You don't see what you expect to see: Blindness to learned action effects

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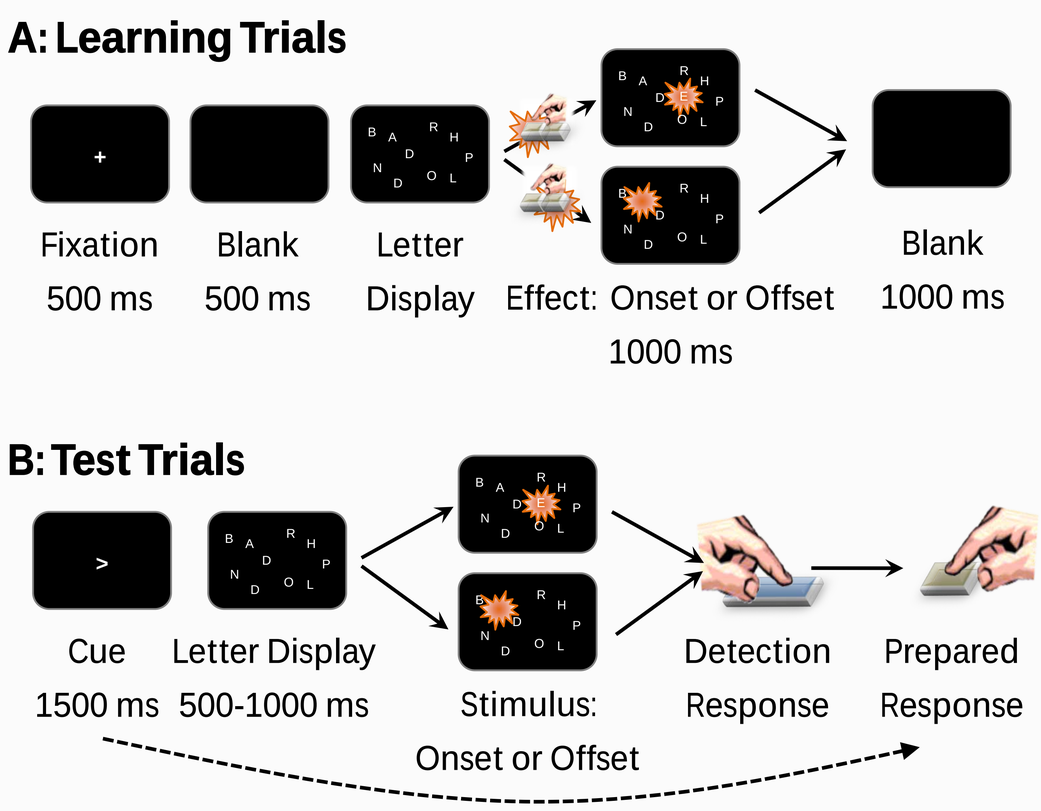
Background & Method

Just before pressing the Snickers™ button on a vending machine, the machine suddenly spits out two snacks: The desired Snickers accompanied by a Mars bar. Which bar will you perceive first? Which one will you catch?

The Theory of Event Coding predicts (somewhat counter-intuitively) that the representation of the desired Snickers – the anticipated action effect – is bound in an action plan and thus inaccessible to other processes (e.g., Müsseler & Hommel, 1997; Müsseler et al., 2005). This **action-induced blindness,** however, was not yet demonstrated for learned, arbitrary action effects.

