Hidden premises in an argument by Deng Xi's: the action of pragmatics according to the syntactic theories

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Abstract. The syntactic theories trying to describe human reasoning, communication, and language often claim that the role played by pragmatics basically consists of providing hidden premises that help one draw conclusions. Obviously, this is a very strong assumption. However, this paper is intended to show that there are arguments used by people that cannot be understood without such premises, and that hence they confirm that assumption. This is done by resorting, as an example, to an argumentation given by the Chinese thinker Deng Xi.
Keywords: Deng Xi; formal rules; hidden premises; pragmatics; syntactic theories

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1. Introduction

As indicated, for example, by Johnson-Laird (2010, p. 204), the syntactic theories, that is, the theories supporting the idea that there are formal schemata in the human mind that lead inferential processes, need to resort to hidden premises to explain some experimental results that are to be found in the literature on cognitive science. Such premises are necessary to account for the role of pragmatics in those processes, since they reveal the way general knowledge can act in human activity. Actually, it cannot be stated that the syntactic theories are a homogenous whole, as under that designation many approaches can be included, simply some examples being that of Beth and Piaget (1966), that of Henlé (1962), that of the mental logic theory (e.g.,

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Braine & O'Brien, 1998a, O'Brien, 2009, 2014; O'Brien & Li, 2013), or that of Rips (1994). However, most of them refer or, at least, seem to be compatible with the idea of the pragmatic action of hidden premises (for a discussion, as far as the particular case of the mental logic theory is concerned, see, e.g., López-Astorga, 2016a). For this reason, I will not assume any of the mentioned frameworks in entirety in this paper and only try to offer a general explanation acceptable for all of them. In this way, I will work here, as it is done, for instance, in López-Astorga (2014), under the hypothesis that the human mind makes inferences following a system with formal schemata directly derived from texts such as those of Deaño (1999) or Gentzen (1934, 1935), that is, following standard logical calculus. There is no doubt that, as also indicated by López-Astorga (2014, pp. 131-132), accepting this hypothesis can be controversial, since several of the syntactic theories intend to move away from classical logic, the cause of this being that some experiments have revealed that some of the requirements of this last logic are not always fulfilled by participants (a clear example in this regard can be the mental logic theory). Nevertheless, this will not be a real problem here (as it is not in López-Astorga, 2014, either), as the arguments that will be provided do not refer to aspects of standard calculus that cause inconveniences and that, therefore, are not admitted by some syntactic theories.

Thus, my main aim here is to show that, while it is evident that the idea that there are hidden premises that play a role in human intellectual activity is a very strong assumption, it is also obvious that we can easily find evidence in favor of it. In particular, I will focus on an argument given by Deng Xi, an ancient Chinese philosopher, in order to support the thesis that, on the one hand, Deng Xi's argument can only be understood if it is assumed that indeed hidden premises coming from general knowledge undertake pragmatic actions that have an influence on the interpretation of discourses, and, on the other hand, that, hence, that very argument confirms the existence of hidden premises in human thinking.

To do all of this, firstly, I will better explain the role that hidden premises can play in the syntactic theories. Then, I will give a very brief description of Deng Xi's philosophical context, the text in which the argument that will be analyzed is, and the reasons that could lead him to raise arguments such as that one. Finally, I will propose an account of why the argument can be considered evidence that the hypothesis of hidden premises is correct and suitably interpreted only if that very hypothesis is accepted. So, I begin by describing in more detail the function that hidden premises can perform in the syntactic theories.

2. Hidden premises coming from general knowledge

Maybe the best way to show how hidden premises can work is by means of an example, and, in this case, I will consider one based on a sentence taken from Orenes and Johnson-Laird (2012) and that these last writers use with goals very different from mine (they are not proponents of any syntactic theory). The sentence is as follows:

"… Ana read *Don Quixote* or she read a novel" (Orenes & Johnson-Laird, 2012, p. 375; italics added).

If we suppose that this sentence is the first premise of an inference and that the second one is 'Ana did not read a novel', we come to a problematic situation from the logical point of view. Certainly, given that my working hypothesis is, as said, that the human mind makes inferences following standard calculus, these equivalences can be provided:

p: Ana read *Don Quixote*
q: Ana read a novel
∨: disjunction
¬: negation

Thus, the two premises can be formalized in this way:

p ∨ q
¬q

And the conclusion in classical logic is clear: p.

True, in standard calculus (and not only in it, as the schema reproduces the formal structure of Modus Tollendo Ponens, a schema that was valid in a logic as ancient as the Stoic one), p ∨ q, ¬q ∴ p (where '∴' means that the right formula can be derived from the left formulae), which leads to an absurd scenario: Ana did not read a novel (¬q) but she read *Don Quixote* (p), the problem being, of course, that *Don Quixote* is a well known Spanish novel.

