

Investigating the appearance of perceptual richness: a systematic review



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Background & Approach

Rather than asking 1 question: *Is perception rich or sparse?*

We asked 2 questions: *Is perception rich? If not, why does it seem rich?*

Consciousness research is the study of subjective experience. Subjective experiences of richness must be explained even if objective measurements indicate perceptual sparseness.

Methods

- PRISMA review of empirical papers relevant to the rich vs. sparse debate.
- Criteria: mentioning rich/sparse debate or related terms in the title or abstract.
- 26 papers included.

Search criteria: Initial: Rich, Sparse, Keywords	Search documents: primary
AND	
Search criteria: Initial: Rich, Sparse, Keywords	Search documents: Rich? OR not? OR sparse? OR 10% or OR central?
AND	
Search criteria: Initial: Rich, Sparse, Keywords	Search documents: conscious? OR not? OR phenom? OR experience?
AND	
Search criteria: Initial: Rich, Sparse, Keywords	Search documents: study OR studies OR experiment? OR paradigm? OR subject? OR subject?
AND NOT	
Search criteria: Initial: Rich, Sparse, Keywords	Search documents: Disorder?

Interpretations & Conclusions

Question 1: *Is perception rich?* High-capacity sensory memory provides a compelling affirmative answer to this question, however convincing evidence that items in sensory memory are consciously perceived remains lacking. High-capacity sensory memory prompts us to question the links between subjective richness, attention & memory, and the accessibility of perceptual details.

Question 2: *If not, why does it seem rich?* Sensorimotor theories of perception combined with predictive processing may help explain why perception subjectively seems rich despite behavioral measures indicating sparseness. Perception may seem rich because the brain predicts richness by maintaining the contingency that it will find rich detail if it looks for it in the environment (e.g., by shifting the eyes or attention). This feeling need not be in line with the reality of sparse processing as reflected in behavior, and summary statistics may play a key role in forming this contingency.

Open Questions

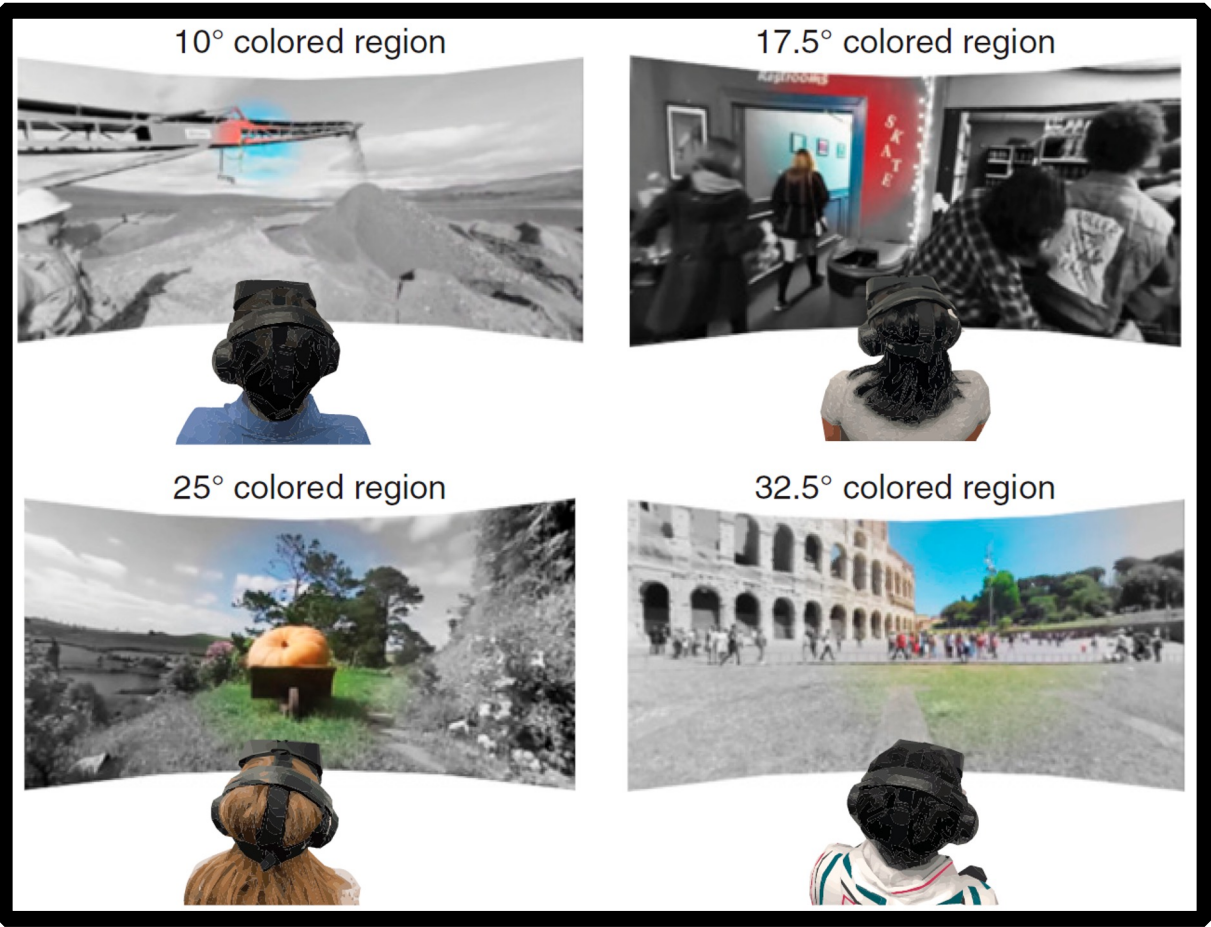
- Is perception of individual items necessary for perception of visual summary statistics? How exactly do summary statistics and predictive processing interact?
- Is change blindness the result of a failure of perception or a failure of comparison, and how exactly do summary statistics and attention contribute to change blindness?
- Are fragile sensory memories unconsciously processed but easily accessible, or consciously processed but easily overwritten?

