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SYMPOSIUM

Précis of "Cognitive penetrability and the epistemic role of perception"*

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SINCE THIS BOOK EXTENDS A research program that started almost 22 years ago, it would help the reader to start this precis of the book by reiterating the pivotal theses put forth before the publication of this book. The first thesis is that early vision, the first stage of visual perceptual processing, is cognitively impenetrable (CI) and conceptually encapsulated. The second is that some perceptual content is nonconceptual if and only if it is the content of CI states. The third thesis is that late vision, the second stage of perceptual processing, is cognitively penetrated (CP stands henceforth for cognitive penetrability) and involves hybrid contents, that is, it contains states that have both conceptual and nonconceptual content.

Early vision is defined functionally and not neuro-anatomically, since both early and late vision engage largely the same neuronal visual areas, albeit in different time-frames. Early vision involves feedforward processes, lateral processes, and recurrent processes that are, significantly, restricted to visual areas and exclude signals emanating from cognitive centers. Early vision lasts for about 120-140 ms. after stimulus onset; its output is situated both at the subpersonal and personal level. Finally, late vision receives as input the output of early vision, which it processes in the light of cognitive signals that it engages in global recurrent processing. Its role is identifying objects and categorizing them, although some sort of initial, perceptual, categorization occurs in early vision.

In all these themes the notion of CI was left largely underdefined since I followed the broad view of CP as the influence of cognitive information on perceptual processing adding the qualification that a cognitive effect on perception should be deemed as a genuine case of CP if and only it is on-line or direct, so as to exclude indirect cases that affect perception either before the onset of perceptual processing or after its termination. Since then, however, many colleagues have discussed CP in illuminating ways and contributed valuable insights on both its meaning and its epistemic role in perceptual processing. Moreover, a wealth of new empirical evidence concerning perceptual pro-

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cesses and their timing have emerged that, occasionally, seemed to suggest that cognitive influences on perceptual processes can take place very early on, undermining the thesis that early vision is CI. This book mostly aims to address these issues.

I have often related CP to the impact of cognitive effects on the epistemic role of perception when trying to answer the question as to why certain sorts of cognitive influences are not cases of CP, but I never attempted to link this concern to the view that CP presupposes direct influences on perception. To do all of these things, one first needs to discuss the epistemic impact of cognition on perception. In Chapter 1, I undertake a critical appraisal of the discussion thus far, examining in detail the main views of supporters of the two main camps, namely internalism and externalism. For internalists, the justification of perceptual beliefs by perception is independent of truth-related factors. Externalists, in contradistinction, argue that perceptual justification is tied to externalist, relational factors that are truth-related. The disagreement follows mainly from a difference about the content of mental, in general, and perceptual, in particular, states.

For the internalist, perceptual content is inherently intrinsic to the viewer and does not constitutively depend on the viewer's relation to the environment. The latter is causally implicated in the formation of this content, but environmental information *per se* is not contained in this content. Internalists think that the evidence on which a perceiver bases *prima facie* a perceptual belief, or the reasons perceptual experience provides a perceiver with the perceptual belief caused by the experience, consists in the way the experience presents the world as being to the perceiver that is, in its phenomenal character. It follows that the justificatory potential and force of a perceptual state (that is, the range of perceptual beliefs this state can justify, and the degree to which is does so) depend solely on the phenomenal character of the experience; this sort of evidence is called phenomenal evidence.

For externalists, perceptual content is inherently extrinsic, in that it constitutively depends on the viewer's relation to the environment at the time of the viewing act. For some externalists, the representational content of perception includes both phenomenal content, which is the phenomenal character (or part of it) of the relevant perceptual experience, and also a different kind of representational content, let us call it externalist content, which depends constitutively on the perceptual relation of the viewer to the external world.

