

# What does «isomorphism between conscious representations and the structure of the world» mean?

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Perruchet & Vinter's provocative paper challenges a series of interesting issues yet the concept of isomorphism is troublesome for a series of issues: i) isomorphism entails some sort of dualism; ii) isomorphism does not explain when a piece of the world becomes a representation; and, finally, iii) it is extremely difficult to provide an explanation about the nature of the relation of isomorphism.

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Perruchet & Vinter's provocative paper challenges a series of interesting issues: i) that the 'powerful cognitive unconscious' is an unnecessary hypothesis; ii) that most of the cognitive mental functions can be explained using elementary associative processes; iii) that there is an isomorphism between the representations composing the phenomenal experience and the structure of the world. We could agree (with some differences) on the two apparently strongest claims, namely i) and ii). However we challenge the very concept of 'isomorphism' and the possibility to have data about what is considered to be 'conscious activity'.

The concept of isomorphism is troublesome for a series of issues: i) isomorphism entails some sort of dualism; ii) isomorphism does not explain when a piece of the world becomes a representation; and, finally, iii) it is extremely difficult to provide an explanation about the nature of the relation of isomorphism.

Let's start from the problem of dualism. By using the word 'conscious representation', Perruchet & Vinter seem to entail that there is something different between being a representation and being a fact of the world, or between a «conscious representation and the unconscious processes generating those representations (§1.3.1)». Hence the conscious mind should be something different and, as a result, Perruchet & Vinter would need a proper ontology, an issue that they leave unexpectedly untouched.

As for the problem of the nature of a conscious representation, if a mental state is referred to as 'conscious' it must have some property that qualifies it as such. On the other hand, if a representation is defined conscious only because it occurs as part of the mental activity of a conscious agent, it should be explained the reason why the agent is conscious. Perruchet & Vinter don't seem to provide any explanations of this. In their paper they refer to the difference between conscious and unconscious as a «status of the processed information (§1.1)». They refer to Dulany's work, which establishes the concept of representation on two cases: deliberative episodes and associations. However they don't provide any rationale to maintain that deliberative episodes are *sufficient* to have true intentionality in the sense of aboutness (Brentano

1874/1973; Searle 1983; Harnad 1990; Dulany 1997; Dretske 1981; Dretske 1995). Perruchet & Vinter don't offer any direct explanation.

Finally, let's get to the problem offered by the concept of isomorphism. What does it mean that «a representation has to be isomorphic to the world structure (§2.1.2)», that «the phenomenal experience is isomorphic to the world (§2.2)», that «internal representations [...] are increasingly congruent with the world structure (§7.1.1)»? Is it something similar to Ludwig Wittgenstein's «logical form»? Is it the syntactical similarity between what happens in the outside world and the internal relation between events? Is it something that can be obtained at different degrees and hence be quantified, as it would seem by the fact that «the initial conscious percept [...] becomes increasingly isomorphic with the structurally relevant units (§6.2)»? Is it some kind of functional isomorphism? Other authors tried to make use of the notion of isomorphism (O'Brien and Opie 1997), which is somewhat Cartesian since it entails that there's a mental copy of some property of the external world. For instance, according to O'Brien & Opie «we are required to think of representational content as a special kind of *correspondence* between intrinsic properties of neural activation pattern and aspects of the world», and «representation exploits a *structural isomorphism* between its physical substrate and its physical domain» (O'Brien and Opie 1999). However, up to now, nobody has presented any convincing example of what ought to be a convincing isomorphic representation of sensory modalities different from spatial relations (O'Brien and Opie 1999) and syntactical symbols (Perruchet & Vinter). In fact, if a spatial relation can be somehow duplicated by some kind of spatial representation how would be possible to duplicate taste, smell or other kind of qualitative conscious contents (Manzotti and Sandini 2001; Manzotti and Tagliasco 2001)?

PARSER, the software model presented by Perruchet & Vinter, is not convincing in this respect since it makes use of words as the input and of words as the output. In other words, PARSER seems to work in two congruent domains. In the real case the two domains are not congruent at all. How can PARSER explain the semantic relation with colors, pains, emotional values, smells, flavors, and so on? Furthermore, in a sense, the inputs of PARSER are words only because we interpret them as such. In the same way the information processed by a computational unconscious system are numbers only because are interpreted as such.

Finally, we have some concerns about the availability of data about the nature of what confidently Perruchet & Vinter call 'conscious activity'. How do we know that a process is better mimicking conscious activity than another one? How do we know that PARSER is nearer to consciousness than other models? The obvious way is to refer to our personal first-person experience. Yet this move is highly dangerous since it trespasses the boundary between objective data and first person subjective reports. Perruchet & Vinter write about «match[ing] the phenomenal experience (§1.2)», «form[ing] conscious representations that are isomorphic to the world structure (§2)», «mimicking the on-line conscious processing of incoming information (§3.3)». How can we get a feasible description of the nature and structure of our conscious activity, a description, which is different from introspectionism? Present approaches don't offer any ready to use methods (Dennett 1991; Varela 2000; Thompson 2001), neither Francisco Varela's second-person neurophenomenology nor Daniel Dennett's heterophenomenology. This problem is crucial when it's time to evaluate PARSER result. If even the authors admit that «the functioning of PARSER [...] does not depend in any way on the conscious/unconscious status we ascribe to its components (§3.3)», how can they claim that PARSER can help as a «model to simulate conscious

states while respecting the properties of conscious thought (§3.3)». Does PARSER satisfy these properties? Are they among the relevant «properties of conscious thought (§3.3)»? Perruchet & Vinter don't say anything about it.

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