Reward-based Influences on Attentional Orienting in Patients with Visuo-spatial Neglect

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Introduction
- Reward, goals, and motivation affect attentional selection. The mechanism of selection is flexible, accurate, and efficient at incorporating these various influences for the purpose of attentional guidance.

Visuo-spatial Neglect
- Neglect is a neurological disorder, characterized by a deficit of attention to the left side, most often accompanied by damage to the right parietal lobe.
- Current treatments are neither effective nor long-lasting.
- Patients are sensitive to implicit target contingencies in search. Reward-based attentional guidance.

Purpose
1) Does reward guide attention in patients with neglect?
2) Is the effect of reward long-lasting?

Bottom-Up Search
- Feature Reward (Color)
  - Reward: 85% high (+10) to highly rewarded color (e.g., green).
  - Location: 33% at each location (Left, Top, Right).
  - Split by Location: Reward Baseline vs. Pre-Reward.
  - Effect of Reward: Yes!

Location Reward (Left)
- Location Reward: Pre-Reward Baseline vs. Pre-Reward.
- Effect of Reward: Yes!

Top-Down Search
- Feature Reward (Shape)
  - Reward: 85% high (+10) to highly rewarded shape (e.g., circle).
  - Location: 33% at each location (Left, Top, Right).
  - Split by Location: Reward Baseline vs. Pre-Reward.
  - Effect of Reward: Yes!

Location Reward (Left)
- Location Reward: Pre-Reward Baseline vs. Pre-Reward.
- Effect of Reward: Yes!

Method & Results

Reaction time (ms)

Top-down
- Reward based attentional guidance.

Conclusions
- C.P. is sensitive to reward manipulation in top-down and bottom-up orienting for both locations and features.
- After training (i.e., reward structure removed):
  - Neither color nor shape, in either top-down or bottom-up orienting, receive a long-lasting benefit of reward.
  - However, there are carry-over effects for both the left side in the highly rewarded feature condition and for the highly rewarded location condition in both top-down and bottom-up orienting.

These findings demonstrate that patients with neglect:
- Are sensitive to reward structure.
- Improve their attentional orienting to the left side with reward training, thus reducing neglect (at least in the short-term).
- Might benefit from a reward-based rehabilitation tool.

References

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