/benefit or effort/reward estimations in the sense of "what does it mean to me?" (Seitz et al. 2009). This includes meaning making in global and situational terms (Park 2010). Drawing on the free-energy principle, Friston (2010) proposed that optimization of value, i.e. predicted benefit and reward, enables humans to generate appropriate behaviour in the ever changing environment.

Third, what makes introspection so particular that it has enjoyed such a profound tradition in philosophy? Introspection has been considered as the process of examining or to be concerned with one's own thoughts, feelings and motives (Oxford Advanced Learner's Dictionary 1992). Thus, introspection is apparently the counterpart to exteroceptive perception of information in the environment. In fact, by introspection humans can become aware of their momentary affective states such as being angry, happy, hungry, thirsty or satisfied. Furthermore, following the argument of the author, introspection seems to afford the examination of one's own thoughts and feelings. To accomplish this interoceptive function, however, introspection requires conscious awareness of the given subject concerning the information that he/she is processing. Nevertheless, introspection is fallible as the authors states. This is most likely the case because neural activity evolves in the range of milliseconds as stated above, while conscious awareness requires some hundreds of milliseconds to become manifest. Thus, introspection is limited to those neural processes that persist in a necessarily continuous fashion over extended episodes of time as, for example, affective states. In consequence, people become aware of facts and events in

the environment and of their own states only in a reflective fashion (Wegner 2003).

Fourth, because interoceptive and exteroceptive perceptions are probabilistic and essentially subjective, they have only some degree to be correct. Therefore, it is suggested that active inference rather than introspection denotes the psychological process by which such conclusions are reached. Inference is based on multiple observations and reasoning (Oxford Advanced Learner's Dictionary 1992). One may become aware of inferred conclusions by inductive and logical reasoning and, consequently, can develop them into conceptual beliefs (Seitz et al. 2023). It is important to realize that inferred conclusions may be modified by new information or observations. The neural representations in the brain that mediate active inference have been modelled within the framework of parallel circuits linking cortical and subcortical neural assemblies (Friston et al. 2017). Such inferences have a first-person perspective when they are concerned with one's own states or actions (Oakley and Halligan 2017). Importantly, however, inferred conclusions may concern also the mind-set of other people involving a third-person perspective.

Fifth, inferred conclusions are not concepts. Concepts are abstract ideas resulting from neuropsychological processing. This includes creative thinking whose non-verbal results may be expressed as musical melodies, artworks or technical inventions. Furthermore, a person may become aware that a concept has occurred to him/her and may say: "Listen, I have an idea". In contrast, one cannot be certain that another person has developed a concept or idea personally, even if he/she claims it. Again, this is because concepts are internal accounts that cannot be accessed directly from outside by others. In fact, a person who claims to have come up with a concept or idea may be mistaken thinking that he/she brought up a new idea, while in reality the person rather may have recalled what he/she heard previously but is not aware of (Wegner 2003). Also, it cannot be excluded that a person may want to deceive other people by pretending that the concept or idea is his/her own product. Importantly, however, psychological concepts describe brain functions such as perception, valuation, introspection, interpretation, inferring, and action on a meta-analytic level of analysis (Seitz et al. 2023). They rely on verbally communicable definitions similarly to conceptual beliefs, for example about one's own autobiography, political and religious issues or the virtues of Antiquity, and may motivate people's behaviour. This accords with the author's statement that we use language as a vocabulary to communicate inferred conclusions and internally generated concepts. Thereby, they can in principle become objects for verification or falsification by people's behaviour or by empirical testing.

In conclusion, there is agreement of the author's philosophical and the presented cognitive neuroscience approach that acknowledges the different domains of

- external behaviour that can be observed directly,
- psychological processes that are brought about by neural activity in the brain and can be inferred from a person's behaviour, and
- psychological concepts that are internal brain products and cannot be accessed directly but may be communicated as narratives.

In fact, there seems to be interdisciplinary agreement to consider psychological concepts as meaningful realities that are suited to understand both people's intuitive and controlled behaviour.

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