For the internalist, cognitive effects on perception may have bad epistemic effects that lead to ill-founded perceptual beliefs because they may engender an irrational etiology of perception, that is, an etiology that introduces an epistemologically speaking suspicious inference in perception, rendering the perceptual process irrational. Therefore, CP undermines the justificatory force of perception by vitiating the epistemic credentials of perceptual inferences, which justifies coining this class of views "inferentialism". In other words, CP downgrades the justificatory force of perceptual experience. Underlying these views is the Analogy thesis, according to which

> It is possible in principle for an experience to depend on a desire, in ways that are structurally analogous to modes in which a belief that P depends on a desire, where the mode of dependence makes the belief ill-founded. [1]

For the externalist, CP downgrades perception because it affects perceptual processing in a way that renders the percept epistemically suspect by raising concerns about whether the percept reflects, or more or less accurately represents, the environmental evidence, or whether it reflects more the contents of the cognitive states that penetrate perception. To the extent that for the externalist the epistemic impact of perception hinges on the relation of the content of the perceptual state to the environment, two viewers who face the same visual scene and share the same phenomenal character may differ in the degree of

justification their respective perceptions confer on them since they may be related differently to the visual scene. One of them may have a veridical perception of O being F, while the other one hallucinates that O is F. Their phenomenal contents are, allegedly, indistinguishable but since only the former is related to O, only she or he is justified in believing that O is F. Some externalists are sympathetic to the internalists' intuition that since both viewers share the same phenomenal content there is a sense in which both are justified in believing that O is F; they have the same phenomenal evidence. To accommodate their externalist allegiance, the sympathetic externalists introduce another dimension of justification that makes it possible to say that the two viewers are differently justified in believing that O is F despite having the same phenomenal evidence.

I criticize internalistic views and adopt an externalist view. I have two main problems with internalism. The first is that it presupposes that perception involves inferences; I have argued and continue to do so in this book that perception does not involve inferences, where inferences are understood in the standard philosophical way, that is, as being discursive. The second problem is that internalism fails to explain and justify the intuition that CP is a genuine epistemic problem because it may make viewers insensitive to environmental information, despite Siegel's attempt to couch the problem in terms of sensitivity to data. Any such discussion, necessarily in my view, relies on the assumption that perceptual states constitutively, and not merely causally, depend on the environment. Another way to see why discussions of sensitivity to the data are better cast in an externalist framework is that the sensitivity of perception to the evidence is an index by which the reliability of perception can be measured, since reliability depends on how accurately perception reflects the environment. Hence, the sensitivity of perception to the evidence ensures that perception reflects the environment. This talk about the reliability of perception and about how this reliability is related to a more or less accurate reflection of the environment in perceptual contents can take place only in an externalist framework.

Almost all externalist accounts of perceptual justification emphasize the distinction between the phenomenal character of perceptual states and their intentional or representational content, and undermine the view that the content of a perceptual state is an intrinsic property of that state that, as such, is logically independent of what the perceptual state is about. This challenges phenomenal dogmatism or conservatism in that it paves the way for a notion of perceptual justification that is not determined solely by the phenomenal character of the perceptual experience viewed as an intrinsic property of the experience. This challenge, in turn, allows the introduction of conditions such as the reliability of perception and its sensitivity to the environmental data to enter into discussions of perceptual justification. What unites externalist accounts of perceptual justification is a conception of justification that a veridical perceptual state that grounds the relevant belief provides a justification or grounding that is stronger than the justification that an illusory, or hallucinatory, or a CP perceptual state provides for a belief with matching content. This justification is stronger in that imposes a further requirement in addition to the condition that the content of the justified belief should match the phenomenal content of the perceptual experience. Let us grant that when perceivers form a belief whose content matches the phenomenal character of their experience, they are doing the epistemically correct thing and exercising their epistemic capacities appropriately. Nevertheless, this is not enough for the perception to ground the belief. Only veridical perceptual experiences can do that, which is why grounding is lacking in the CP cases. What underwrites all these externalist views is that for perception to play its justificatory role it must be sensitive to the environmental input and reflect it accurately.

