ORAL PAPER

"Two cues are not better than one" the integration of geometric and featural information in the reorientation paradigm

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Background

According to the idea of "integration" proposed by Hermer and Spelke (e.g. 1996) in the reorientation paradigm, disoriented human adults, can correctly find an object in a rectangular room, since they are able to conjoin the shape of the room (geometric information) with a wall with a distinctive colour (featural or landmark information). However, present study indicated that when two compatible information are available, but one is adequate to solve the task, second one seems to interfere with, rather then to integrate, the process that lead to a correct search.

Exp. I

Method

Participants: 36 university students (18 women) ranging between 19-25 years old were involved in six experimental conditions each (order of trials was randomized). They faced both "Rectangular" and b) "Square" rooms in a desktop virtual environment. For each condition, a series of rooms 1) without landmarks, 2) with one coloured wall near to the target, and 3) with one coloured wall far from the target, were presented. The target was located in one of the corner. During study time the target was visible while was hidden during the searching task. Participants were requested to identify the corner hosting the target previously. The locations of hidden object and the initial positions of the participants in the search task were approximately balanced across trials.

Results

In the rectangular rooms without landmark the correct and rotationally equivalent corners were chosen almost the totality of the trials. Participants were aware of geometric information. In the square room with a landmark, participants indicated the correct corner almost in the 96% of the times, since the sense relation ("the sphere is on the right of the blue wall") between landmark and target is adequate to solve the task. More interestingly, in the rectangular room with a landmark (i.e. with additional layout information), performance was significantly worse: participants chose the correct corner about the 85% of the times.

Exp. II

In order to clarify and replicate the results of the first experiment, a second experiment was carried out with a larger sample and with a between-subjects design in order to avoid the interference between experimental conditions.

Method

Participants: 72 university students ranging between 19-25 years old were randomly divided into two groups: a) Rectangular room group and b) Square room group.

Results

The results matched those in the previous experiment. Moreover, the difference in the level of performance between square and rectangular rooms with landmarks appeared larger then in the experiment I.

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Conclusions

This study presents two experiments based on a virtual environment. It reconsiders the notion of integration between different aspects of geometric information and featural information during a searching task. Integration of geometric and landmark information is more demanding then considering landmark information solely (that, however, holds implicitly the sense relation between target and landmark). When geometric information is available (a distinctive layout of the room), it interferes with spatial mental representation and consequently impairs the performance. Results are explained as function of the difference between "action-oriented" and "recognition-oriented" information.

Reference

Hermer, L., & Spelke, S. S. (1996). Modularity and development: the case of spatial reorientation. Cognition, 61, 195-232.