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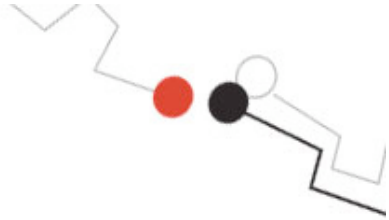

Data in the belief-bias task and the unified normative notion of logical consequence.

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Consider some cognitive abilities to perform tasks which respond to normative patterns, for instance: to determine the number falling between two others in the ordinal series (bisection) or to infer a valid conclusion from given premises (logical consequence).
On the one hand, patients suffering from brain lesions in the parietal lobe are impaired in identifying which number falls between two others in the ordinal series. However the same patients are not impaired when the task is transposed in other contexts such as days of the week, hours etc…. Some interpretation of these results posits that the patients are impaired in the first case not because their 'bisection ability' is impaired but rather because their mental representation of the objects mentioned in the task, ordinal numbers, is 'missing'. The parietal lobe is considered to be the neural substrate for this representation.
On the other hand, some fMRI studies of deductive reasoning tasks related to the belief bias (syllogisms) reveal different patterns of brain activation depending on the content (abstract or belief-based) of the task. A first interpretation of these results, analogue to the case reported above, would be that such difference in brain activation is explained by the difference in the nature of the mental representations involved by the difference in the content (abstract or belief based) suggested by the tasks. In such interpretation, as the case above, it is still possible to consider the processing of a deductive inference to be independent of the representation of the content evoked by the task. In contrast, a second interpretation is to consider that the deductive inference itself is realized by different cognitive and neural processes depending on the content expressed by the tasks.
Our joint question is: i) does the fact that subjects perform those tasks with different rates of success according to the ways the task is presented (like in the belief-bias experiment) and ii) does the implementation of those cognitive abilities in different neural systems allow us to speak of a notion of logical consequence in a full-fledged unified way. To the extent that the notion of logical consequence is prescriptive of how subjects should actually perform their reasoning processes, is the variety of performances and mental procedures supportive of a same notion of logical consequence? We can identify three main positions:

- The notion of logical consequence is unified, and subjects whatever the quality of their performances and the different mental procedures (logical patterns or heuristics) and neural mechanisms they trigger in performing logical inferences, comply with one same representation of what an inferential pattern is.

- The notion of logical consequence is realized only in the case subjects follow abstract inferential patterns and are not guided (or misguided) in their reasoning patterns by unlogical heuristics. Subjects can reason in two different ways but one of them only should inform our idea of logical consequence.

- The notion of logical consequence is not unified and is realized in different mental procedures and neural mechanisms. There is not one over-arching representation of what an inferential pattern is in conformity with a unified notion of logical consequence that can be abstracted from actual reasoning performances and procedures.

These positions involve different degrees of psychologism. i) and ii) support the notion that mental procedures should conform to an independent representation of what a logical pattern is in order to be reckoned as instances of the relation of logical consequence.

iii) acknowledge variety of inferential patterns in absence of a common representation of what counts as an instance of logical consequence. The question we raise is to know whether the interpretation of data related to the belief-bias task permits to avoid this radical and relativistic form of psychologism,