Sentential and morphological negations: an analysis of theses from Cognitive Linguistics based on iconic models

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Abstract: Cognitive Linguistics is an important approach to language and cognition that gives relevant arguments and theses on topics related to these subject matters. On the other hand, the mental models theory is a psychological reasoning theory that also offers interesting experimental results consistent with its general ideas about these very topics. This paper is intended to look for connections between these two frameworks in order to show that, at least in principle, they are not contradictory, can be assumed at the same time and can support each other. This will be demonstrated mainly by means of an example linked to the differentiation between sentential and morphological negations and the way it can be addressed from the two approaches.

Key words: cognition, iconic models, mental space, negation, perspective.

1. Introduction[2]

Cognitive Linguistics is nowadays a very important approach in the general field of linguistics. It cannot be said that it is only one theory, but a general framework that can contain different points of view (see, e.g., Geeraerts & Cuyckens 2007). In spite of that, several aspects can be deemed as common between the proposals about Cognitive Linguistics. Geeraerts and Cuyckens (*ibid.*) remind us what these aspects are and the most important of them are discussed below.

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On the one hand, Cognitive Linguistics considers linguistics as something that "involves not just knowledge of the language, but knowledge of the world as mediated by the language" (*ibid.*: 7). And, in this way, to understand linguistics, semantics is much more important than syntax. However, this does not mean that semantics is the only aspect that is relevant to take into account in linguistic studies. Cognitive Linguistics, on the other hand, also insists on the role played by context, which can be "social", "cognitive", and "situational" (*ibid.*: p. 13).

Thus, a really interesting characteristic of this approach, which does not seem to have been analyzed much to date, is that it presents clear relations to other contemporary cognitive theories coming from other fields. Such theories often have a strong empirical support that appears to confirm their essential theses, and one of them is the mental models theory (e.g., Bucciarelli & Johnson-Laird 2019; Khemlani, Byrne, & Johnson-Laird 2018; Khemlani, Hinterecker & Johnson-Laird 2017). Nevertheless, oddly, it is not very frequent to find references from Cognitive Linguistics to this last theory or vice versa in the literature.

This is curious because, indeed, one might think that certain correspondences between Cognitive Linguistics and the mental models theory are obvious. On the one hand, the latter deals, in addition to reasoning, to a large extent, with language as an essential element in cognition. Examples such as the papers by Quelhas & Johnson-Laird (2017) – in which disjunction is addressed – or by Quelhas, Rasga, & Johnson-Laird (2017) – in which the conditional is addressed – can be illustrative enough in this way. On the other hand, it is a framework in which semantics is more relevant than syntax and in which pragmatics (and hence context) is crucial as well. So, the idea that both approaches are compatible can be justified, and this paper will try to further explore in this direction.

In particular, it will attempt to show that the concept of 'iconic model' from the mental models theory (e.g., Johnson-Laird 2012; see also, e.g., López-Astorga 2019) is not very far from notions such as 'mental space' (e.g., Fauconnier 1985, 2007) or 'perspective' (e.g., Verhagen 2007) from Cognitive Linguistics. And that will be done by means of an example in which two different kinds of negation, the sentential one and the morphological one, will be compared and contrasted by resorting to very simple sentences. Thus, firstly, this last example will be explained in detail, as well as the notions that are often used from Cognitive Linguistics to interpret it. Then, the concept of iconic model of the mental models theory will be described. Finally, it will be argued that the above-mentioned notions from Cognitive Linguistics can be easily linked to the one of iconic model, and that this is so even if they cannot be defined in exactly the same way.

2. Two types of negations and their perspectives or mental spaces

The example comes from Verhagen (2007), and it is understood by virtue of the classical differentiation in Cognitive Linguistics between the concepts of 'Figure' and 'Ground', which, following Verhagen, was first proposed under that approach by Talmy (1978). In this way, Verhagen considers the element that is highlighted or attracts attention in a sentence as Figure, and the rest around as Ground, and, based on this, his example is as follows.

If the concept of happiness is assumed as Ground and Mary's mood is taken as Figure, these two sentences expressing the fact that the concept assumed does not describe Mary's actual mood can be constructed:

[I]   Mary is not happy (Verhagen 2007: 67)

[II]   Mary is unhappy (*ibid.*)

The main point here is that the fact that they are negated in different was leads to great differences. In particular, while [II], whose negation is morphological, only allows thinking about one perspective ('Mary not being happy'), [I], whose negation is sentential, invites us to consider two perspectives ('Mary being happy' and 'Mary not being happy'). Verhagen (*ibid.*) explicitly says that he understands the concept of perspective in a similar manner as Fauconnier (1985, 2007) understands the concept of mental space. So, it can be stated that mental spaces, or perspectives,

> [...] are very partial assemblies constructed as we think and talk for purposes of local understanding and action. They contain elements and are structured by frames and cognitive models. Mental spaces are connected to long-term schematic knowledge, such as the frame for walking along a path, and to long-term specific knowledge, such as a memory of the time you climbed Mount Rainier in 2001 (Fauconnier 2007: 351).