In Chapter 2, I examine the definitions of cognitive penetrability offered by Pylyshyn, Macpherson, Stokes, Siegel, and Wu to assess their merits and shortcomings in an attempt to

synthesize them with my own views in order to come up with a more adequate definition of CP. My main concern is to explain the differences between direct and indirect cognitive effects on perception and to argue why the former but not the latter entail the CP of perception. To do this, I use the result attained in the previous chapter that a cognitive effect on perception signifies CP iff it affects its sensitivity to the environmental input. Needless to mention that my account owns much to the work of the aforementioned authors and especially to Stokes's clear statement that CP is inherently related to the epistemic impact of cognitive effects on perceptual processing.

I propose, first, a partial definition of CP focusing on the directness of the cognitive effects on perception. This runs as follows

> *CP revisited*: A cognitive state C cognitively penetrates a perceptual state P when C partially causes P, and the causal chain from C to P is

(a) mental and internal in the sense that it is contained entirely within the subject;
(b) C does not act so as to merely select the input for P;
(c) C affects the perceptual processes that lead to the formation of P in the sense that these processes use information contained in C. The information contained in C is used by the processes that issue P in an online manner, that is, it is used during the course of the processes underwriting P and it does not simply fix the values of some parameters that figure in the state transformations in which the processing in P consists. It follows that when C penetrates P, the conceptual contents of C (or a subset of them) enter the contents of P;
(d) C may affect P in a top-down manner, or C may be imbedded in the processes that issue P.
(e) The cognitive effects on perception should be such that if perception is CP, it is nomologically possible for two viewers (or for the same viewer at different times and circumstances), to have perceptual states with different contents while seeing the same distal stimuli under the same external conditions.[2]

CP is in general the influence of cognitive (including emotive) states on perception under certain conditions. This entails that cognitive states partially cause a perceptual state, where the causal chain is internal to the viewer. The condition that the causal chain be internal to the viewer is sometimes thought to exclude cognitive effects mediated by attention, whether it be spatial or object-centered, from being instances of CP. This, however, is wrong since the attentional effects on late vision are internal and ubiquitous and clearly affect perceptual processing partially causing a perceptual state, which means that they render late vision CP.

The proposed definition handles cases of indirect cognitive effects well, including precueing. Why should the indirect cognitive effects on perception be excluded from being cases of CP? I suggest that the reason why indirect cognitive effects at any perceptual stage should not be considered as cases of CP is that by not affecting perceptual processes themselves, they do not affect the epistemic status of perception in a pernicious way and can be easily alleviated simply by asking viewers to refocus attention which results in their seeing the same thing given the same stimulus and under the same viewing conditions.

This imposes a second condition that an adequate account of CP should fulfill.

> *Epistemic Condition for CP*: If perception (or a stage of it) is cognitively influenced in a way that either renders it unfit to play the role of a neutral epistemological basis by vitiating its justificatory role in grounding perceptual beliefs, or enhances its epistemic status, perception (or a stage of it) is CP. If perception (or a stage of it) is cognitively influenced in a way that does not affect its epistemic role it is CI.[3]

This is not a necessary condition for CI, which means that a perceptual stage can be CI even if attention affects its epistemic status in some specific way. The reason is that some indirect cognitive effects may downgrade perception, but their effects are not pernicious because they could be easily alleviated, and for this reason they are not considered to be cases of CP. Covert attention, for example, may affect the epistemic role of perception when it gives priority to some objects in a visual scene by marking them for preferential processing during late vision, but since its effects are easily countermanded, its role does not entail that perception is CP. If, on the other hand, some cognitive effects do not influence the epistemic role of a perceptual stage, this stage is CI. It follows that a cognitive influence on perception is a case of CP if it undermines the epistemic role of perception in such a way that its effects are not alleviated simply by refocusing attention, whether it be overt or overt. The effects must be such that the epistemic role of perception is downgraded in a philosophically interesting way. This calls for a revised Epistemic Condition