Acknowledgements

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Results

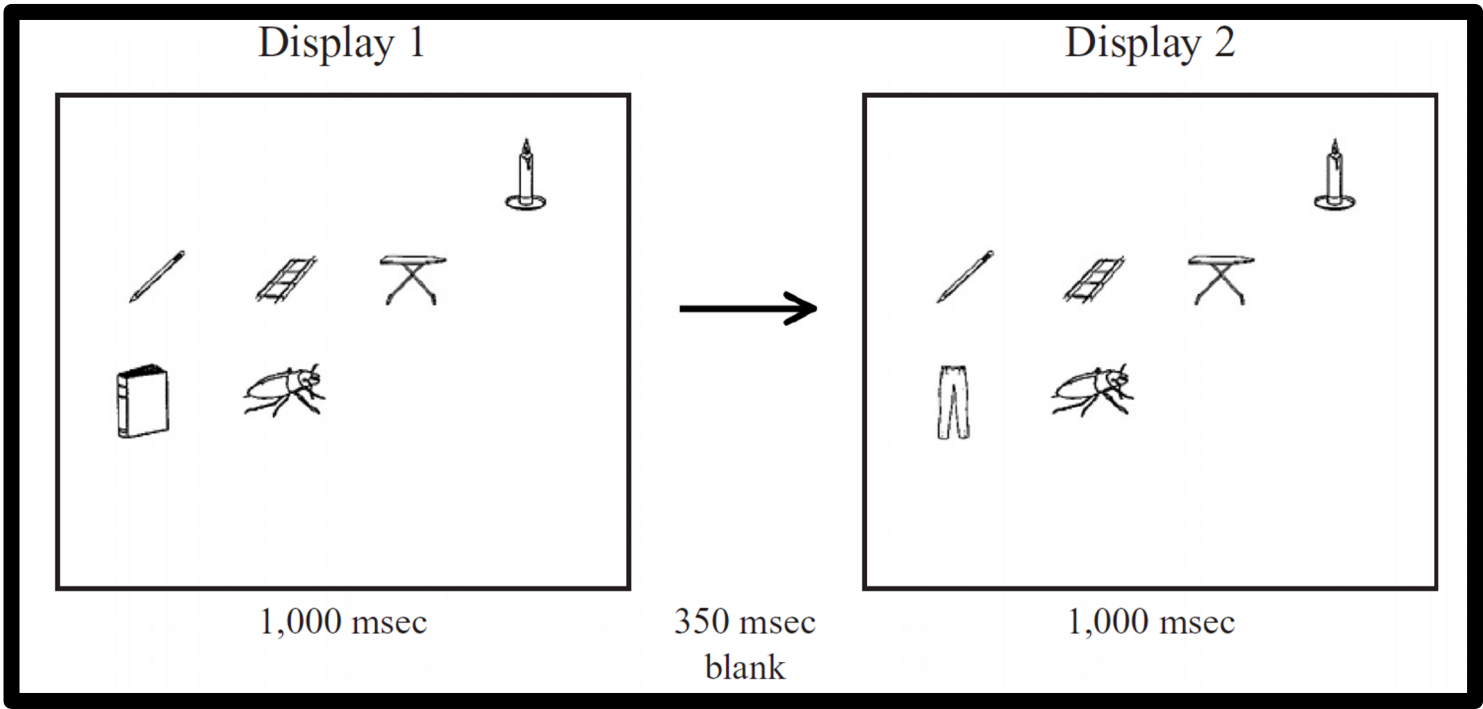
Included papers were sorted into four categories: color perception & summary statistics, change blindness, sensory memory, and miscellaneous.