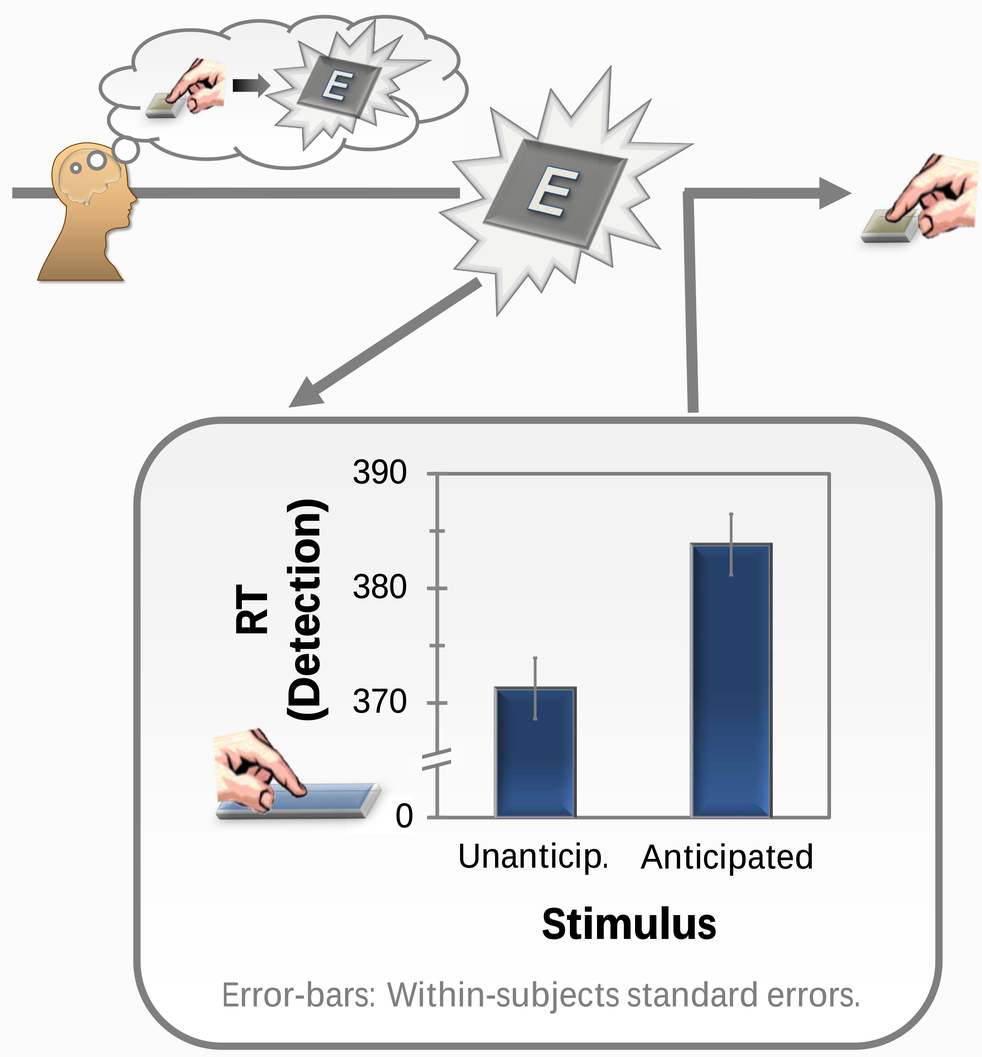


Learning Trials: Participants (N = 22) associated two actions (key presses; right index / middle finger) with contingent distal sensory effects: Onset of the letter "E" or offset of the letter "A" in a visual search display.

Test Trials: While preparing one of the two actions, a former action effect occurred; participants had to detect this effect as fast as possible by pressing the space bar with their left index finger.

Results

Participants were slower in detecting stimuli that were associated with the prepared response, $F(1,21) = 11.08$, $p = .003$, $\eta_p^2 = .35$. In other words: Anticipating the effect of a planned response (onset vs. offset) impaired the detection of this particular event if it suddenly appeared in the environment.



Additionally, detection responses were faster to offsets than to onsets (366 ms vs. 389 ms), $F(1, 21) = 14.18$, $p = .001$, $\eta_p^2 = .40$, whereas the interaction of both factors did not approach significance ($F < 1$).

Conclusions

Previous studies reported action-induced blindness for stimuli that resembled physical features of an action (e.g., Müsseler & Hommel, 1997). We show that this blindness effect **generalizes to action effects proper**, i.e., environmental changes that are produced by an action.

Furthermore, we show that this blindness effect **impairs instant responding** to the exogenously presented stimulus – probably because its endogenous representation has to be deactivated first (e.g., Obhi & Haggard, 2004). You catch the Mars, not the Snickers.

Müsseler, J., & Hommel, B. (1997). Blindness to response-compatible stimuli. Journal of Experimental Psychology: Human Perception and Performance, 23, 861-872.

Müsseler, J., Wühr, P., Danielmeier, C., & Zysset, S. (2005). Action-induced blindness with lateralized stimuli and responses. Experimental Brain Research, 160, 214-222.

Obhi, S. S., & Haggard, P. (2004). Internally generated and externally triggered actions are physically distinct and independently controlled. Experimental Brain Research, 156, 518-523.