> *Revised Epistemic Condition for CP*: If perception (or a stage of it) is cognitively influenced in a way that either renders it unfit to play the role of a neutral epistemological basis by vitiating its justificatory role in grounding perceptual beliefs in a philosophically interesting way, or enhances its epistemic status, perception (or a stage of it) is CP. If perception (or a stage of it) is cognitively influenced in a way that does not affect its epistemic role it is CI.[4]

In view of the above considerations, it seems that the relationship between the directness condition, which relates the problem of whether a cognitive effect on perception entails CP to whether it affects perception directly, and the epistemic condition, which relates CP to the repercussions of the cognitive effect for the epistemic status of perception, is intricate. If cognition directly affects perception, the latter is CP. Let us put this as follows: CDAP (Cognition Directly Affects Perception)→CP. Thus, the directness condition constitutes a sufficient condition for CP. Does it hold that if a process is CP then it is directly affected by cognition; CP→CDAP? In other words, could indirect cognitive effects render a perceptual process CP? If they did, the necessary part does not hold, which means that the directness condition is not sufficient and necessary for CP.

This is the juncture at which the epistemic criterion enters the discussion. According to this criterion, if cognition either downgrades perception in a philosophically interesting way, or enhances its role, perception is CP. As a lemma, cognitive influences on perception that do not in any way affect the epistemic role of perception are not cases of CP. This excludes indirect cognitive effects on perception from entailing CP and allows us to hold that CP→CDAP (the necessary part of the extended directness condition). It follows that the extended directness condition conjoined with the revised epistemic condition yield a sufficient and necessary condition for CP. Things are intricate because, in the last analysis, the fact that indirect cognitive effects are easily alleviated stems from their being indirect effects that as such do not affect perceptual processing itself. It turns out that the directness condition entails a pragmatic property, namely, that the epistemic consequences of the indirect cognitive effects could easily be alleviated, which when used in the context of the dialectic concerning whether CP has an epistemological consequence, allows us to draw the conclusion that indirect cognitive effects do not entail the CP of perception.

Having provided a definition for CP, in Chapter 3 I proceed to defend my thesis that early vision is CP in the light of some criticisms based on empirical work that has targeted the view that early vision is CI. This criticism is multifaceted addressing several parts of the arguments for the CI of early vision. A first class of criticisms purports to show that cognition need not act in a top-down manner to affect perception but can do so from within the perceptual circuits. This can be inferred both from

the way the perceptual system uses certain principles to guide its processes, and from the fact that objects can be categorized very quickly, which means that concepts may become components of perceptual contents very early on. A second class of counterarguments centers on recent evidence that recurrent processes are found in perception as early as 50 ms., a finding which is taken to entail that early vision is CP. Finally, a third class of counterarguments emanates from various pre-cueing experiments that allegedly show that cognition affects early vision directly.

I analyze all these counterarguments and argue, based on the same empirical evidence adduced against my theses, that not only do they not establish the CP of early vision, but, in contrast, strengthen the thesis. I discuss first the role of the "principles" that guide perceptual processing and argue that there are various ways to understand the epistemic status of these principles. These principles are widely construed in the literature as merely causal connectors with no representational contents, or as some sort of tacit, non-representational knowhow, or as some sort of tacit, representational knowledge. However, irrespective of how one conceives of the information realized by the principles, the principles are not rules of inference that the visual system looks-up implicitly or explicitly to perform its interstate transformations, or premises used in such transformations. This is why I prefer to call them *operational constraints* to avoid the semantic overtones of the term "principle". Moreover, that perception relies on some operational constraints to function successfully does not entail that perception is affected by concepts from within. In any interpretation of the informational content realized by the operational constraints, if such content exists (because if they are merely causal connectors they are not states with contents), it is not conceptual content. Hence, the existence of some operational constraints hardwired in perception does not entail that there is some sort of knowledge that determines or simply affects perceptual processing.

