Task demands can affect binocular rivalry and motion transparency

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Introduction

Does our visual system try to find the most probable scene given the stimulus (Mamassian & Landy, 1999) or the most useful scene given the objectives of the current task? We address the existence of a “task dependant gain process”, influencing the perception at least in ambiguous situations. This work extends previous demonstrations where the task influence the type of information intake (Schyns & Oliva, 1999).

QUESTION: Can perception be modified by the expected gain in a task?

If so, how fast can it be learned implicitly?

Expected Gain in the Perceived Depth of Transparent Surfaces

Stimuli
Two random dot surfaces (white dots) sliding on each other in opposite directions.

Procedure
• Bistability: depth order of the surfaces
• Measure: surface seen in front as a function of motion direction

Results

• Gradual changes in the surface seen in front, as expected

Expected Gain in Binocular Rivalry

Stimuli
8 Gabor patches per eye, oriented to the left in one eye and to the right in the other, on a grating background. They flicker out of phase at 5-Hz.

Procedures
1. Rivalry report Task
2. Visual Search Task
3. 32 runs

Results

• Bistability: orientation rivalryrous stimuli
• Measure: classical rivalry report (15 seconds run)
• Target: a Gabor with a lower contrast in one eye
• Association: during the blocks 2-3, the target is always displayed with the same orientation (bias).
• Expected Gain: will the biased orientation dominate to improve performance in the visual search task?

Methods

First Percept Dominance

Based on Orientation

• First percept dominance effect appears in blocks 2 & 3.
• Effect persists in block 4.
• As a control, no ocular effect.

Discussion

We have shown that a visual search task can influence the temporal dynamics of bistable perception in phenomena as different as binocular rivalry and motion transparency.

Conclusions

• Influence of the expected gain on perception
• Implicit and long-lasting learning

References


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