

S3. Biology and Symmetry

Abstract

Experimental verification of a theoretical model of human visual perception based on the hierarchy of center-symmetrical and temporal relations

The Transcendental Psychology Approach (A.I. Mirakyan) to the study of perception (has been developed since 1990) assumes that in the perception there are so-called structurally-generative processes that are realized outside their mediation by conceptual data of cognitive categories. To study these transcendental processes, it is proposed to use an axiomatic methodology based on general natural principles that provide conditions and possibilities for form creation. Several general principles were developed including structure-process anisotropy, formation of symmetric relations, spatial-temporal discreteness, co-presentation, and some others. They are both explanatory for the generative process of perception and are the direct object of further specification. The conducted experiment was devoted to the verification of a theoretical model based on a possible hierarchy of center-symmetrical and temporal relations in human visual perception. It was shown that sequential formation of temporal relations between the results of center-symmetrical relations can predict a special phenomenon of perception of short-term displayed objects that vary in size at a fairly high speed. According to the Fröhlich effect, it is usually impossible for these stimuli with a speed of resizing up to 15 visual deg/s to see the start of the process, while the final position of the object can be observed regardless of the direction of resizing. The studied model indicated the possibility of the appearance for subjects of the reversed Fröhlich effect for stimuli decreasing in size at high speeds of 15-60 deg/s. The results of the experiments showed that for a speed of 15 deg/s, the percentage of such subjects was 8%, and for a speed of 30 deg/s - 22%, while for a speed of 60 deg/s this percentage exceeds 65 %. Thus, for the last speed, there was a significant number of tests with the reversed Fröhlich effect, which was predicted by the model.

Keywords: model; center-symmetrical relations; temporal relations; visual perception; size-changing stimuli; reversed Fröhlich effect