Second, concerning early categorization, I argue that it is a purely perceptual phenomenon in which cognition plays no direct role whatsoever since the perceptual processes involved do not use any semantic information. I assess, third, the arguments concerning early recurrent processing. I examine the empirical literature painstakingly and show that even though early recurrent processing does indisputably occur, it is restricted to local recurrent processing that does not involve cognitive signals and, thus, does not entail the CP of early vision. Finally, I discuss pre-cueing at length and argue that the evidence shows that it neither affects early vision directly, nor does it have any epistemic effects on early vision.

Let us assume that early vision is CI, in that it affected by early vision only indirectly, and that late vision is CP. In view of the fact that CP is related to the downgrade of the justificatory force of perceptual experience, does the CP of late vision, which produces the final verdict of visual perception, that is, the percept, entail that CP undermines the justificatory role of perception, vindicating, thus, Hanson's, Kuhn's, Churchland's and others' view that perceptual experience cannot be a neutral arbiter of the epistemic status of scientific theories and even of everyday perception? In Chapter 5, I address this problem.

First, I discuss the epistemic impact of the indirect cognitive effects on early vision. One might insist that the indirect cognitive effects on early vision may highlight some information at the expense of others and this, arguably, may affect the epistemic role of early vision. Let me first note that for reasons explained in the book, I categorize preparatory effects along with attentional effects even though strictly speaking they are different in nature. I assess this claim by examining what happens when spatial and object-based attention indirectly affect early vision. With respect to spatial attention, I argue on empirical grounds that no information from the attended visual scene is privileged; both targets and non-targets in the visual scene selected by spatial attention are taken in by early vision. All information pre-

sent in it is equally processed; what spatial attention does is to select a visual scene from the environment.

In cases of feature/object attention, the information that matches the objects or features cued in the attentional command is indeed highlighted and receives a prior boost. Thus, the hypothesis concerning the identity of the feature/object that matches the cue likely will be the first hypothesis to be formed and tested during late vision since the cued information facilitates the formation of a hypothesis concerning feature/object identity. Despite the ensuing initial boost of some neuronal activity in the early visual circuits, however, early vision retrieves all the information in the visual scene. All this information, therefore, is there in the iconic image, that is, the image formed during early vision and which contains the information in the scene retrieved by early vision from it, because the cue does not affect perceptual processing but only changes the values of some parameters before the onset of perceptual processing so that some of the incoming information be highlighted. When a hypothesis is tested, the evidence in the iconic image can either confirm or disconfirm the hypothesis. Thus, by itself, any attentional cues do not introduce any confirmation bias and, thus, do not have any epistemic effects for perception. If the facilitated feature/object is present in the visual scene, the attentional effect has increased the efficiency of perception, which means that it has increased its reliability. What is more important, however, is that information incongruent with the favored hypothesis is included in the evidential basis provided by early vision so that late vision would have the capability to reject the hypothesis based on this evidence independently of whether it will finally do so.

This brings us to the epistemic impact of CP on late vision, which, as the reader recalls, is directly affected by cognition and is, thus, CP. Since late vision receives and processes the output of early vision, what are the repercussions of the CP of late vision for the way it exploits the output of early vision. This is important because the epistemic role of perception is mainly determined by late vision, because it is in late vision that the percept is formed and the percept is the crucial factor in the epistemic role of perception. If, as I have argued and repeat in the next chapter, all hypotheses concerning object identity formed in late vision are tested against the iconic image formed in early vision, the following question emerges. Why is it that usually this testing is not characterized by any confirmation bias since the perceptual system searches the iconic image for either confirmatory or disconfirming clues for the tested hypothesis, while in other cases the perceptual system searches the image for confirmatory clues while it disregards any disconfirming evidence? In the former case, the CP of late vision does not epistemically downgrade perception, while in the latter case it does.