Nevertheless, if we accept the hypothesis that general knowledge provides hidden premises with pragmatic value, we can say that individuals know, for example, that ¬q → ¬p (where '→' represents the logical conditional), that is, that, if Ana did not read a novel, then she did not read *Don Quixote*, and that, therefore, the second premise (¬q) along with this last hidden premise enables to deduce, via Modus Ponendo Ponens (i.e., another schema coming from the Stoic system), ¬p (i.e., that Ana did not read *Don Quixote*) as well. And this can explain why nothing is really deduced. The premises are not p ∨ q and ¬q, but p ∨ q, ¬q, and ¬q → ¬p, and, as indicated, p ∨ q, ¬q, and ¬q → ¬p ∴ p ∧ ¬p (where '∧' denotes conjunction). So, there is no doubt that this last contradiction can stop the inferential process and cause one to derive no formula.

Nonetheless, a new difficulty arises here. As it is known, in standard logic there is a principle usually called 'Ex Contradictione Quodlibet Sequitur', which provides that all of the formulae that can be thought can be derived from a contradiction such as p ∧ ¬p. However, this problem is not hard to solve either. Theories such as the one of the mental logic have proposed in this regard that this is precisely one of the aspects that differentiate the real logic the human mind follows from classical logic. In the real mental logic, contradictions are never linked to the aforementioned principle, but only to Reductio ad Absurdum processes, which only reveal that at a minimum one of the suppositions is false (see, e.g., Braine & O'Brien, 1998b, p. 206). Nevertheless, beyond the difficulties that this solution can have too (see, e.g., for a discussion, López-Astorga, 2016b, pp. 46-47), it is not really necessary. The problem disappears if we simply note that, from a cognitive point of view, the possibility to derive all of the formulae that can be constructed is very akin to the possibility to derive nothing. Indeed, in both of those cases, there is no significant information that allows one to continue the inference having a certain security. If nothing can be drawn, the inference just cannot continue. If every possible formula can be drawn, given that whenever something is derived, it is possible to derive its

negation as well, no certainty can be achieved about anything. So, in this last case, the more suitable attitude also seems to be not to come to any conclusion and to claim nothing about the truth value of any formula, that is, to stop the inferential process too.

In any case, this is only an example of the way hidden premises coming from general knowledge can work. What is interesting for this paper is that it is possible to find real circumstances and discourses in which such premises are actually present and which can only be understood paying attention to them. As said, that is the case of an argument offered by Deng Xi. But before analyzing that argument, it appears to be necessary to give some data about this thinker.

3. Deng Xi and the theory of *liang ke*

According to Fraser (2017), Deng Xi, who died in 501 B.C.E., was a representative of the named 'School of Names (*ming jia*)', which was concerned about the relationships between words and things. However, his aspects more relevant here can be that, also following Fraser (2017), *The Annals of Lü Buwei*, Book 18, show him using rhetoric and putting forward that it is difficult to clearly distinguish concepts such as 'right' and 'wrong', and 'admissible' and 'inadmissible', and that, in connection with any issue, two speeches are possible, one of them in favor of an idea and the other one against that very idea (the theory providing that 'both sides are admissible' or '*liang ke*').

Obviously, these characteristics remind of Greek sophists, and a fragment reproduced by Fraser (2017) and taken from the aforementioned annals (in particular, the fragment is in Book 18.4/453) makes it even more evident that, indeed, Deng Xi thought that every matter admits two opposite discourses. The text is as follows:

> "The Wei river was extremely high. A person from the house of a rich man of Zheng drowned. Someone found the body. The rich man asked to buy it back. The man demanded very much money. The rich man told Deng Xi about it. Deng Xi said, 'Calm down about it. There's certainly no one else he can sell it to'. The one who found the body was troubled by this and told Deng Xi about it. Deng Xi replied to him too by saying, 'Calm down about it. There's certainly nowhere else they can buy it'".

However, if reviewed in detail, this text is really problematic. We cannot truly observe two contrary speeches in it because actually what is said to the rich man (i.e., that there is no one else he can sell it to) is not inconsistent with what is said to the other man (i.e., that there is nowhere else they can buy it). And this is so because, clearly, the fact that the man who found the body can only sell it to the rich man is not, in principle, incompatible with the fact that the rich man can only buy the body to the man who found it. It is possible even to think that the two answers are both of them true at the same time, the reason of it being that they refer to two different aspects of reality that do not have a necessary influence on each other (that there is only one possible buyer does not necessarily imply that there is only one possible seller, or vice versa).

But this evidently raises an immediate question. If there is no explicit contradiction between the two answers given by Deng Xi in the previous fragment, why do we tend to consider them to be incoherent and think that texts such as that one enable to deem Deng Xi as a 'Chinese sophist' similar to the Greek ones? The response to this last question is clear: the reason is that the answers offered by Deng Xi refer to hidden premises. The next section is intended to show this.

