

# Learning to suppress a distractor may not be unconscious

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## INTRODUCTION

- **Statistical learning** has been understood as a process by which organisms discover the regularities of their environment [1]. Recent evidence suggests that statistical learning can bias visual attention [2].
- **The additional singleton task** has been widely used to explore this type of attentional bias [3, 4]. In this paradigm, participants have to find a singleton target among several different-shaped distractors (for example, a green diamond among green circles, see Figure 4). Unknown to participants, a singleton distractor appears more frequently in one particular location (i.e., the high probability distractor location or HPDL, marked in the Figure 5).
- Participants learn to use this information to **suppress attention** to the location where the singleton distractor is most likely to appear, which improves their performance in the task [3, 4].
- **Awareness tests** performed after the search task usually reveal that participants were not aware of the statistical regularities that drove performance in the task, even if they benefitted from them [3, 4]. However, meta analytical evidence from related paradigms [5] suggests that the absence of evidence of awareness may be due to the lack of sensibility and other methodological drawbacks.

- **Our aim is to test if participants are aware of the statistical regularities in the presentation of the stimuli using three alternative measures of awareness.**

## RESULTS

### EXPERIMENT 1

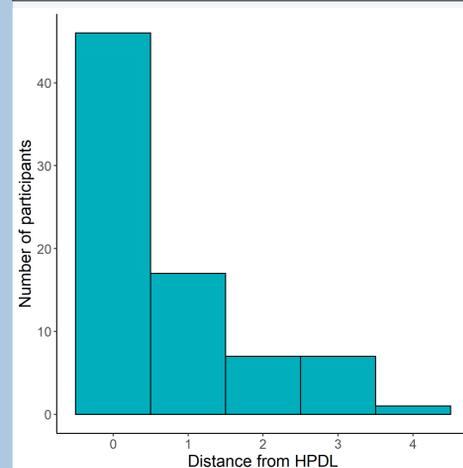


Figure 1

### EXPERIMENT 2

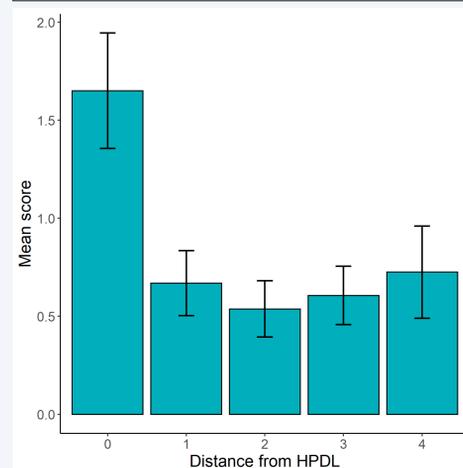


Figure 2

### EXPERIMENT 3

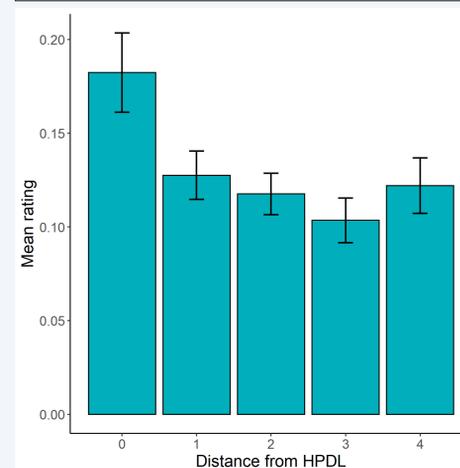


Figure 3

## ALL EXPERIMENTS

- Behavioural task: 6 blocks of 120 trials (see Figure 4).
- The 1st question of the test:

“Do you think that this figure tended to appear more often in a particular location of the screen?”

## DIFFERENCES BETWEEN EXPERIMENTS

- The 2nd question of the test:

EXPERIMENT 1: “Choose the location you think that contained the distractor more oftenly” (see Figure 6).

EXPERIMENT 2: “Rank the tree locations you think that contained the distractor more often” (see Figure 7).

EXPERIMENT 3: “Estimate a number of trials in which the singleton distractor had been presented in each of the eight locations of the display (0-240)” (see Figure 8).

Figure 4

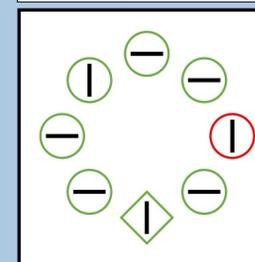


Figure 5

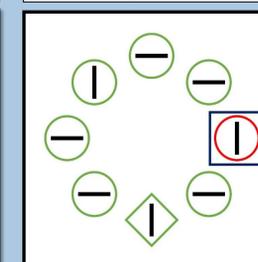


Figure 6

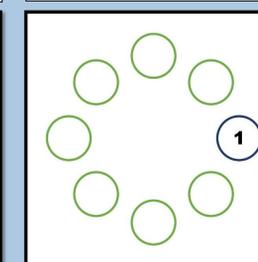


Figure 7

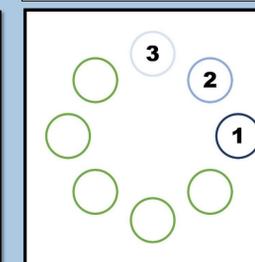
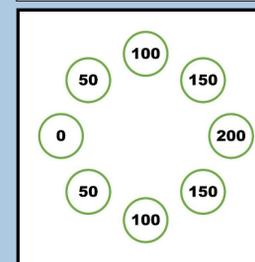


Figure 8



## CONCLUSIONS

- **Our results (Figures 1, 2 and 3) suggest that participants have awareness about which region of the screen is more likely to contain the distractor.**
- **More sensitive measures of awareness and better evidence are needed.**

## REFERENCES

- [1] Frost, R., Armstrong, B. C., & Christiansen, M. H. (2019). Statistical learning research: A critical review and possible new directions. *Psychological Bulletin*, 145(12), 1128–1153.
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