Maybe, as far as what will be argued below is concerned, it is convenient not to forget that Fauconnier thinks that the structure of mental spaces is given by cognitive models. Nonetheless, what is relevant now is that [I] leads to one more perspective than [II], and this can be seen if the sentences [I] and [II] are extended, and [III] and [IV] are, for example, deemed as answers to a hypothetical question about Mary's mood:

[III]   Mary is not happy. On the contrary, she is feeling really depressed (Verhagen 2007: 67)

[IV] Mary is unhappy. On the contrary, she is feeling really depressed (*ibid.*)

Examples [III] and [IV] show that the new sentence linked to both [I] and [II] ('On the contrary, she is feeling really depressed') does not have the same influence on them. While in [III] it seems to just provide further information (not only is Mary not happy, she is depressed), it transforms [IV] into a contradiction (being depressed is not the opposite of being unhappy). However, under Verhagen's (2007) approach, the reasons why this is so are not hard to understand.

His general idea is that, as indicated, a sentential negation allows considering two perspectives or mental spaces. Nevertheless, a morphological negation only leads to one. Thus, [IV] only enables one to think about one situation: the circumstance in which Mary is unhappy, that is, a circumstance that cannot be inconsistent with being depressed. But, because its negation is sentential, [III] allows taking two different situations into account: the situation in which Mary is not happy and the situation in which she is happy. In this way, since being depressed is inconsistent with the second one, that is, with the situation in which Mary is happy, the use in [III] of 'On the contrary' causes no problem.

Another interesting point in this regard is that this phenomenon is not limited to English. It can be observed in many languages, and the translations of [III] and [IV] into the Romance languages indicated below are simply three examples:

[III$_s$] Spanish: Mary no es feliz. Por el contrario, se está sintiendo realmente deprimida.

[IV$_s$] Spanish: Mary es infeliz. *Por el contrario, se está sintiendo realmente deprimida.

[III$_p$] Portuguese: Mary não é feliz. Pelo contrário, ela está se sentindo muito deprimida.

[IV$_p$] Portuguese: Mary é infeliz. *Pelo contrário, ela está se sentindo muito deprimida.

[III$_f$] French :   Mary n'est pas heureuse. Au contraire, elle se sent vraiment déprimée.

[IV$_f$] French :   Mary est malheureuse. *Au contraire, elle se sent vraiment déprimée.

In these three cases, [III$_s$] and [IV$_s$], [III$_p$] and [IV$_p$], [III$_f$] and [IV$_f$], the same as in [III] and [IV] happens, since, while [III$_s$], [III$_p$] and [III$_f$], whose negations are sentential, clearly make sense (as [III] does), [IV$_s$], [IV$_p$] and [IV$_f$], whose negations are morphological, seem to be

contradictory (as [IV] does). And the reason is the same as in the case of [III] and [IV]. [III$_s$], [III$_p$] and [III$_f$] permit two perspectives to be considered, and [IV$_s$], [IV$_p$] and [IV$_f$] only one.

It is very easy to relate all of this to the basic theses of the mental models theory. That will be shown below, but, before that, the next section explains what an iconic model is under the framework of this theory.

3. Sentences and their iconic models

The mental models theory in its entirety will not be accounted for here, as that would be beyond the scope of this section. It suffices to remind the reader that the theory is a psychological and reasoning theory, and that, by trying to predict human cognitive behavior, it provides very relevant arguments from a linguistic point of view. Thus, the main idea in this way can be that sentences always lead to models that are iconic ways of representing images of the world in the human mind (e.g., Johnson-Laird 2012).

Unlike standard logic, according to this framework, the same connectives do not always have the same interpretations, which, under this approach, means that the same connectives are not always linked to the same kinds of models (e.g., Orenes & Johnson-Laird 2012). Apart from the influence that a lack of effort on the part of the particular individual can have, which can mean that fewer models are identified (e.g., Johnson-Laird 2012), as argued in most of the works supporting the theory, pragmatics and especially semantics play a very relevant role in this regard. An example can illustrate this point:

[V] Pat visited England or she visited Italy, or both (Johnson-Laird *et al.* 2015: 204)

As pointed out by Johnson-Laird *et al.* (2015), the iconic models of [V] are three:

[VI] Pat goes to England and Pat does not go to Italy.

[VII] Pat does not go to England and Pat goes to Italy.

[VIII]Pat goes to England and Pat goes to Italy.