The fact that the evidential basis, that is, the iconic image contains all information present in the visual scene entails that when this basis is revisited for whatever reason, any evidence that was initially disregarded in a case of a confirmation bias or of wishful thinking may be selected and processed just by cognitively refocusing driven attention to another, initially neglected, part of the iconic image. Upon such a revisiting the percept may change, which means that the viewer may come to realize that things are not as they seemed to be. It follows that the initial epistemic downgrade of perception owing to the CP of late vision can be alleviated; the harmful epistemic effects of the CP of late vision can be mitigated owing to the fact that the iconic image delivered by early vision is not cognitively affected in a way that changes the processing in early vision. Thus, the epistemic downgrade of perception by CP, when it occurs, is neither systematic nor intractable, and this undercuts constructivism.

In my attempt to explicate the notion of CP an issue arises concerning the relation between the two clauses of the proposed definition of CP in Chapter 2, that is, the relation between the demand that CP occur when cognition affects perception directly and the demand that CP occur when cognition affects the epistemic role of

perception, namely the problem concerning the relation between the two conditions. After the discussion of the epistemic impact of cognition on early and late vision, I think that there is a sort of a bootstrapping relation between the two clauses. A cognitive effect on early vision does not threaten its epistemic role because cognition does not intervene in the process of retrieval of information from the environment and, thus, does not diminish the sensitivity of early vision to the environment. It follows that the epistemic role of early vision is unaffected by cognition because early vision is not directly affected by cognition since attentional effects influence early vision indirectly. But one might wonder why these indirect cognitive effects do not entail that early vision is CP and the answer to this is that by being indirect they do not affect the epistemic role of early vision and the discussion concerning CP is philosophically interesting, as many philosophers have argued, only if the cognitive effects on perception undermine its epistemic role in grounding or justifying perceptual beliefs. This is how, I think, the two conditions are intertwined.

In the last, Fifth, chapter, I discuss the processes of early and late vision to determine whether they employ discursive inferences. This is important because, as the reader recalls, internalist discussions about the epistemic repercussions of CP on perception presuppose the thesis that perception involves inferences. That they do so is an old idea endorsed by both philosophers and psychologists. Against this, I argue that neither early vision nor late vision involve discursive inferences, although there is a philosophically uninteresting sense in which scientists talk of perceptual inferences. Although the non-inferential process that results in the formation of a recognitional thought can be recast in the form of an argument from some premise to a conclusion, this does not entail that the formation of the perceptual thought is a piece of reasoning, that is, a transition from a set of premises that act as a reason for holding the thought to the thought itself. Perceivers can be asked why they think that O is F and they may reply "because I saw it". However, this does not mean that the reason they cite as a justification for their thought is a premise from which they inferred the thought. They do not argue from the thought "I saw it to be thus and so" to the thought "it is thus and so". They just formed the thought on the basis of the information included in the relevant perceptual state in a non-inferential way.

I also address the issue of whether late vision, in view of the fact that it is CP and involves concepts, should be deemed properly speaking a perceptual stage, or, rather, as a thought-like discursive stage. Some philosophers consider that there is a sharp distinction between vision and thought and attempt to explain various phenomena (such as modal and amodal completion, or cognitive effects on perception) either as perceptual or thought-based. Since there is a hybrid stage of vision/thought in which perception and cognition are intermingled, i.e., CP late vision, I argue that late vision does not involve pure thoughts, and is essentially relying on perceptual information in the typical contextual or centered way perception is tied to the environment. Hence, it is a genuine perceptual stage and not a case of visual understanding.

Notes

[1] S. SIEGEL, *How is wishful seeing like wishful thinking?*, in: «Philosophy and Phenomenological Research», vol. XCV, n. 2, 2017, pp. 408-435, here pp. 410-411.
[2] A. RAFTOPOULOS, *Cognitive penetrability and the epustemic role of perception*, Palgrave Macmillan, Basingstoke 2019, p. 118.
[3] *Ibid*., pp. 120-121.
[4] *Ibid*., p. 122.

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