

## Perceptual Constancy

Dissertation abstract – Alessandra Buccella

When we move around, we generally don't experience objects in the world as changing shape, size, or color, even though the light they reflect onto our eyes changes immensely from position to position. How does it happen that we have no trouble perceiving a wall during the day and at dusk as maintaining the same color, or a person walking towards us as maintaining her size and not 'growing' as she comes to occupy a larger part of our visual field? These familiar phenomena of 'perceiving invariance within variance' depend on a capacity psychologists call 'perceptual constancy'.

Philosophers – especially those who want to account for perception in a naturalistic way, i.e. in a way that's consistent with and in a way relies upon the facts studied by the natural sciences – take interest in this capacity, too. They usually appeal to perceptual constancy in the context of explaining the relationship between two fundamental 'facts' about human perception. The first fact is that through perception we find out how the world around us is independently of us. Perception, in other words, can present us with 'objective' reality. However, and this is the second fact, perception is always perspectival: we always perceive the world from a specific point of view, and there is a clear sense in which whenever we perceive we can distinguish *what* we are perceiving (the 'things' out there in the world) from *the way in which* these things are presented to us this particular time, from this particular perspective. For example, take a coin laying on a table: when we look at the coin, we can see both that it is 'objectively' a coin (circular, metallic, silver-colored, etc.) and that it looks in a certain way from our current viewpoint (sort of elliptical, with some shades that make certain portions look darker in color than others, etc.).

Philosophers interested in explaining how perception can be both 'objective' and 'subjective' at the same time often see in perceptual constancy the key to solve this puzzle: after all, isn't perceptual constancy precisely the capacity to perceive an object or a property (e.g. the color of a building, the size of a person) as staying

invariant while something *else* changes (e.g. the light hitting our retina as we change position with respect to the object we are perceiving)? Because this seems to be the case, many philosophers looked at this 'lower-level' psychological capacity in order to find out more about the higher-level philosophical puzzle.

My dissertation uses the same strategy: it proposes a way to understand how perceptual constancy works and what its effects are which provides also some insight into the 'puzzle' of objectivity. My view of perceptual constancy differs from the traditional one, on which most philosophers (more or less explicitly) rely when talking about this capacity. The first chapter is devoted to presenting the traditional view and to raising a first set of worries about it. The traditional view has it that the effects described above depend on perceptual systems retrieving the actual, perceiver-independent properties of objects (i.e. their 'real' size, shape, color, etc.) by analyzing the ambiguous sensory stimuli and discounting the effects of the context in which the object is presented. For instance, if you look at a red cup in sunlight, you manage to see the illuminated parts and the shaded parts as having the same color. This is an example of 'color constancy'. The tradition explains this by saying that the visual system has recovered the actual shade of red of the cup and 'interpreted' the differently shaded areas as being the result of *that particular shade of red* being presented in a certain context. The shade of red is recovered precisely by estimating the effects of the context (on the basis of previous experiences with seeing red objects in sunlight), and then by discounting them. The first kind of worry with the traditional view lies in the relationship between the definition of the capacity in terms of recovery of perceiver-independent properties and the way in which psychologists relying on such a definition then went on to design experiments to study it. In particular, it seems like most of the experiments done by psychologists accepting the traditional definition take for granted that *that* is the correct definition of the capacity under investigation. But notice that, for instance, in the case of color constancy research, another group of psychologists claimed that the data gathered in 'traditional' experiments are compatible with a different definition of what color constancy amounts to. If this is the case with color, then it is plausible to imagine

that the traditional view of constancy in general has the same kind of issues. The first chapter concludes that the traditional definition cannot be simply assumed, and that there is room for an alternative.

The second chapter looks at how perceptual constancy in modalities different from vision, for example in audition, has been defined and studied. Through examining two cases of ‘auditory constancy’, namely with respect to loudness with varying distance and with respect to timbre with varying physical surroundings, I reach the conclusion that the traditional definition doesn’t seem to apply to these cases, even though it should be possible to include them as examples of constancy, especially given that they seem to have a lot in common with more standard, visual constancies (e.g. color or shape) from the point of view of their *function*, i.e. the role they play for the perceiver. If we believe that psychological capacities and phenomena should be classified functionally, then auditory constancies are constancies, and the traditional view must be put aside. This is the conclusion of chapter 2.

Chapter 3 discusses a potential alternative to the traditional view which draws on some ideas from ecological psychology (i.e. the approach to perception first articulated and defended by James Gibson), on the one hand, and a view in philosophy of science called ‘structural realism’ on the other. While this alternative, which I call the ‘relational-structuralist approach’, is an improvement over the traditional view, I still argue that it misses something important in the way it captures the functional role of a capacity like constancy. To bring up the ‘missing element’, I take a brief detour in the history of philosophy, and in particular I revisit the contributions of William James and John Dewey to what would later become Gibson’s theory. I argue that the relational-structuralist approach to constancy (which I formulate mostly through a dialectical exchange with philosopher Alistair Isaac) fails to capture the ‘pragmatist’ component which, in this particular case, amounts to including purposeful action as a constitutive part of what specifies constancy’s functional role.

Finally, in chapter 4 I present my own view of perceptual constancy and I apply it to the higher-level philosophical puzzle of perceptual objectivity. The ‘Relational

invariance' view of perceptual constancy maintains that constancy is the capacity to create and maintain stable (i.e. mostly invariant) *relations* between the perceiver and certain features in the environment. When we create and maintain a stable perceptual relation, for example the way we do when we try to balance on one foot by looking at a precise spot on the wall in front of us, in a sense 'anchoring' ourselves to it, no specific property of any specific object in the world is recovered. Yet, the fact that this relation (e.g. between our fovea and the spot on the wall) is being created and kept stable is what makes it possible to act successfully (e.g. to keep our balance) and to have an experience of a world around us that doesn't change all the time something varies in sensory stimulation.

My solution to the 'puzzle' of objectivity described at the beginning draws largely on Merleau-Ponty's theory of perception and changes our understanding of perceptual objectivity consistently with the way I argued we should change our understanding of constancy. I take from Merleau-Ponty the crucial claim that the objectivity of perception necessarily depends on its intrinsic *indeterminacy*. According to Merleau-Ponty, there is no objective perception without indeterminacy, because indeterminacy simply is part of the very nature of perception. Differently from, e.g., a flat picture, the real world is made up of three-dimensional objects, and for this reason it is not all determinate: at any given time there is something we are not seeing but that necessarily influences what we do see. Perception of the world just is *structured* this way: there is always co-presence of figure, i.e. the specific object we are perceiving, the 'focus' of our attention, and background, i.e. the context in which the 'main' object is presented, including the parts of the object that are currently invisible, thus remaining indeterminate. The figure-background structure is necessary for objectivity. To perceive objectively, then, I don't have to 'step outside' and form a perspective-independent 'model' of the world. Rather, objectivity is achieved by 'stepping further in', by inhabiting the world, engaging with it, moving around to disclose more of it and make regularities emerge.

Overall, the Relational invariance framework, with its perhaps counter-intuitive accounts of both constancy and objectivity, invites us to re-think how living

creatures with perceptual systems relate to their environment, what 'perceiving the world' ultimately means, and what role *action* plays in defining the meaning of that expression.