Understanding Negation – The Case of Negated Metaphors

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Understanding negated statements is more difficult than understanding affirmative ones. People are slower to verify that negative statements are true and seem to understand them best in contexts that make them particularly plausible (see Horn, 1989). Little, however, is known of the online processes that take place during the comprehension of such statements. Particularly, the nature of the representation of negated statements is undecided. Two hypotheses have been raised regarding this issue: according to the first, representation of negation is representation of that which is not the case. This is well summarized by Fauconnier (1994): "negatives set up corresponding counterfactual spaces in which the positive version of the sentence is satisfied". According to the second hypothesis, comprehension of negation goes beyond the comprehension of the affirmative since it involves active inference-making (Manktelow and Over, 1990).

In both cases, negated statements should take longer to process than affirmative ones, since additional cognitive work is required. To explore this issue we presented participants with negated metaphors, e.g., "this train is not a rocket". Following each metaphor, we presented participants with a lexical decision task. The words presented for lexical decision were related either to the negated form of the metaphor (e.g., slow), or to the affirmative form (e.g., fast).

If negation involves processing beyond the affirmative, we would expect that the affirmative meanings of sentences be activated early on, with negation activated only later. Accordingly, we would expect affirmative-related words to be facilitated early on, with negative-related words facilitated only later.

Method

Eighty undergraduate students from Princeton University participated in the experiment for course credit. The variables manipulated in the study were: (a) the time between the endpoint of reading the sentence and the lexical decision task (150, 500 and 1000 ms), (b) the type of prime sentence (Negated metaphor, Affirmative metaphor and Control metaphor) and (c) the type of word presented for lexical decision (related to the negated metaphor or the affirmative metaphor).

Results and Discussion

Figure 1 presents difference from baseline response-times for affirmative- and negative-related target words after reading a negated metaphor. For present purposes, we will not consider response patterns for affirmative sentence primes.

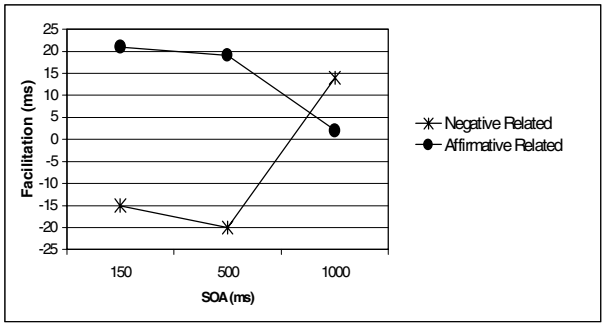

Figure 1: Target facilitation after negated metaphors.

Initially after reading a negated metaphor (e.g., That kindergarten is not a zoo), words associated with the affirmation (i.e., noisy) were facilitated, while words associated with the negation (i.e., calm) were not. This result was also found at 500 msec. By 1000 msec, negative related words were facilitated while affirmative-related words were at baseline level.

This pattern of priming suggests that negated statements are initially represented in their affirmative form. In a short time, however, the affirmative meaning is no longer active, and is replaced by the negated meaning. The findings are consistent with both Fauconnier's, and Manktelow and Over's hypotheses.

References

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