

According to common sense, in order to visually grasp an object, focus on it, we are first required to visually attend to it. This notion turns out to be congruent with our knowledge on anatomy and physiology of the human eye. As only a small structure in the central part of the retina, called fovea, provides the resolution high enough to enable acute and color vision. However less obvious is the fact that such an anatomical constraint results in constant movement of eyes from one position to another if we are to clearly perceive the world around us. Quite contrary to this kind of common intuition seems to be the opinion, dominant in the area of cognitive psychology, according to which, “the eye follows the attention” i.e. we are first required to focus onto an object before we are able to visually attend to it. Accordingly, there is some mechanism of “attentional fovea” that is thought to be independent from visuomotor system and comprehended in terms of attentional focus or a spotlight which scans the visual field, identifies objects and enhance their cognitive representations before directing the most sensitive part of the retina to this location.

While the hypothesis, according to which, attention precedes action, may appear doubtful, it is obvious that each movement requires to be programmed first. The researchers gathered around Giacomo Rizzolatti came up with so-called Premotor Theory of Attention (PToA) according to which, attention is a “results” of movement preparation. It explains why attention is already “in place” before any overt movement takes place. Thus, so to speak, attention precedes action only when it is regarded as “covert action” or as the preparation of action to be carried out. The value of the theory derives from its effective implementation of Ockham’s razor. The research that has been carried out so far do not provide the conclusion concerning the nature of attentional processes in favor of any of those theories. In the face of this ambiguity the research project is to contribute to our understanding of the nature and mechanisms that condition those processes.

The project thus concerns the relation between the issue of visuomotor processes and attention. In particular, the aims of the research are two basic processes of attention: facilitation of attention and inhibition of return. The former refers to brief enhancement of a stimulus detection in a location where attention has just been reoriented to. The latter occurs as temporal inhibition of attention from being oriented to a location that previously turned out to be irrelevant, i.e. triggered useless engagement of the attention. It results in reduction of stimuli processing. We have come up with two considerable modifications in the standard research procedure of studying these phenomena. The first one consists of blocking eye movement towards the location where a stimulus is presented. It is to be carried out by means of drawing eyes to the fixation point located sideways in the visual field in a way that prevents a subject from shifting the sight further aside from this point. As the sight can not be shifted to a certain location, due to anatomical constraints, the movement can not be programmed either. Subsequently, according to the PToA, if the movement can not be programmed, the attention can not be reoriented and engaged to this unavailable location. Thus both the effect of facilitation and related IOR are unlikely to occur.

The main result of experimental manipulation to be carried out along this research project concerns the hypothesized difference between some effects of attention like facilitation as well as inhibition of return in “natural” and experimentally modified conditions of blocking (the rotation) the eye movement in one direction. The parameters of attention to be studied are behavioral data as well as manual reaction times together with such electrophysiological parameters as evoked potentials.

The results of the project are supposed to be published in journals from the List of Polish Ministry of Science and Higher Education Ccored Journals.