

Impairments of attention and mental imagery following brain damage: An investigation of spared subliminal processing

Researchers

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Aim

1) To assess clinically the existence of different forms of visuo-spatial neglect, including pure representational and pure perceptual neglect. 2) To investigate whether people with neglect could process semantic material implicitly. 3) To address the concept of visuo-spatial working memory as a feature of a mental workspace, rather than as the more traditional holding system for material that is being transferred from perception to long term memory.

Project Outline/Methodology

A series of behavioural experiments investigated which model of working memory might best account for the pattern of spared and impaired abilities observed in patients with either perceptual neglect or representational neglect or neglect in both forms. To reach this aim, we used mainly methods assessing implicit processing of semantic material in neglect.

Key Results

Pure form of neglect exist and can be identified clinically.

In perceptual neglect, long-term memory representations can be activated by visually presented material of which the participant is unaware, either because of a cognitive deficit arising from brain damage (patients with neglect), or because of experimentally manipulated presentation time (subliminal presentation). The phenomenon appeared only for material with which participants were familiar. This suggests that activation is at the semantic level rather than based on simple association between individual features.

Conclusions

The results can most easily be explained by a model in which there is direct activation of Long-term memory from perception without recourse to an

intermediate stage of processing that then transfers information into Long-term memory.

What does this study add to the field?

From a clinical perspective our results showed that assessment of neglect should be more thorough than in current practice, to include assessments of representational neglect as well as perceptual neglect. Neglect therefore should not be conceived as a monolithic entity but rather as an umbrella term encompassing several different syndromes, each one of which affects patients differently.

Theoretically, a workspace model of memory, whereby working memory is conceived as the locus allowing further manipulation of LTM activations could account for our data, while any model assuming serial steps of activation from perception to working memory to long-term memory would run in serious difficulties in accounting for our data

Implications for Practice or Policy

The outcome of this project has been a better understanding of the different forms of neglect that could inform clinical and everyday management and care of patients, provide techniques to assess the cognitive impact of any treatments that might be developed. Our results also showed that assessment of neglect should be more thorough than in current practice, to include assessments of representational neglect as well as perceptual neglect.

Where to next?

From a clinical perspective, the observation that perceptual neglect can occur as a pure syndrome without representational neglect suggests that patients might benefit from use of their intact representational system rather than relying on a damaged perceptual system. These possible routes to techniques assisting rehabilitation and management could and should be pursued.

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