Does evolution really like Interface species against veridical ones?

Arman Rezayati Charan[a], Shahriar Gharibzadeh[a, *]

[a]*Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran*

Abstract

The relation between objective reality and subjective perception is a controversial issue. In modern cognitive science many of well-known scientists believe that evolution prefers veridical perception systems which constitute representations which are similar to external reality, but in a recent theory which entitled as "interface theory of perception" D.D. Hoffman and his colleagues remark evolution prefers interfacial perceptual system which reflects the objective reality in a manner that there is no congruency between the perception and perceived object. It seems this theory neglects the environmental dramatic changes but we think this parameter can change the situation and bring and significant evolutionary advantage for veridical species.

Keywords: Interface theory of perception, Veridical perception, relation of subjectivity and objectivity.

The debate on the relation of objective reality and subjective perception has a long history. The different opinions about this problem are distributed between two contradictory poles: in one pole the people believe that our perception has an exact alignment with the external world and on the contradictory pole others believe that there is no congruency between our perception and what is out there. This debate has continued to the modern age and now it is a controversial subject in cognitive science. For example, some well-known scientists like Marr and Palmer argue that visual perception is effective only when it describes the objective world precisely [1, 2]. On the other hand, some theories

recruit evolution to argue against this realistic point of view, one of these theories is the "Interface Theory of Perception" which hypothesized by D.D. Hoffman and his colleagues.

Hoffman argues that not only our perceptual system doesn't project the world accurately but also even there is no kind of homeomorphism between our perception and the real world [3]. He proposes a theoretical framework for his idea entitled "interface theory of perception". To describe the concept of the interface, it's convenient to use the desktop metaphor [3-6]. The main argument of interface theory is established on the energy cost for information processing and knowledge acquirement. They utilize an analogy between our mind, perceptual system and our total organism in one hand, and the system of a computer on the other hand. They say when you see a rectangle on your Windows desktop and remove it by dragging to a recycle bin on the corner of the desktop, in reality, there is nor a rectangle neither a recycle bin in the computer. In computers only there are circuits, diodes, and many other electronic devices and any action you do in your desktop are equivalent to many complicated processes that happen at that electronic body. But if you had to know and handle all these complicated processes to do anything with your computer then for every simple action you should spend a lot of time and energy and before of them, you should obtain many of knowledge and skills. So the windows desktop acts as an interface between us and those complex electronic hardware and decreases the costs and make it very easy to work with the computer. Then they extended their theory to a theory of consciousness and based on that they argued only the objects which are perceived by a conscious agent exist [7] [4].

But we think the bottleneck of this theory is that it doesn't consider the dramatic environmental changes. The main concept of interface theory is that evolution drives all living system to align their perception system to the world in such a manner that with least energy consumption achieve survival. So we can go further and ask if the environment changed in a dramatic way what would happen for species with interfacial perception system? In other words, if a species had a veridical perception system it means its perception system is independent of the environment and always perceive the world in an exact and precise way so this kind of living system can survive during the drastic environmental changes, but interfaces depend on the general and main features of the external world that an agent and his interfacial perception system has evolved there. As Hoffman mentioned in [5] there are examples of insects or other livings that because of the environment changing and then the resulted incompatibility between their perceptual interface and the new environment they are getting to extinction. Hoffman mentioned these as pieces of evidence to confirm interface theory of perception. But in contrast, we suggest that they can be used to criticize his theory; because this new feature can cause a serious tradeoff between being veridical or interfacial in the presence of dramatic environmental changes. [8] remarks a similar opinion but his argument is a little different. He accepts the dependency of perceptual categories construction on the fitting advantages but he argues that the relation between real world categories and fitting advantage is more than what Hoffman argues. So it seems that reformulating interface theory's models or simulations and considering the significant environmental changes would be a good way to test the robustness of interfacial perceptual systems which are described by interface theory of perception.

References:

[1]   Marr, D., *Vision: A computational investigation into the human representation and processing of visual information, henry holt and co.* Inc., New York, NY, 1982. **2**(4.2).

[2]   Palmer, S.E., *Vision science: Photons to phenomenology*. 1999: MIT press.

[3]   Mark, J.T., B.B. Marion, and D.D. Hoffman, *Natural selection and veridical perceptions.* Journal of Theoretical Biology, 2010. **266**(4): p. 504-515 %@ 0022-5193.

[4]   Hoffman, D.D. and C. Prakash, *Objects of consciousness.* Frontiers in Psychology, 2014. **5**: p. 577 %@ 1664-1078.

[5]   Hoffman, D.D., M. Singh, and C. Prakash, *The interface theory of perception.* Psychonomic bulletin & review, 2015. **22**(6): p. 1480-1506 %@ 1069-9384.

[6]   Hoffman, D.D., *The interface theory of perception.* Current Directions in Psychological Science, 2016. **25**(3): p. 157-161 %@ 0963-7214.

[7]   Fields, C., et al., *Conscious agent networks: Formal analysis and application to cognition.* Cognitive Systems Research, 2018. **47**: p. 186-213 %@ 1389-0417.

[8]   O'Connor, C., *Evolving perceptual categories.* Philosophy of Science, 2014. **81**(5): p. 840-851 %@ 0031-8248.