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SPECIAL SECTION ARTICLE: THEORY-LADENNESS

# Theory-Ladenness Special Issue: Introduction

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Are sensory experiences, perceptual beliefs and observation reports faithful encoders of truthful information about the world? The theory-ladenness thesis poses an important challenge to answering this question in the affirmative. Roughly the thesis holds that theoretical factors affect the content of those experiences, beliefs and reports. In other words, it holds that their content is laden with theory. Theoretical factors here are construed broadly so as to include scientific theories, beliefs and cognitive processes. Two crucial questions arise in relation to the theory-ladenness thesis. First, how pervasive is theory-ladenness? And, second, what is the extent of the distortion theory-ladenness has on the content of experiences, perceptual beliefs and observation reports? If theory-ladenness is not only pervasive, i.e. if it affects the majority of experiences, perceptual beliefs and observation reports, but also highly distortive way then those experiences, beliefs and reports cannot be telling us much that is true about the world. Such a state-of-affairs would cripple our ability to make correct choices when faced with rival theories and beliefs. Thus the topic of theory-ladenness is of the utmost importance. The eight papers in this special issue attempt to shed light on theory-ladenness and various related issues. The contributors represent a number of different disciplines, including philosophy, psychology, cognitive science, history of science and physics. This introduction does not aim to provide a detailed overview of their views and arguments. Rather its purpose is to give the reader a little foretaste of what follows.

We begin with those papers that discuss the issue whether perception is cognitively penetrable. The contribution of Athanassios Raftopoulos, a philosophically trained

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psychologist, chiefly concerns the potential effects of cognition on vision. He cites evidence from neuroscience to argue that early visual perception is cognitively impenetrable and therefore that its content is neutral with respect to theory. A sizeable part of the paper is spent on trying to deflect possible objections to this view. For example, the question whether certain principles manifest in top-down cognition guide perceptual processing and have a theoretical effect on the resulting content is considered and ultimately rejected. That is because, Raftopoulos argues, these principles are hard-wired and do not therefore constitute the kind of representational states that would deserve the designation 'theory'. Even if not construed as theoretical in character, the question remains whether the effect of such principles is to merely supplement the truth-aptness of our perceptual states or to at least sometimes distort it.

Ellen Fridland's contribution also focuses on the debate over cognitive penetrability of perception. To be precise, she looks at the issue of how broadly or narrowly must cognition be construed in this debate. Fridland argues that those who defend the modularity of mind thesis and in particular the thesis that perception is modular—one of whose consequences is that perception is impenetrable to cognition—have set about defeating a straw man's view. This is because they narrowly identify cognition and, in particular, cognitive states with propositional states. Once a broader construal of cognitive states is taken on board, one that includes not only propositional states but also skill-related states, then it is far from clear whether perceptual processing is immune to the influences of those states. Importantly, for the purposes of relating this point to the second question raised in the introductory paragraph, Fridland steers clear of the question whether such cognitive penetration affects the truthfulness of the information carried by perceptual states.

A third contribution that tackles the issue of cognitive penetrability but also concerns itself with issues of theory-ladenness within the philosophy of science is that of William F. Brewer, a psychologist with philosophical leanings. Brewer considers the vital question of which criteria psychological experiments must meet in order to have something useful to say about the theory-ladenness debate. He proposes a short list of such criteria. One criterion is that experiments must make use of comparisons between stimuli, beliefs and perceptual judgments. For example, a commonly employed experimental setup requires the differential manipulation of the beliefs or theories of two groups of test subjects prior to them being given the same stimulus and asked to make a perceptual judgment. If the perceptual judgments of the two groups differ then it is reasonable to draw the conclusion that this difference is due to the theories or beliefs each group was primed with prior to their exposure to the stimulus. Brewer freely admits that psychological experiments demonstrate the effect top-down cognitive processes have on perception. However, he guards against the view that perception carries no truthful information about the world. Instead he argues that, among other things, bottom-up effects can be just as strong as top-down ones and that they often overrule the latter.

Next up is the contribution of Gerhard Schurz. His essay discusses various versions of the theory-ladnenness thesis. Schurz begins his essay with a summary of eight arguments in support of the theory-ladenness of observation. Although he concedes that these arguments make some valid points about the effects of theory on observation, he nonetheless argues that a weak form of theory-neutrality can still be achieved and that this can save the objectivity of empirical science. That is to say, as long as some observation reports and concepts are theory-neutral, there is no real threat to science's ability to decide between rival theories and beliefs. The paper concludes with a proposal of a method, which Schurz calls 'the method of ostensive learning', through which the extent of theory and language dependence can be put to the test. Associated with this method is a definition of theory-

neutral observation concepts. Put simply, a concept counts as a theory-neutral observation concept if and only if, under normal conditions of observation, nearly every human being can obtain it in an experiment based on ostensive learning and regardless of their language, culture and background beliefs. According to Schurz, the two major advantages of this explication of theory-neutral observation concepts is that (a) the explication works without presupposing a specific language and (b) whether a concept is an observation concept becomes an empirically testable question.

