

'BUT' AND ITS ROLE IN THE BUILDING OF MENTAL REPRESENTATIONS

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Abstract

The mental models theory rejects that sentences are linked to logical forms. From its perspective, their most relevant aspect refers to the semantic possibilities that correspond to them. In this way, the theory has analyzed in detail the real semantic role that the traditional connectives in logic can play in reasoning. However, given that logical forms are not important in its framework, in this paper, it is argued that those connectives are not the only operators that the mental models theory should review, and that there are other connectives present in most of the languages in general that can be interesting for it as well. That is the case of 'but' in English, which is addressed from the approach of the aforementioned theory here.

Keywords: *But; Connectives; Mental Models; Modulation; Semantics.*

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‘PERO’ Y SU ROL EN LA CONSTRUCCIÓN DE REPRESENTACIONES MENTALES

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Resumen

La teoría de los modelos mentales rechaza que las oraciones estén vinculadas con formas lógicas. Desde su perspectiva, su aspecto más relevante hace referencia a las posibilidades semánticas que les corresponden. De este modo, la teoría ha analizado detenidamente el rol semántico real que las conectivas tradicionales de la lógica pueden desempeñar en el razonamiento. No obstante, dado que las formas lógicas no son importantes en su marco teórico, en este trabajo, se argumenta que tales conectivas no son los únicos operadores que la teoría de los modelos mentales debería revisar, y que existen otras conectivas presentes, en general, en la mayoría de los idiomas que pueden ser igualmente de interés para ella. Este es el caso de ‘but’ en inglés, que es considerada aquí desde el enfoque de la mencionada teoría.

Palabras clave: *pero; conectivas, modelos mentales, modulación, semántica.*

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I. Introduction

Many works describe and explain the general theses of the mental models theory (from now on, MMT), including, for example, Byrne and Johnson-Laird (2009), Johnson-Laird (2004, 2006, 2010, 2012, 2015), Johnson-Laird and Byrne (2002), Johnson-Laird, Khemlani, and Goodwin (2015), Khemlani, Lotstein, Trafton, and Johnson-Laird (2015), Khemlani, Orenes, and Johnson-Laird (2012, 2014), Oakhill and Garnham (1996), Orenes and Johnson-Laird (2012), Quelhas, Johnson-Laird, and Juho (2010), and Ragni, Sonntag, and Johnson-Laird (2016). However, if it is necessary to indicate its main idea, it can be said that it is the assumption that human mental activity has to do with possibilities. According to the theory, people do not consider logical forms when they think (see especially Johnson-Laird, 2010), but only semantic combinations referring to possible scenarios iconically reproduce reality.

Nevertheless, it is true that the theory has been basically devoted to analyze the combinations of possibilities of just the traditional connectives in standard logic, that is, the conditional, biconditional, conjunction, and

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inclusive and exclusive disjunction (see, e.g., Table 9.2 in Johnson-Laird, 2012, 138). There is no doubt that this work absolutely makes sense within its framework, since such operators are essential to make inferences from information received in the form of premises. Nonetheless, it is also evident that, from the perspective of MMT, the revision of other connectives that, in the same way, are relevant in reasoning and language is also advisable too. And this is so because, obviously, the theory rejects the hypothesis that the human mind follows a natural deduction calculus akin to that of Gentzen (1934; 1935), and, given that language enables to link data by means of more operators than those of that calculus, such additional operators should not be ignored either.

Thus, the central goal of this paper is to address one of those connectives not included in the set of those of traditional logic. Such connective is ‘but’ in English, which, as it is known, can be translated into more or less similar words in most of the languages, for example, ‘*pero*’ in Spanish, ‘*mas*’ in Portuguese, ‘*ma*’ in Italian, ‘*aber*’ in German, ‘*dar*’ in Romanian, or ‘*sed*’ in Latin. Of course, the meanings of these words in such languages do not always exactly match, as, apart from the fact that the particular semantic content of the sentences and pragmatics may have an influence in certain cases, all of them do not accurately have the same functions in their own language. However, it can be said that, in general, such words share a contrasting function regarding a main idea, and that is the function that will be principally studied here.

In order to do so, I will begin by presenting some of the main theses of MMT that it is necessary to take into account to achieve the aforementioned goal. Then, in the second section, I will focus on ‘but’, its semantic possibilities, and the role that can be assigned to it within the approach of MMT. So, a brief description of this last theory is given in the next section.

II. MMT and the iconic models

MMT is clearly a psychological theory. Nevertheless, it acknowledges its philosophical background, which comes from writers such as, for example, Peirce (1931-1958). This heritage is explicitly assumed in several works (e.g., Johnson-Laird, 2012; Johnson-Laird et al., 2015), and means that, while each connective in traditional logic is related to the possibilities in which it is true in a truth table of this last logic, those possibilities lead to a model, “which is iconic in that its structure corresponds to the structures of the sets it represents” (Johnson-Laird et al., 2015, p. 207).

