Ontology of multisensory unification

Senses do not present the environment in a random or chaotic way, but in a way that is governed by some rules. For example, apart from cases of severe dysfunctions, the visual field has the same shape no matter what is seen and within the visual field one never perceives that the exactly same fragment of a surface is simultaneously green and red. Such rules, which organize perceptual experiences independently of what it perceived, determine the structures of perceptual experiences.

What is important, is that structures of experiences related to different senses may be distinct. For instance, the same shape, like a circle, can be experienced both visually and by touch. However, in each case, the spatial structure of an experience seems to be different. In the visual case a circle is perceived as positioned within a stable structure of visual field while in the case of touch, when it is experienced by using hands, it is perceived due to pressure inflicted on various skin fragments and the perception of the current position of the fingers.

In this context, it is worth noting that the usual perceptual experiences are multimodal. It seems that within a single experience we may, for instance, see something, hear something, and be in a tactile contact with some object. However, if perceptual structures associated with distinct senses are different from each other, a question arises regarding in what way such potentially incompatible structures are combined in a multisensory experience. I name this problem the problem of structural multisensory unification, and within the project I aim to provide a solution to it from the perspective of empirically-informed philosophy of perception.

My answer will have a form of an ontological model in which, by using formal ontological tools and with reference to the empirical state of the art, I will provide a characteristic of the main structural aspects of perceptual experiences. First, I will analyze spatiotemporal frameworks of perceptual experiences. Second, compositional principles, which regard the way in which simpler elements are perceived as composing complex wholes, will be analyzed. Third, conducted analyzes will concern individuation principles governing the way in which elements are perceived as being the same despite movement and other changes. Finally, I will analyze structural dependencies regarding situations in which perception of some elements depends on perception of some other elements (e.g., whether perceiving a shape depends on perceiving edges which compose it).

Investigations concerning the above structural aspects will allow evaluating three general hypotheses regarding the structural multisensory unification and assessing which detailed variants of these hypotheses are the most plausible in the case of particular types of multimodal experiences. First, in accordance with the simple unity hypothesis, it may occur that certain perceptual structures are compatible and may compose a structure of a multisensory experience without undergoing modifications. Second, in accordance with the transformative unity hypothesis, certain perceptual structures are incompatible, but some of them undergo modifications to create a structure of a multimodal experience. Third, in accordance with the disunity hypothesis certain structures remain incompatible and a multimodal experience does not have a unified structure.