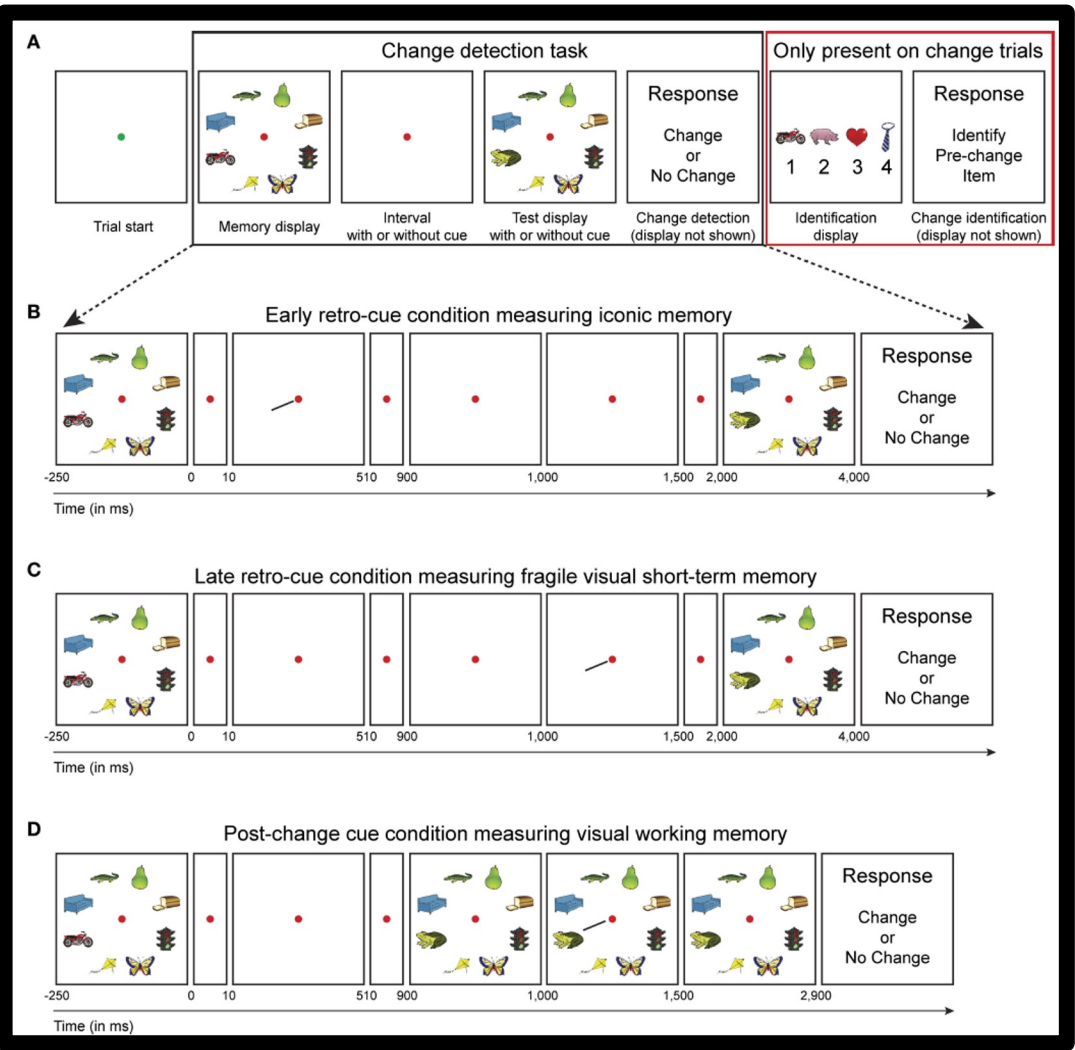
Reproduced from Cohen et al. (2020) PNAS

Change blindness

Why do we often fail to detect changes from one perceptual snapshot to the next? Inattention may contribute to failures in perception (of pre- or post-change items) and/or failures in comparison.



Reproduced from Mitroff et al. (2004) Perception & Psychophysics



Reproduced from Sligte et al. (2010) FIPS

Sensory memory

Why do we detect more changes when memory is probed at earlier stages in time? Early retro-cues may trigger attention shifts to fragile and quickly fading (un)conscious memory traces.

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