All of this can be better understood if we pay attention to the four possible combinations between two clauses p and q that can be imagined:

- [I]: $p \ \& \ q$
- [II]: $p \ \& \ \neg q$
- [III]: $\neg p \ \& \ q$
- [IV]: $\neg p \ \& \ \neg q$

Where ‘&’ links the clauses and ‘ \neg ’ represents negation.

Following this, MMT assigns possibilities sets to each connective in standard logic. In this way, if the particular individual is able to identify all of the possibilities related to the connective, (which, for several reasons, does not always happen), it can be stated that the sets are, in principle, as follows (see, e.g., Johnson-Laird, 2012, p. 138, Table 9.2):

- Conditional: [I], [III], and [IV]. Evidently, a sentence such as ‘if p then q ’ will be false only in cases of p and $\neg q$, that is, in cases of [II].
- Conjunction: [I]. Obviously, a sentence such as ‘ p and q ’ can only be true when its two conjuncts are so, that is, in cases of [I].
- Disjunction: [I], [II], and [III]. Clearly, a sentence such as ‘either p or q ’ will be false only in cases of $\neg p$ and $\neg q$, that is, in cases of [IV]. Nevertheless, those are the possibilities sets of disjunction only if it is inclusive. If exclusive, [I] would have to be removed as well, since an exclusive disjunction, as it is well known, cannot be true when its two disjuncts are true either.

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If only these assignments are taken into account, it can be thought that MMT is not very different from the truth tables of classical logic. Nonetheless, as pointed out, thinking that is making a mistake. On the one hand, people sometimes fail to build the correct model and, because further reflection is needed, forget some possibilities. On the other hand, as also indicated, the models are iconic and represent possibilities in the world. So, they can be modified by semantic and pragmatic influences. These modification processes are called ‘modulation’ processes in the theory (see, e.g., Johnson-Laird, 2012; Johnson-Laird et al., 2015; Orenes & Johnson-Laird, 2012; Quelhas et al., 2010), and clear examples can be the following. Think about, for instance, this conditional:

“If Pat is in Rome then she is in Italy” (Orenes & Johnson-Laird, 2012, p. 360).

Of course, as shown by Orenes & Johnson-Laird (2012, p. 360), its model includes the possibilities presented above:

- [I]: She is in Rome & She is in Italy
- [III]: She is not in Rome & She is in Italy
- [IV]: She is not in Rome & She is not in Italy

Indeed, a conditional such as this one can only be false in cases of [II], that is, in scenarios in which Pat is in Rome but not in Italy.

But, if we consider now other conditional that, although it is very similar to the previous one, it is not identical to it, the situation completely changes:

“If Pat is in Italy then she is not in Rome” (Orenes & Johnson-Laird, 2012, p. 360).

In this case, as also explained by Orenes & Johnson-Laird (2012, p. 361), the possibilities of the model are not the same:

[I]: She is in Italy & She is not in Rome

[III]: She is not in Italy & She is not in Rome

It is clear why [II] is not a valid possibility for this example. The sentence is a conditional and, as said, conditionals are false in [II]. Nevertheless, what is most important now is that modulation does not enable [IV] for it either. The reason is also simple: it is not possible that Pat is not in Italy and in Rome at the same time, because, if somebody is in Rome then he/she is necessarily in Italy too.

16 As far as conjunction is concerned, it is easy to think about examples as well. A sentence such as the following undoubtedly has the only set attributed to it above:

This car is green and it is John's car.

True, its model is just:

[I]: This car is green & This is John's car

[II] would not be possible because the car would not be John's. In [III], it would be John's car but not green. And, in [IV], the object would be neither green nor John's.

Nonetheless, the model does not remain the same if, simply, a possibility verb is introduced:

This car is green and it may be John's car.

Certainly, by virtue of modulation, the model admits now two possibilities:

[I]: This car is green & This is John's car

[II]: This car is green & This is not John's car

And the reason is not hard to understand. Although the sentence continues to be a conjunction, the second conjunct is not known for sure, which means that two situations are possible: a scenario in which John is the car owner and other scenario in which he is not that.

Of course, examples related to disjunction are not difficult to find either (see, e.g., Orenes & Johnson-Laird, 2012). However, what has been said is already enough to analyze ‘but’ and the possibilities that can be assigned to it. I do that in the next section.

