Transfer of Attentional Sharpening Across Contexts is Stimulus-Specific

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BACKGROUND

- Attentional sharpening refers to the representational narrowing of target features when visually similar distractors are expected.[1]
- This sharpening may reflect altered sensory activations following repeated exposure to target/distractor values (i.e., stimulus-specific).[2]
- Alternatively, frequent conflict from target-similar distractors may trigger global adjustments in cognitive control, unspecific to the target or distractors.[3]
- To contrast these accounts, we examined whether attentional sharpening can be transferred to unlearned features.

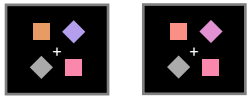
METHOD

Training: Experiments 1 & 2

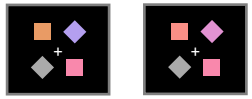
Task: find the target defined by a specific color and identify its shape.

1800–2400 ms RT < 2000 ms

Mostly intermediate group (MI):
Frequently encountered distractors that were 60º from the target in hue space.

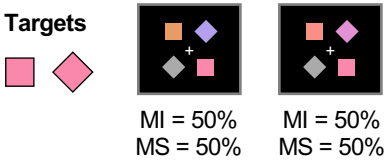


Mostly similar group (MS):
Frequently encountered distractors that were just 30º from the target in hue space.



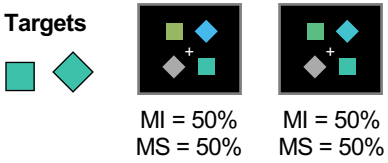
Transfer: Experiment 1

Intermediate and similar distractors were now equally frequent for all participants.



Transfer: Experiment 2

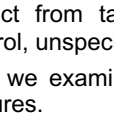
A new target color was assigned; intermediate and similar distractors were equally frequent.



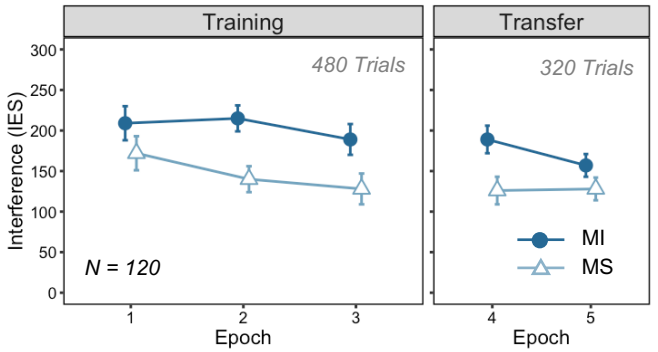
- Performance was measured using inverse efficiency scores (**IES = RT/prop. correct**).
- Attentional sharpening was inferred through target-similar distractor interference (IES for similar displays minus IES for intermediate displays).

RESULTS

Experiment 1

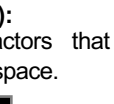


Persistence of Sharpening?

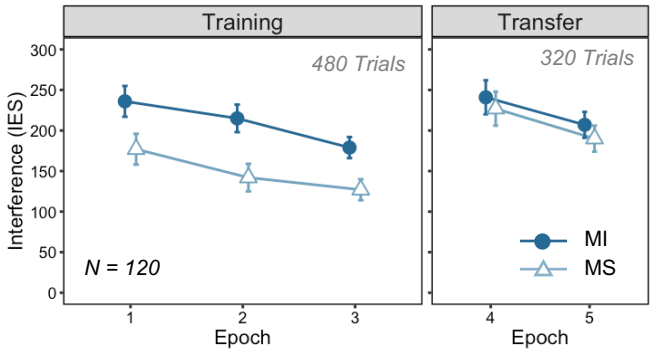


The MS group showed reduced interference from target-similar distractors over both the training and transfer phases.

Experiment 2



Feature-Based Transfer?



The MS group again displayed reduced interference over the training phase; however, this effect did not persist into the transfer phase when participants were given a new target color.

- **Across both experiments, frequent exposure to target-similar distractors produced greater attentional sharpening over the training phase.**
- **However, this sharpening did not transfer to a new target color.**
- **As such, we show that attentional sharpening is owed to sensory-specific processes, rather than global adjustments to cognitive control.**

1. Geng et al. (2017). *J Exp Psychol Hum Percept Perform, 43* (12); 2 . Won & Geng (2020). *J Exp Psychol Gen, 149*(10); 3. Botvinick et al. (2004). *Trends Cogn Sci, 8*(12)