



# A symposium on *Thinking and Perceiving*: On the malleability of the mind

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Accepted: 7 May 2023 / Published online: 12 September 2023  
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## Abstract

This is a symposium on *Thinking and Perceiving*, a single authored monograph that argues that thought not only affects sensory perception, but sometimes improves it, and sometimes to the point of epistemic virtue. The case for these claims is empirically grounded, with special emphasis on studies on perceptual expertise. The symposium includes an introduction by the author, and three critical commentaries, concluding with a reply by the author. The discussion is wide ranging, including: attention, cognitive penetrability or perception, the modularity of mind; computational analyses of mind, imagination, imaginative skill and expertise; theory-ladenness of perception; objectivity; perceptual content and perceptual success.

**Keywords** Perception · Cognition · Perceptual expertise · Cognitive penetrability · Modularity of mind · Epistemology of perception

## Introduction

In certain quarters of philosophy of mind, the modularity of mind continues to be an orthodoxy. A related debate concerns whether cognitive states like belief or desire or intention influence, in some important way, perceptual experience. The strong modularist maintains that this influence rarely if ever occurs. Perceptual processing is *informationally encapsulated* and therefore *cognitively impenetrable*. *Thinking and Perceiving* attempts to shift scientific and philosophical theories of perception away from that orthodoxy towards *malleability*.

Theorists challenge modularity with a case or an empirical study where it appears that cognition is affecting perception and argue that the data is best explained in terms of *cognitive penetration*, rather than as a mere *intra-perceptual* effect, an effect on *pre-perceptual attention*, or an effect on *post-perceptual* cognitive states such as judgment or belief. There have been some promising

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putative counterexamples in recent years but suffice it to say that the debate remains largely unmoved. This of course depends on who you ask.

If you ask me, I think we have good reason to move past this debate, and I attempt to do so in the *Thinking and Perceiving*. But not before I make the case that modular theories fail. The first way I do this is familiar, and it's the approach that I have taken in the past: provide empirically grounded counterexamples to the alleged informational encapsulation of perception. I attempt to shed some new light in a couple of ways. Attempts to define cognitive penetrability as such have largely failed and result in unhelpful theoretical cross-talk. In place of a "real definition", we should characterize the phenomenon in terms of its consequences. Thus, " $\psi$  is cognitive penetration if and only if  $\psi$  is a cognitive-perceptual relation, and  $\psi$  implies consequences for theory-ladenness or the epistemic role of perception or the behavioural role of perception or mental architecture" (106). I also argue that the modularists' standard take on attention-mediated instances of cognitive influence on perception is oversimplified. There are plausible cases where cognition influences covert selective attention—such as *feature based* and *object based attention*—and whereby this in turn influences conscious perceptual experience. This yields two distinct arguments for cognitive penetration.

I then pivot to the second approach: largely abandon the debate about modularity and cognitive penetration. To justify this shift, I argue that modularity does not deserve the status of default theory for the architecture of perception. This *default position assumption* is made by theorists on both sides of the debate, as evidenced by the pattern that pervades the cognitive penetrability literature. Opponents to modularity argue that a case violates modularity; proponents then deny that violation and maintain that modularity survives. Repeat. It is in this way that I think modularity (and cognitive penetrability) continues to be a litmus test for interesting cognitive influence on perception. For modularity to be the theory against which an alternative theory must position itself, that theory must be supported either by strong arguments or by superior explanatory power. Modularity enjoys neither. I first defend this evaluation by criticizing the clearest and most formidable arguments for informationally encapsulated perception.

The rest of the book then makes the case that a malleable architecture better explains a large range of recent empirical studies and data concerning *perceptual expertise*. Perceptual experts skillfully perform in a specific domain of training, their performance success is above a threshold set by the standards of that domain, and their performance non-trivially involves sensory perception. Such experts have been studied across a wide range of domain, from radiology to ornithology to fingerprint examination to elite athletics. Researchers use a range of behavioral, physiological, and neurological measures. The best explanation of many of these phenomena is that the expertise is partly resident in the perceptual experiences of the expert, and those perceptual differences (by contrast to novices or the naïve) depend upon the richly cognitive training of the expert.

It is in this way that I support the claim that thinking affects perceiving (the *TaP thesis*), and in many cases thinking improves perceiving (the *TiP thesis*). The *TaP thesis* divides into two architectural claims: (1) Some cases of perceptual expertise are genuinely perceptual, insofar as they involve differences in perceptual

experience, and (2) those perceptual differences are sensitive to the cognitive learning specific to the domain of expertise. To support the first claim, studies on expertise show robust similarities with facial recognition (an undeniably perceptual phenomenon), where experts display standard behavioural and neural markers. Experts enjoy rapid and often “automatic”, successful performance and display significant differences in eye movement patterns. And they enjoy advantages in visual short-term memory. This convergence of data is best explained perceptually. And those perceptual differences depend upon the cognitive etiology of the expert; this is the second architectural claim. Experts’ performance success, and persistence of that success, varies with fine grained learning of concepts and categories, and those changes are corroborated by lasting neural changes. Accordingly, mere “practice” or exposure to relevant stimuli is often insufficient for expert performance. And these skills tend not to “transfer” to similarly complex tasks in domains outside of the expert’s field. Perceptual experts are, genuinely, *perceptual experts*.

If one is compelled by these claims and their support, then the epistemology follows easily. Within a domain, perceptual experts approach optimality, performing reliably, rapidly, and with less distraction. This is another another important shift in the book: an emphasis on cases of expertise is an emphasis on cases of cognitive improvement of perception (by contrast to the cases of cognitive detriment that populate the cognitive penetration literature). And so later in the book I argue that this successful performance, *qua* performance of the agent, is best understood in virtue-theoretic terms. This requires that perception can genuinely improve, and not merely as a matter of normal development or exposure to stimuli. Some experts acquire, through cognitive training, through deliberate activity, a skill. The expert radiologist performs better visually because of what she has done, because of her actions, as a responsible epistemic agent. As a consequence of this training, her perceptual systems perform in exceptional ways within that domain. And those levels of performance near maximally satisfy the natural norms for perception, thus fulfilling the representational function of perception. The important epistemic difference between this case and the cases of mere development or exposure is that the agent is herself clearly responsible for the relevant etiology and, accordingly, for the perceptual improvement. The epistemic virtue is therefore attributable to the agent herself. In cases of expertise, thinking thus improves perceiving.

The TaP and TiP theses are the basic descriptive and normative components of a malleable architecture. Important lessons for a number of philosophical issues follow, including: perceptual content and accuracy, admissible contents (and aesthetics), theory-ladenness and social perception, epistemology and virtue, understanding, and views of the self. And because the phenomenon is pervasive, the lessons generalize. Although the perceptual experts studied are remarkably accomplished, they are not super-humans. All humans are habit forming and many of those habits involve perception in non-trivial ways. We are all of us potentially perceptual experts and in a variety of contexts. To accept this kind of malleability is, I think, to better understand ourselves and our place in the world.

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