

Review of: "Cognitive Dissonance Model of Conditional Reasoning based on Truth-making"

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Review of "Cognitive Dissonance Model of Conditional Reasoning based on Truth-making"

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This paper tries to offer some help to the problem of understanding the performance in conditional reasoning tests questions involving assertions of the type "If A, Then B") as in the famous Wason selection task, by applying the notion of cognitive dissonance and by contrasting it with the truth-maker theory. The Wason selection task, also known as the four-card problem, is a sentential logic puzzle proposed by Peter Cathcart Wason in 1966 (cf. [4]).

The authors conducted a pre-test and a post-test to examine how the truth-makings of people affect conditional reasoning. According to them, the experimental results showed that truth-making is an important factor governing people's ordinary reasoning processes. The role of cognitive dissonance arises when the truth-table for material implication is explained to a group of people who have not touched the logic, and then conduct a selection task experiment. These subjects, the authors claim, "will choose between the pattern of daily reasoning and the rules of symbolic logic", as if they were distinct.

Let us examine the tests proposed in this text, and then evaluate the roles of cognitive dissonance and truth-making in their conclusions. The text argues that:

"The selection task... consists of four kinds of conditional arguments, each with the same conditional premise, presented in turn. Two are deductively valid; they are Modus Ponens (MP) and Modus Tollens (MT) and the other two are the fallacies of Affirming the Consequent (AC) and Denying the Antecedent (DA). When the four arguments are presented as a whole set, the task is referred to as "the conditional reasoning task".

This is not exactly what the Wason selection text proposes: there is not any fallacy in the Wason test. Using their example of "AK47":



"The rule: If there's a vowel on one side, there's an even number on the other.

Figure 2. The pre-test material

Select those cards that you need to turn over to determine whether the rule is true or not."

Actually there is no need to refer to Modus Tollens; the test just asks for the minimal checking model to be employed, in order to verify whether the rule has been correctly applied or not (whether the rule has been really applied or not is irrelevant for the subject, the minimal checking model will decide this).

Anyone with a minimal training in propositional symbolic logic that understands the truth-table for implication and the rule of contraposition ("If A then B" is equivalent to "If not-B then Not-A") will know that the rule :

"If A (there's a vowel on one side) then B (there's an even number on the other side) " Is equivalent to

"If not-B (there's an odd number on one side) then not-A (there's a consonant on the other side). Importantly, they will also know that those are "If-then" rules, and not "If and only if" rules). The rule of Modus Ponens says: "If X is the case, and X implies Y is the rule, then Y must be the case", and is entirely sufficient.

Therefore, in the test, the minimum checking test should be applied only when vowels and odd numbers are the case. Hence, only cards A and 7 should be verified. The others are irrelevant. But the test is not to be applied only to people, aware of this reasoning, but to everyone- and intended to explain people's mistakes. In my opinion, the pre-test and post-test are not totally clear and conclusive, but let's examine the conclusions.

How truth-making theory is applied

The notions of "truth-making" and "truth-makers" involve deep questions in philosophy, logic and language. References are given in the paper, Truthmaker theory is a branch of metaphysics that proposes that truth for a truth-bearer depends on being, on the existence of truthmakers. In simple words, it investigates the relationships between what is true and what exists. Perhaps the best quick summary has been given by the logician and philosopher Michael Dummett, also referred to, when he explains in a nutshell: the truthmaker theory "expresses one important feature of the concept of truth . . . that a statement is true only if there is something in the world in virtue of which it is true".

The paper stays on the safe side, assuming that all sentences in the test have their truthmakers, and reasoning agents maintain truth-making processes, or suppositional processes. But truthmakers have different levels and nuances and may be a result of evolutionary psychology, and so sensitive to social contexts. Evolutionary psychologists like Leda Cosmides and John Tooby defend in [2] that selection tests tend to produce more "correct" response when presented in a context of social relations ([2].) For example, also in the text:



The rule: "If a person is drinking beer then they must be over 18 years old on the other side".

Drinking beer plays the role of a vowel on one side, and the need to be over 18 years old plays the role of an even number on the other. Since the truth-maker in this case are universally accepted and understood, it becomes immediately intuitively clear that whoever drinks coke can be of any age, and whoever is over 22 years old can drink anything. So the minimum checking model requires to turn over the "Beer" and the "16", similarly, to the answers "A" and "7" in the AK47 version. This social aspect and its impact on the performance of a test is slightly outlined, but not taken seriously.

How the theory of cognitive dissonance is applied

The idea of cognitive dissonance proposed by the American psychologist Leon Festinger ([3]), simply explained, proposes that the mind sometimes enters into a state of mental discomfort from holding contradictory or conflicting beliefs or values. People then tend to restore consistency, naturalizing or minimizing certain facts, or rejecting them, or explaining them away, or avoiding new information that does not "square" well with their own beliefs..

According to the paper, the results indicate that cognitive dissonance can describe the way people reason when they can't guarantee the correct answer. This means, as proposed, that when their confidence in deductive reasoning differs from the confidence in their own reasoning, their cognition will not appear harmonious, which makes them choose suppositive reasoning. And then they would appeal to the mechanism of truth-making to reason. In addition, to a certain extent one could use cognitive dissonance to predict how people reason. One could use the theory of truth-makers to foresee some steps in reasoning when people's minds act under the pressure of cognitive dissonance.

I myself have a paper where logic interacts with psychology, forming the "completeness propensity".The paper analyses the idea of the propensity to completeness which shows how certain dangerous kinds of deceptive reasoning can arise in a discussion, and which would be the defense strategies against such deceptive attacks on the light of some principles accepted as fundamental for rationality and logic.

The idea of completeness propensity is quite simple- it proposes that it is a natural mechanism of our mind to "complete the picture", so when someone tells us a part of the truth, we generally complete the picture in favor of the opponent, almost never adding negative aspects. For example, if someone wants to sell us a vacation trip on a paradise beach, we will never imagine how difficult the trip is, nor that we will have to pay a lot to eat, nor about the mosquitoes...

As suggested in [1], the idea of completeness propensity is analogous to the idea of maximal consistency that is extensively used to build models in logic.Unconsciously, reasoners can build maximal models that many times act against their own interests.

Actually, it is possible that the two ideas, completeness propensity and cognitive dissonance, could be special cases of some more abstract mental phenomenon, yet to be discovered.

To sum up, the text is not written in the best of all styles; although I will not detail some confusing points here, the fact is that better care in the presentation would help to clarify the arguments raised. However, despite the fact that the authors themselves apparently did not quite understand the logical structure of the Wason test, the paper is a valid attempt to address this very intriguing question: how people so recurrently make mistakes when faced with reasoning involving logical implication.

References

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