As said, [VI], [VII] and [VIII] are representations of the world that iconically describe it. So, they are alternative possibilities that can be true if [V] is so. In this way, one might think that what the mental models theory claims is that 'or' in [V] has a behavior akin to that of disjunction in standard logic, since [VI], [VII] and [VIII] match the rows in any truth table of that logic in which that connective is true. However, as indicated, that is not so because semantics and

pragmatics can also have an influence (for the relations between the mental models theory and standard logic, see also, e.g., López-Astorga 2014). One example in which semantics modifies the models is as follows:

[IX] Pat visited Milan or she visited Italy (Johson-Laird *et al.* 2015: 204)

Now, as also explained by Johnson-Laird *et al.* (2015), only two iconic models could be possible:

[X]   Pat does not go to Milan and Pat goes to Italy.

[XI] Pat goes to Milan and Pat goes to Italy.

The model referring to a situation in which Pat does not go to Milan and, nevertheless, she goes to Italy cannot be taken into account here. The reason is obvious: Milan is a city in Italy and, if somebody goes to Milan, he or she necessarily goes to Italy.

This way of understanding the models associated to sentences can easily be related to concepts from Cognitive Linguistics such as perspective and mental spaces. That is accounted for hereunder.

4. Perspectives, mental spaces and iconic models

Actually, if the specialized literature and works such as those cited above are reviewed, one might note that, in a narrow sense, the three concepts (iconic models, perspectives and mental spaces) are not totally equivalent. As argued by Verhagen (2007), perspectives and mental spaces can be. Nonetheless, the mental models theory attributes to its iconic models some characteristics that are not exactly those of perspectives or mental spaces. In addition, Cognitive Linguistics assigns to these two last notions some features that do not completely tally with iconic models (even if, as mentioned, Fauconnier 2007 resorts to the word 'model' to explain what a mental space is).

However, that does not prevent us from establishing parallels that can somehow link the concepts. Thus, the mental models theory can describe what happens with [III] and [IV] with its terminology. Under this last theory, it can be stated that a sentence such as [III] refers to two iconic models:

[XII] Mary is not happy and Mary is depressed.

[XIII] Mary is happy and Mary is not depressed.

On the other hand, [IV] can only be linked to this one:

[XIV] Mary is unhappy and Mary is depressed.

In reality, given that they are iconic models, [XII] and [XIV] are the same model, since they iconically reflect the same situation. Nevertheless, the interesting point here is that the mental models theory can also explain, in a way very alike the one of Cognitive Linguistics, why the presence of 'On the contrary' causes difficulties in [IV], and not in [III]. As far as [IV] is concerned, its only model, that is, [XIV], or, if preferred, [XII], does not admit this expression because, as pointed out, being depressed is not the opposite of being unhappy (or not being happy). In fact, in [XIV] Mary is both unhappy and depressed at the same time, and, as it is the only model, a different combination of clauses giving sense to the expression 'On the contrary' cannot be thought. Nevertheless, in [III] the situation is very different. Because of the existence of two iconic models, [XII] and [XIII], individuals can think that 'On the contrary' does not refer to the first clause in [XII], but to [XIII], and that, accordingly, [XIII] must be ignored and [XII] must be deemed as the actual description of what really happens in the world.

So, connections between the mental models theory and Cognitive Linguistics can be found, and dialogue is possible between them. The previous argument shows that, in principle, what is described by Cognitive Linguistics can be expressed in terms of the mental models theory. Therefore, one may think that both approaches can benefit from each other.

5. Conclusions

Perhaps further research is necessary to check to what extent iconic models, perspectives, and mental spaces are similar or different. But, in any case, the conclusions from the account above are clear. If there are links between the two frameworks, mutual cooperation is an indisputable possibility.

On the one hand, the strong empirical support the literature shows for the mental models theory can help argue in favor of Cognitive Linguistics as well. Indeed, Cognitive Linguistics in general and Verhagen's (2007) proposal in particular can also be confirmed by the experimental data that seem to reveal that human beings reason by resorting to iconic models such as the ones described by the mental models theory.

On the other hand, the developments of Cognitive Linguistics can help the mental models theory too. For example, it can reveal particular situations in which more or fewer models can be deployed. The explanations offered by the proponents of the mental models theory are sometimes a little general or abstract (see, e.g., López-Astorga 2014). In some cases, they only affirm that semantics or pragmatics can change the models and just give examples such as

[V] and [IX]. Nevertheless, arguments such as those of Verhagen (2007) can make the theory more exact and detailed, by indicating concrete circumstances in which the number of models is different. In this way, it can be said that such arguments, in particular, allow assuming that sentential negations are related to two iconic models, while morphological negations are linked to only one.

However, this point, which clearly deserves to be studied in greater depth, is just an instance. More arguments and developments from Cognitive Linguistics could be analyzed and compared to the mental models theory. And, given what has been illustrated in this paper, a task of this kind could be very useful, since it could enable researchers to check whether or not the mutual benefit is also present in other possible cases.

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