Following up on the theme of theory-neutrality is Allan Franklin's contribution. He takes a look at the relationship between the theory-ladenness thesis and the incommensurability thesis in the context of experiments in physics. He considers the latter to be a 'radical cousin' of the former. According to his understanding of it, the incommensurability thesis holds that there is no hope for a theory-neutral language. That is, even the meaning of observational terms depends on the theory one endorses. If this were true, our ability to choose between different theories or paradigms on the basis of neutral observation statements would be doomed to failure. Franklin opposes the incommensurability thesis. He identifies two types of problems, namely philosophical and practical, that if successfully addressed would vanquish the thesis. In his view, the philosophical problems have already been adequately addressed. For example, take the case where the theory behind an instrument and the theory being tested by that instrument are one and the same. Following some of his earlier work, Franklin reasons that in such cases any potential bias may be avoided or at least mitigated in one of two ways. First, he notes that just because the theory behind an instrument and the theory being tested are one and the same does not mean that the instrument cannot yield output that contradicts the theory. Second, he notes that we may calibrate the original instrument against another instrument whose operation supposes an entirely distinct theory. Turning his attention to practical problems, Franklin admits that these are more difficult to surmount. One problem concerns the experimenter's selection of data. Part of the reason why such selections are made is to discard or reduce confounding signals, i.e. signals that either conceal or imitate the signal under study. Since such selections are guided by theory the fear is that they may lead to observations that are favourable toward the experimenters' conjectures. To combat the potential for such bias, scientists turn to 'blind analysis' where the choice of selection criteria is made in separation from any knowledge those criteria may have on the resulting observations.

The question of how to best construe the notion of observability is taken up by Martin Kusch, who, in his contribution, provides an extended defence of Bas van Fraassen's recent work on that matter. A little background information goes a long way in helping us understand how van Fraassen's views have evolved. The reader will perhaps already be familiar with his claim that we should be agnostic about the veridicality of observations produced through various, though not all, types of instruments. Van Fraassen endorses this view because such observations cannot be validated by observations made with our unaided senses. Thus images produced by microscopes cannot be said to be veridical. What van Fraassen has lately added to this view is that such images should be treated as 'public hallucinations'. They are public because they can be inspected by everyone but they are hallucinations because, in his view, they do not qualify as independent things. Kusch considers Marc Alspector-Kelly's and Paul Teller's separate objections to this new element of van Fraassen's view and dismisses them as inadequate. One of the latter's objections ties in with the topic of theory-ladenness. Teller seems to claim that when looking through a microscope we make spontaneous judgments about real microscopic things, not images as van Fraassen suggests, and this very 'fact' counts in favour of the veridicality of microscopic observations. Kusch, following van Fraassen, stands firm against this claim. The

spontaneity of such judgments seems to motivate veridicalism vis-à-vis microscopic observations, says Kusch, only if one already espouses the 'theory-laden' view that microscopes are windows to the microscopic world. Without the benefit of such a view, spontaneous judgments are no more supportive of veridicalism than they are of anti-veridicalism. The most sensible conclusion to draw, claims Kusch, is to remain agnostic like van Fraassen.

Unlike many of the contributions in this special issue, Robert N. McCauley's maintains that theory-ladenness is a pervasive phenomenon. He builds on prior work to argue that humans possess certain natural cognitive proclivities, which he calls 'maturationally natural'. These may develop to some extent over the course of their lives but are often activated at an early age. They are meant to be intuitive, automatic, fast, unconscious and selective. Examples include the ability to understand the physics of solid objects and the ability to recognise faces. The connection with theory-ladenness becomes clear when one considers the effect these proclivities have on perceptual judgments. Take a case where test subjects are presented with a meagre amount of stimuli. According to McCauley, despite the scarcity of the incoming stimuli the test subjects still make stout perceptual judgments and this is a direct consequence of maturationally natural processes. For example, test subjects cannot help but interpret the motion of dots on a computer screen as agents having certain intentions. It may be thought that McCauley's point about maturationally natural processes is meant to call into question the rationality of science and theory choice. Though he thinks that his point certainly poses a challenge that needs to be addressed, he at the same time concedes that science has made progress, often by offering conceptions that run counter to those our natural proclivities underwrite. But the reason for this progress, McCauley claims, is not down to some theory-neutral perceptions but rather to science's social and institutional arrangements.

The final paper in our collection is that of Eva Schmidt who dives into the debate between non-conceptualists and conceptualists. That is, between those who endorse the view that some mental, and in particular perceptual, content is not structured by concepts and those who deny it. Schmidt deliberates over a conceptualist claim made by McDowell and others that only conceptual content can be objective. Roughly speaking, objectivity here means that the content represents the mind-independent world to the individual *as* objective. If objectivity is indeed a prerequisite for content-hood, then non-conceptualism cannot be endorsed without seeing off this challenge. With this aim in mind, Schmidt reconstructs the conceptualist argument that is meant to support the conclusion that non-conceptualist content cannot be objective and then questions two of its premises. First, she questions whether rational integration into a conceptualised world view is necessary for objectivity. And second she questions whether the world needs to be represented as objective for experience to possess content. Finding both of these premises implausible she concludes that the conceptualist claim offers no significant challenge to the non-conceptualist.