

Ruling out task difficulty in the context-generalization of texture perceptual learning

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Introduction

Perceptual learning reflects improved sensitivity to diagnostic stimulus components¹.

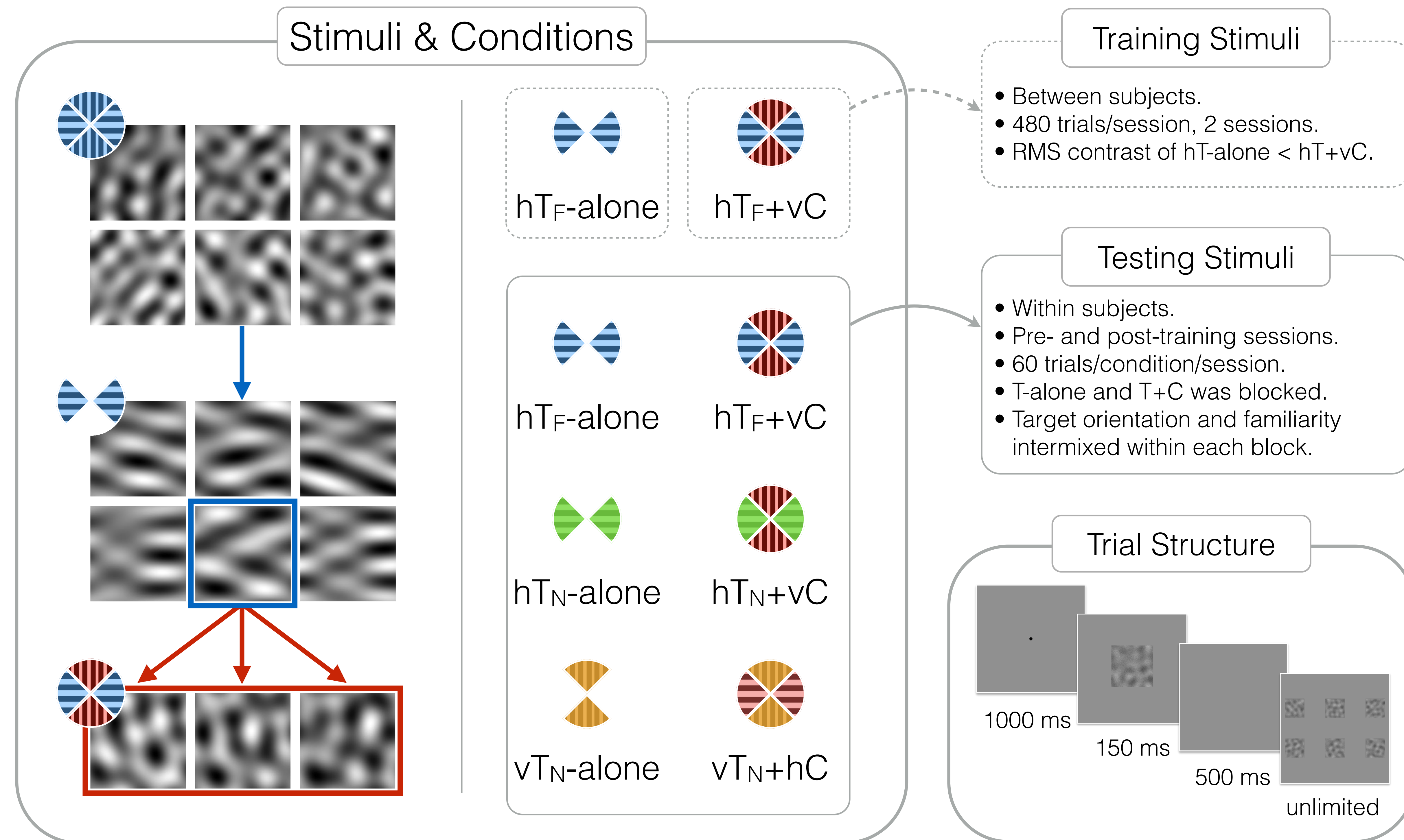
Discriminating particular orientation components in a texture identification task is difficult when orthogonal, uninformative orientation components (i.e., context) are present².

Learning to discriminate particular orientation components is highly specific to the context presented during training³, but context-generalization occurs when the context varies across trials⁴.

