



Modality and spatial selectivity of attentional capture by body shadows



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Background

Galfano & Pavani (in press) have recently shown that mere viewing of the task-irrelevant cast shadow of a hand can elicit spatial shifts of tactile attention to that very same hand, as indicated by faster and more accurate discrimination of tactile targets at the hand casting the shadow.

In the present study we examined attentional capture by body shadows in more details, assessing whether such phenomenon is selective for tactile stimuli at the body or rather involves any stimulus presented in the hemispace occupied by the cast shadow (i.e., visual stimuli near the body and visual stimuli near the cast shadow)

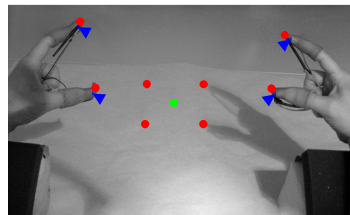
Method

The cast shadow of one hand (natural in Exp. 1; unnatural in Exp. 2) appeared 1750 ms before each target. Shadows were totally non-predictive of target side or modality (i.e., task-irrelevant) and spatio-temporally correlated with any hand-movement.

Target type: a) Tactile: single tactile pulse at the thumb or index finger of either right or left hand; b) Visual near hand: brief flash at the thumb or index finger of either right or left hand; c) Visual near shadow: brief flash at the positions occupied by either right or left cast shadow. All targets were equiprobable and varied on a trial by trial basis

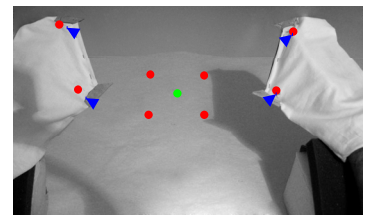
Validity: spatial congruency between the hand casting the shadow and target side (left or right)

Exp. 1



Green circle: visual fixation; red circles: positions of visual targets; blue triangles positions of tactile targets. 384 trials divided in 4 blocks.

Exp. 2



Task: speeded up-down discrimination (thumb vs index finger; up vs. down LED near hand or near shadow, regardless of side). Response: release of one of two foot pedals.

Experiment 1 (N=14)

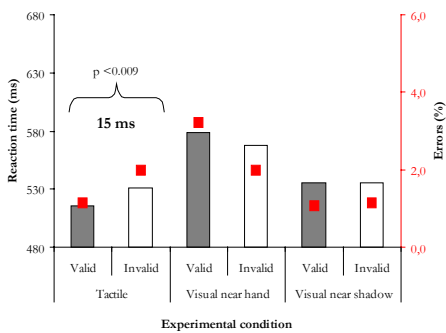
ANOVAs

RTs:

Target Stimulation Type: $F(2,26)=13,957$ $p=.0001$
Validity \times Target Type: $F(2,26)=3,417$ $p=.04$

% errors:

Target Type: $F(2,26)=4,936$ $p=.01$



Experiment 2 (N=14)

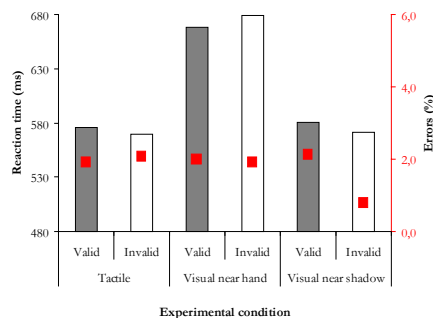
ANOVAs

RTs:

Target Stimulation Type: $F(2,26)=13,650$ $p=.0001$
Validity \times Target Type: n.s.

% errors:

Target Type: n.s.



Between Experiments ANOVAs

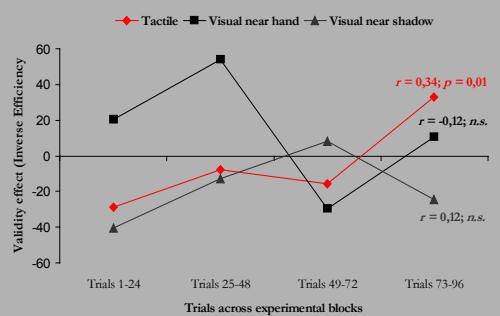
RTs:

Exp \times Validity \times Target Type: $F(2,52)=4,383$ $p=.01$

% errors:

Exp \times Validity \times Target Type: n.s.

Experiment 2: Shadow temporal exposure analysis



Discussion

Despite shadows were always task-irrelevant, participants in Exp. 1 (natural shadow) were overall faster in responding on valid than invalid trials, even with an SOA of 1750 ms. Critically, this long lasting capture of attention emerged for tactile targets only, indicating that cast shadows cued the body part they referred to rather than the physical space they occupy, selectively for the tactile modality.

Exp. 2 suggests that unnatural shadows (cast by hands wearing shaped gloves) do not capture attention in similar fashion. However, a time course analysis within each experimental block revealed that some validity effect can emerge with prolonged exposure to the cast shadow, for tactile targets only.

These findings suggest that shadows cast by our own body may constitute a special type of shadows in the visual scene. They are tightly integrated with the body part that cast it and may be perceived as an extension of our body schema (Pavani & Castiello, 2004).

References

- Galfano, G., & Pavani, F. (in press). *Exp Brain Res*
- Pavani, F., & Castiello, U. (2004). *Nature Neuroscience*, 7: 14-16.

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