4. Deng Xi's argumentation and its hidden premises

To describe the hidden premises that can be identified in Deng Xi's argumentation above and how they can work in the human mind, I will resort to first-order predicate logic. This can seem incorrect, since the previous explanation of the role of that kind of premises in the syntactic theories has been presented in terms of propositional calculus. However, it is not a problem either. On the one hand, the relationships between those two types of logic are evident and it is known that any formula expressed by means of symbols of one of them can be easily translated into another formula with symbols of the other one (see, e.g., Deaño, 1999). On the other hand, some of the syntactic theories have also proposed predicate logics considered a natural development of its propositional logics and absolutely complementary to them (see, e.g., for the particular case of the mental logic theory, Braine, 1998). So, it can be thought that it is clearly justified to use first order predicate calculus if, as mentioned, the working hypothesis of this paper is that standard logic controls human thinking.

That said, to formalize the first answer responded by Deng Xi, that is, that the man who found the body can only sell it to the rich man, these equivalences can be assumed:

Sxy: x sells to y
a: the man who found the body
b: the rich man
$\exists$: the existential quantifier
$x \neq y$: x is different from y

Thus, the logical form of that response can be:

$\neg \exists [(x \neq b) \wedge Sax]$

That is, there is no x so that x is different from b and a sells to x.

Hence, this formula indicates that b is the only possible buyer. However, people know that, if somebody is the only buyer, then he/she is in a rather advantageous position with regard to the seller, and that he/she can become who finally makes a decision on the price of the sale. In this way, a new equivalence can be this one:

Dx: x makes the decision (in this case, as said, on the price)

And it can be claimed that the previous formula is always linked to this hidden premise by pragmatics:

$Db \wedge \neg Da$

That is, b makes the decision and a does not make the decision.

As far as the second answer (that is, that the rich man can only buy the body to the man who found it) is concerned, only one more equivalence is needed to show its logical form:

Bxy: x buys to y

And with it, it is possible to build this other formula:

¬∃x [(x ≠ a) ∧ Bbx]

That is, there is no x so that x is different from a and b buys to x.

Therefore, this last formula states that a is the only seller. Nevertheless, this formula has a hidden premise provided by pragmatics as well. People also know that, if somebody is the only seller, he/she is who can make the decision on the final price, that is, they know that

Da ∧ ¬Db

That is, a makes the decision and b does not make the decision.

So, the contradiction is obvious. Given that ¬∃x [(x ≠ b) ∧ Sax] is true, Db ∧ ¬Da is also so, and because ¬∃ [(x ≠ a) ∧ Bbx] is true, Da ∧ ¬Db is so too. But Db ∧ ¬Da and Da ∧ ¬Db express the contrary and are hence inconsistent, which means that, while it is true that the responses given by Deng Xi are incompatible, they are so only because of their pragmatic premises, and not because of themselves. The first of the answers implies, by virtue of pragmatics, that the rich man is who makes the decision on the price, and not the man who found the body. On the contrary, what pragmatics indicates in the case of the second one is that the decision is made by the man who found the body, and not by the rich man. Clearly, at the same time as this Deng Xi's argument gives support to the hypothesis of hidden premises, it is hard to correctly interpret it ignoring the existence of such premises.

5. Conclusions

Therefore, the previous account shows not only that the idea of hidden premises given by pragmatics makes sense, but also that a framework based on a system more or less akin to standard logic does as well. In this way, it can even be thought that this paper reveals how a framework of that kind can have the necessary resources to explain certain facts difficult to understand from a radically different approach.

Undoubtedly, nowadays it is very hard to claim that human reasoning works just following standard calculus, since, as said, several studies have shown that people do not always respect all of its requirements (see also, e.g., Orenes & Johnson-Laird, 2012). And, on the other hand, certain problems have been detected in particular syntactic theories such as the one of the mental logic as well (see, e.g., López-Astorga, 2016b). However, that does not mean that any syntactic system is not possible. Standard logic and the mental logic theory are not the only syntactic proposals that can be thought. Of course, it is totally feasible to raise approaches similar to those ones and that, nevertheless, are able to overcome the problems or difficulties that can be attributed to frameworks such as those very systems.

Indeed, modifications can always be done. As seen above, the mental logic theory introduces an important change with regard to standard calculus.

According to the former, the Ex Contradictione Quodlibet Sequitur principle must be ignored. As also indicated, this change may not be absolutely necessary. Nonetheless, it demonstrates that minor modifications are possible in any syntactic theory, and that hence, by virtue of such modifications, we can construct by degrees an actual model of the human intellectual dynamic that can finally really describe how the human being reasons and carries out linguistic and communicative activities. Thus, the construction process of that model can lead us to a theory that is consistent with most of the experimental results that are to be found in specialized literature.

As pointed out, the arguments of this paper reveal that to try to build that model is not an absurd task. So, it is evident that it is worth continuing to look for the exact syntactic framework that clearly shows the actual operating of the human mind.

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