Presence of a variable context makes the task drastically more difficult. However, difficulty is known to modulate the stimulus-specificity of perceptual learning⁵.

Is the context-generalization of the perceptual learning of textures explained by task difficulty?

Methods



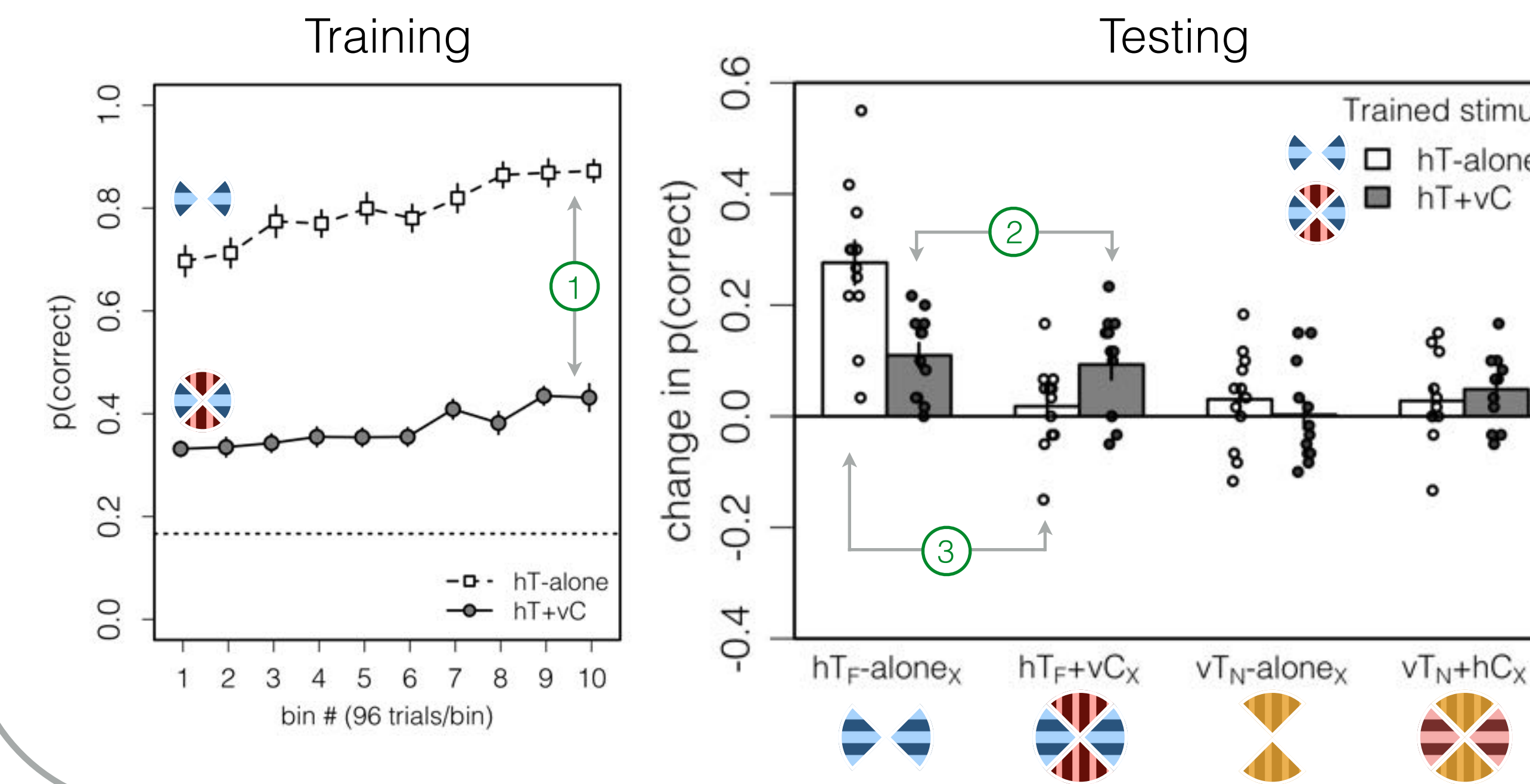
Twelve subjects trained on horizontal targets alone (hT-alone) and twelve subjects trained on horizontal targets with a vertical context (hT+vC).