III. The semantic possibilities corresponding to ‘but

Intuitively, one might think that, with regards to semantic possibilities, ‘but’ plays a role akin to that of conjunction, since its model appears to tend to be the same: a model including just the set [I]. This can be easily seen by means of an example:

This is a car but it has three wheels.

Indeed, the only set that the model can accept is this one:

[I]: This is a car & This has three wheels

In [II] the car does not have three wheels, in [III] the object is not a car, and in [IV] these two circumstances occur together: the object is not car and it does not have three wheels.

However, from the framework of MMT, this fact raises an absolutely legitimate and justified question: if this is so, why are there different words in most of the languages for ‘and’ and ‘but’? Certainly, if we take up the examples mentioned above, it can be stated that those two words can be ‘y’ and ‘pero’ in Spanish, ‘e’ and ‘mas’ in Portuguese, ‘e’ and ‘ma’ in Italian, ‘und’ and ‘aber’ in German, ‘și’ and ‘dar’ in Romanian, and ‘et’ and ‘sed’ in Latin. Nevertheless, the answer to that question is not hard to find from just the MMT approach. As accounted for, the models are iconic representations linked to semantics and pragmatics, and hence to people’s general knowledge. In this way, continuing with the example of the car and the three wheels, it can be claimed that, based on MMT, if individuals only listen or read the word ‘car’, they will tend to build a model in which the object, that is, the car, has four wheels, the reason of this being that they know that cars usually have four wheels. Thus, given only the word ‘car’, the model will be generally as follows:

Car & Four wheels

Therefore, what ‘but’ does is to introduce an exception or unusual information. From this point of view, its function is really important, as it helps to create the correct representation of the particular situation by advising that the model must be modified in an unexpected direction, that is, eliminating an element very probable given its characteristics and adding another one that is not common given those same characteristics. So, in other words, it can be said that ‘but’ facilitates the elaboration of the suitable model, which, in the case of our example, has to remove ‘four wheels’ and include ‘three wheels’, the result being this one:

Car & Three wheels

Hence ‘but’ can be considered to be a very useful linguistic tool pointing out that general knowledge and cultural background must be forgotten to some extent and that due attention must be paid to the information that is truly

stated in the sentence. And this can also apply in the case that modulation modifies the model. Think about, for example, this sentence:

This is a car but it may have three wheels.

Its model clearly refers to these possibilities:

[I]: This is a car & This has three wheels

[II] This is a car & This has four wheels (This does not have three wheels)

[III] and [IV] cannot be admitted because the object is not a car in them. Nonetheless, what is important here is that, again, ‘but’ warns about an exception. The only difference is now that the exception is just a possibility that may happen ([I], the case in which the car has three wheels) or may not occur ([II], the case in which there is nothing unusual and, as general knowledge indicates, the car has, as almost always, four wheels).

IV. Conclusions

18 It is evident that ‘but’ can be used in English in senses other than the one explored in this paper. Likewise, the other more or less equivalent words in several mentioned languages can have other functions in those languages too. And all of this without even mentioning that such uses and functions can be expanded by modulation, that is, by the particular contextual, pragmatic, or semantic circumstances (as far as this last point is concerned, there is no doubt that to provide relations between what has been presented here and approaches such as that of Redeker, 1990, could be a very relevant activity).

Nonetheless, as stated above, this analysis has dealt with but’s more habitual sense in different languages, that is, the one related to the contrast between two ideas, and, in this way, has shown the potential that MMT can have in studies on language. This theory is, of course, a psychological framework. However, beyond the fact that currently it is often used to solve many problems related to cognitive science, philosophy of mind, or epistemology (see, e.g., López-Astorga, 2015), as it can be noted in the previous pages, it can also enable interesting linguistic researches that can lead a better understanding of some of the elements that constitute our expressive resources, or, at least, to raise challenging hypotheses about them. In the case of ‘but’, as argued, MMT allows considering it as a tool helping to make mental representations and that, in addition, seems to have a similar role in many other languages.

Obviously, beyond the classical connectives in standard logic reviewed by MMT and ‘but’, our languages include more words, expressions, and operators that would be worth analyzing with a methodology akin to that

used in this paper Some of them can be, for example, ‘although’, ‘when’, ‘even if’, etc. This would allow us to detect the possibilities to which they usually refer and, therefore, to know their actual functions in communication. Furthermore, it is also evident that research in this direction could be a big support in checking whether or not there are differences between languages regarding such connectives, to grasp the true way human beings transmit and receive information and the real importance that aspects such as semantics and pragmatics have in language (modulation can have an influence in sentences including operators such as the last indicated too). Hence it is clear that working in this field is not trivial, and that searching for other linguistic connectives to be reviewed might be promising as well. And this is so without forgetting that continuing to analyze ‘but’ can be a very relevant task.

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