Testing the automaticity of predictiveness-driven attention: The effect of task difficulty

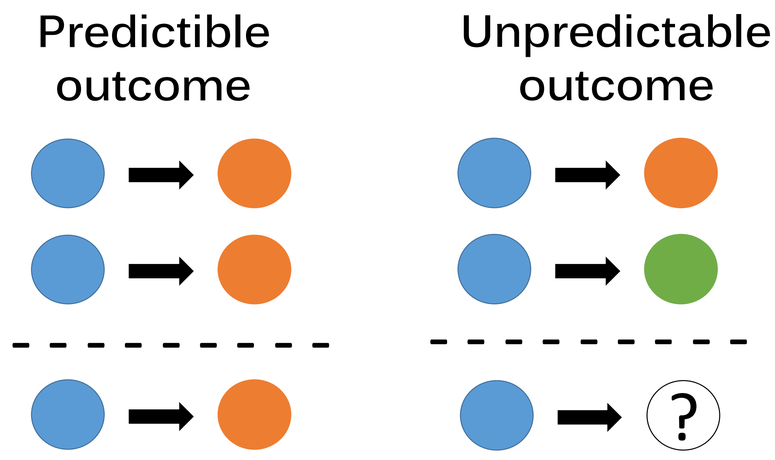
Mina Jevtović[1], Tom Beesley[3,4] & David Luque[1,2,4]
[1]Universidad Autónoma de Madrid, Madrid, Spain
[2]Universidad de Málaga, Spain
[3]Lancaster University, UK
[4]UNSW Sydney, Australia

Predictiveness-driven attention

Associative learning (learning new cue-outcome pairings) produces changes in attention (Kruschke, 2003; Le Pelley, 2004)

Cues that are good predictors of relevant outcomes are prioritized to those that are non-predictive/redundant

PREDICTIVENESS-DRIVEN ATTENTION



The exact nature of the predictiveness-driven attention is still debated in the literature

TWO DIFFERENT VIEWS

VOLUNTARY (Mitchell et al., 2012)

AUTOMATIC (Le Pelley et al., 2013)

Current Study

Is predictiveness-driven attention automatic or voluntary in nature?

How does task difficulty affect predictiveness-driven attention?

Methods

Participants

N = 104 undergraduate students
2 groups (1-trial & 8-trial group)

Design

Phase 1	Instructions	Phase 2	
AL task		*AL task*	*DP task*
		ALTERNATING TRIALS	
$p1^{\square}$+$np1^{\square}$-R1	*Pay attention to the square/circle on the DP trials*	$p1^{\square}$+$np1^{\square}$-R1	$p1^{\square}$+$p2^{\circ}$
$p1^{\square}$ +$np2^{\circ}$-R1		$p1^{\square}$ +$np2^{\circ}$-R1	$p1^{\square}$ +$np2^{\circ}$
$p2^{\circ}$ +$np1^{\square}$-R2		$p2^{\circ}$ +$np1^{\square}$-R2	$np1^{\square}$ +$p2^{\circ}$
$p2^{\circ}$ +$np2^{\circ}$-R2		$p2^{\circ}$ +$np2^{\circ}$-R2	$np1^{\square}$ +$np2^{\circ}$

p1, p2
predictive cues

np1, np2
non-predictive cues

R1, R2
correct responses in AL

Procedure

Associative Learning Task (AL)

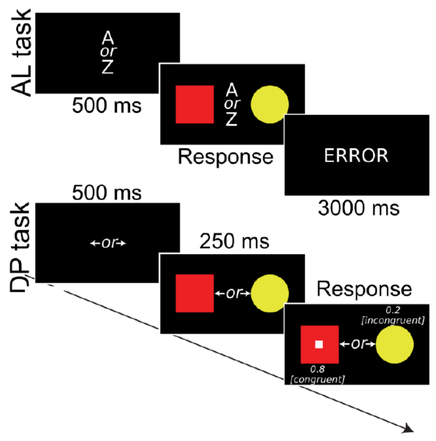
+

1-trial run group

AL DP AL DP .....

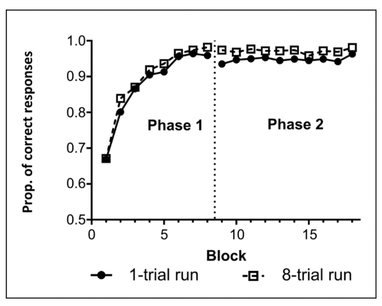
8-trial run group

8 x AL 8 x DP 8 x AL 8 x DP .....



Results

Associative Learning Task



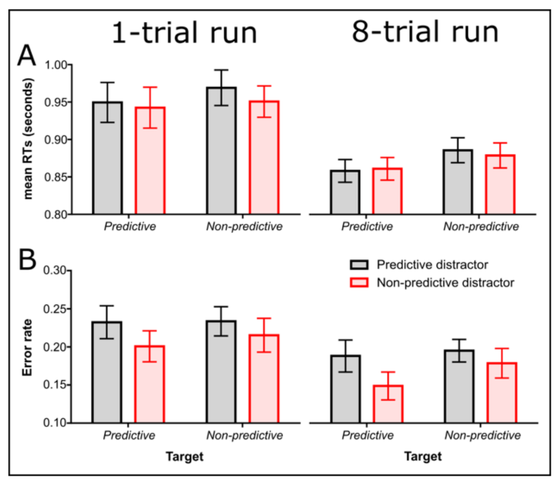
Mean proportion of correct responses in the associative learning task in both groups of participants

that participants learned to make correct responses in both groups

Dot-Probe Task

main effect of run length
F(1, 94) = 15.92, p < .001, ηp2 = 0.145
(faster RTs for the 8-trial run than 1-trial run group)

main effect of target predictiveness
F(1, 94) = 5.51, p = .021, ηp2 = 0.055
(faster RTs when the instructed shape was in a predictive colour than in a non-predictive colour)



Conclusion

Even when tasks differ in difficulty, participants prioritize predictive over non-predictive cues. This finding, along others (participants attend to the colour despite its irrelevance, explicit instructions given before the task) suggest that predictiveness-driven attention is at least partly involuntary.

References
Le Pelley, M., Vadillo, M., & Luque, D. (2013). Learned predictiveness influences rapid attentional capture: Evidence from the dot probe task. Journal Of Experimental Psychology: Learning, Memory, And Cognition, 39(6), 1888-1900.
Mitchell, C. J., Griffiths, O., Seetoo, J., & Lovibond, P. F. (2012). Attentional mechanisms in learned predictiveness. Journal of Experimental Psychology: Animal Behavior Processes, 38(2), 191-202.
Le Pelley, M. (2004). The Role of Associative History in Models of Associative Learning: A Selective Review and a Hybrid Model. The Quarterly Journal Of Experimental Psychology Section B, 57(3b), 193-243
Kruschke, J. (2003). Attention in Learning. Current Directions In Psychological Science, 12(5), 171-175.