All subjects were tested on familiar targets (hT_F), and novel targets in the trained (hT_N) or untrained (vT_N) orientation. All three targets were presented alone and within a variable context.

To equate difficulty between T-alone and T+C stimuli, we lowered the RMS contrast of all T-alone stimuli from 0.035 to 0.0088.

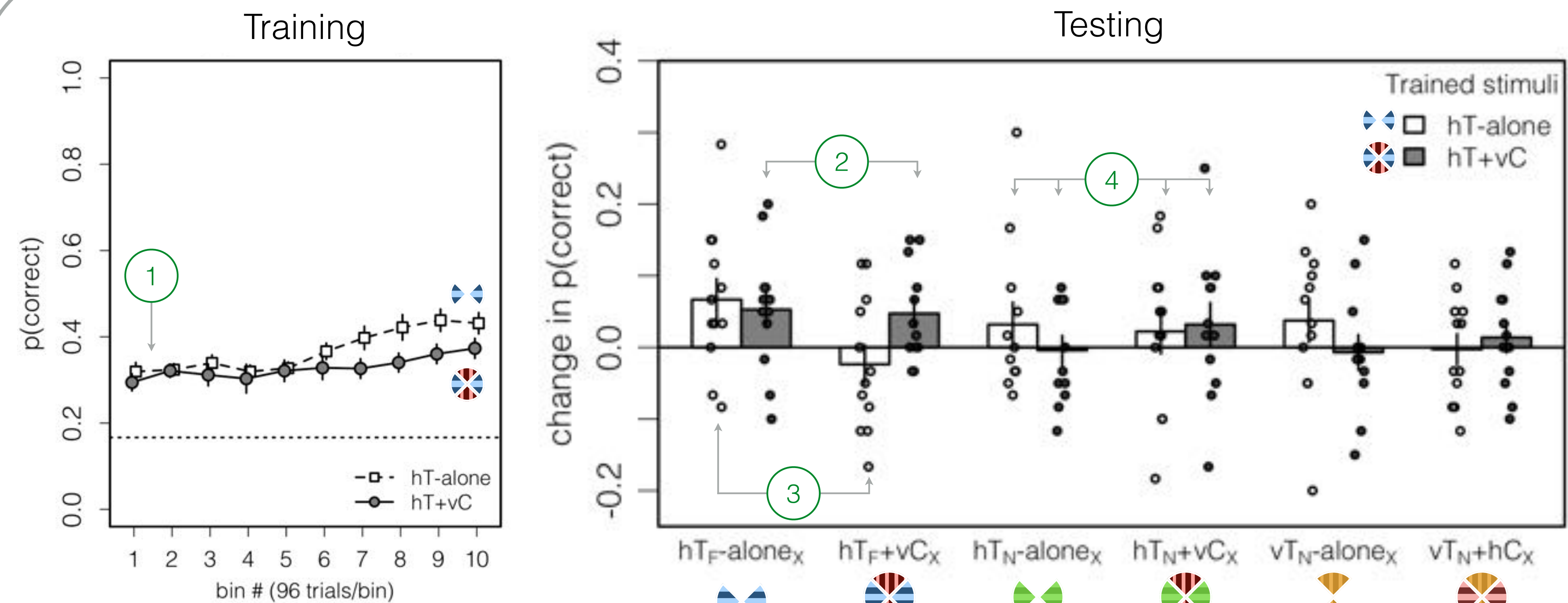
In T+C stimuli, the target and context were independently set to 0.035 RMS contrast.

Previously: Training with a variable context makes learning context-generalizable⁴.



- hT+vC training was more difficult than hT-alone.
- hT+vC training produced context-generalizable learning.
- hT-alone training did not generalize.

Current study: Task difficulty does not explain specificity.



- Decreasing contrast of hT-only equated difficulty of hT-only to match hT+vC.
- hT+vC training produced context-generalization, even when hT_F-alone was lower contrast.
- Training with difficult hT-alone still did not produce notable generalization.
- No strong evidence of generalization to novel targets in trained or novel contexts.

Conclusions

Training using a variable context produces learning that generalizes to novel contexts, but not to novel targets (but see Poster #33.4054).

Task difficulty is unlikely to drive the asymmetric patterns of generalization.

The variability in the stimulus due to the context is responsible for promoting generalization, consistent with previous results⁶.

References

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