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READING COMPREHENSION: IN DEFENSE OF A MENTAL MODEL  
APPROACH

Commentary on G&M on Reading-Inference

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## 1.0 INTRODUCTION

1.1 Glenberg & Mathew (1992) (G&M) have provided us with an excellent occasion to address some of the central issues concerning reading and comprehension. Their target article, a response to a paper by McKoon & Ratcliff (1992) (M&R), has the virtue of stimulating reflection and will prove highly beneficial if, as we expect, it can also generate an exchange of ideas among interested researchers. Their target article focuses on three main questions. One relates to the nature of processing and the issue of automaticity. The second has to do with mental models and their (limited) life-likeness. The third concerns a debate about the interpretation of empirical evidence from the mental-model position compared to the minimalist/"salience" position. All three questions are interesting and will be further explored and discussed in what follows.

## 2.0 AUTOMATICITY

2.1 The debate about the automaticity of inference-making in the formation of representation of discourse has been addressed in a rather radical manner, both by G&M on one side and by M&R on the other. If one were to look for them, one would probably find purely automatic processes and genuine controlled processes in almost any area of cognitive psychology. It seems very plausible, however, that the construction of a situational representation or mental model will often involve both automatic and nonautomatic processing: Some inferences are made immediately and some more laboriously; some relations between tokens need to be effortfully attributed and some are just "noticed" (Glenberg & Langston, 1992). Hence the debate should not be about whether mental models are the result of automatic or controlled processing. Assuming that the construction of a particular mental model is likely to involve both forms of processing, we should try to understand which inferences are the product of each type of processing and under what conditions they are made.

## 3.0 LIFE-LIKENESS

3.1 When they were first introduced to account for comprehension data (e.g., Garnham, 1981), mental models were not very well defined. The one thing most people were sure of was that mental models were not a representation of the text but of the situation described by the text. This poor early definitional status of the concept of mental model has facilitated "easy" criticism from anticonstructionist positions. One clear case in which the concept of mental model has been misrepresented and then criticized is the recent paper by M&R. Their idea that mental models are full representations of events explicitly or implicitly described in the text is incorrect and consequently their criticism of it is misdirected. Their own example, with the actress falling from the fourteenth story of a building, is easily turned around by G&M.

3.2 Aside from the above "Gedanken experiment," there are other arguments that can be used to support the idea that mental models are not complete representations. Early approaches already introduced the possibility that situational representations were incomplete. One example is the concept of "focus" (Sanford & Garrod, 1981), which allowed different representational status for different textual pieces of information. Data from Glenberg, Meyer and Lindem (1987) and from Fernandez and Saiz (1989) suggest that information associated with the main character of a text is more likely to be incorporated into the situational representation than information dissociated from that character. Furthermore, the assumption that mental models may be only a partial representation of the information explicitly or implicitly represented in the text is supported by both data and sound argumentation, as provided by several authors (for example, Oakhill, Garnham and Vonk [1989] in their account of pronominal interpretation).

3.3 To summarize: We think the analogical correspondence between models and the situations they represent is indeed limited. This is the standard doctrine among mental modelers, and only a poor review of the relevant literature could lead one to think otherwise.

#### 4.0 SALIENCE

4.1 From the minimalist position adopted by M&R, the effect of the associated/dissociated variable does not depend on the formation of a mental model, as suggested by Glenberg, Meyer and Lindem (1987). Rather, the reason associated targets would be more accessible is that they are embedded in propositions that are more relevant to the topic of the text, rendering them more salient than dissociated targets. We think the question of salience could be very important if it could be demonstrated, first, that the data clearly favor a salience account for foregrounding effects, and second, that salience is independent of the formation of a mental model. For the time being, neither of these conditions is met.

4.2 Let us start by examining how the salience position manages to account for pertinent data. We will have to acknowledge that the first reason that G&M adduce to discount salience as an adequate account of associated/dissociated differences does not bear up under careful analysis. In 1.4.4, G&M argue that salience should make the associated target more accessible than the dissociated target immediately after reading the sentence that introduced it. There are two problems with this argument. First, it is not clear why the effect of salience should be apparent so early in the course of processing. According to some sources, the topical value of a proposition, i.e., its salience, might depend on some kind of macroprocessing that comes relatively late in the process of comprehension (Kieras, 1982; Van Dijk & Kintsch, 1983).

4.3 Second, the argument does not seem fair. In 1.4.1, in presenting a

mental model account of accessibility data, equivalent fast access to associated and dissociated targets immediately after their presentation is attributed by G&M to recent mention, a verbatim memory effect. The same reasoning could be applied when accounting for the data in terms of salience. G&M half-heartedly acknowledge this possibility and that their argument is not strong. But then in 1.5.1 they offer three reasons why the salience account is incorrect, and absence of differences in immediate recognition is back again, as if it were a decisive piece of evidence against the salience position. We think the reasonable conclusion to draw regarding this point is that data on immediate recognition of targets are not relevant to the salience question.

4.4 The correlational data offered in Experiment 1, in the second part of G&M's paper, do not favor a minimalist interpretation, but they do not constitute strong evidence for the mental-model side either. On the other hand, the data from Experiment 2 are quite important, because they directly demonstrate that the salience position cannot account for the results. The effect of the associated/dissociated variable on location targets was not found when experimental material was carefully selected; accordingly, the conclusion to be drawn is that the differences found by M&R are in fact artifactual.

4.5 One might at first feel a little uneasy with the suggestion that data from a group of subjects (the "second wave") should be disregarded, but careful consideration of G&M's data clearly supports their conclusion. As G&M argue, the subjects in the second wave are slower. Also, and more important, this second group does not show the expected effect of the associated/dissociated variable for the Glenberg, Meyer & Lindem (1987) targets. Despite some differences in its interpretation, that effect has always been very consistent; it has been reported in a number of previous papers (Fernandez & Saiz, 1989; Glenberg, Meyer & Linden, 1987; McKoon & Ratcliff, 1992) and is again found in two groups by G&M. Problems in replicating the effect are a clear indication that things were not going as expected in the experiment; and eliminating those subjects seems like the right move. Of course, running the whole experiment again with a nonproblematic sample of subjects would have looked cleaner.

4.6 Finally, even if salience could be shown to play a role in accounting for accessibility in tasks such as the one used by Glenberg and his collaborators (e.g., Glenberg, Meyer and Lindem, 1987), it could be that propositional salience is just a consequence of its meaning's being incorporated into a mental model, as argued in G&M's discussion of the results of their Experiment 1. This is not to say that salience is always conferred by mental models; but it is easy to see how it could be on many occasions. As suggested with regard to the automaticity question, the debate should focus on specifying which factors contribute to salience and under which conditions each of them is more likely to be important.

## 5.0 CONCLUSION

5.1 Taken separately, some of the arguments presented by Glenberg & Mathew may not be as conclusive as they would need to be to provide unequivocal support for a mental-model position. But taken together they surely make a good case for it. After considering carefully what the minimalist position originally proposed, the mental-model reply, and the points we have raised here, we arrive at the conclusion that the constructivist approach has not been proved substantially wrong. What is clear is that more theoretical elaboration and empirical research are needed, and in this regard more must be learned about the relationships that may exist among factors such as types of text (e.g., narrative, expository), levels of processing and representation (e.g., lexical, propositional, situational), and levels of comprehension (e.g., general, detailed).

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