

Illusions that are not Illusions: Misleading cross-level comparisons

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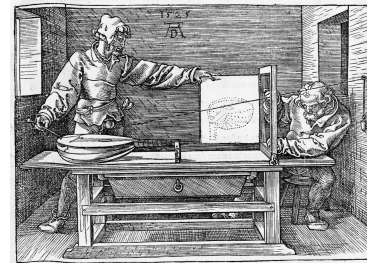
Illusion, Working Definition

“A visual illusion is a consistent and reproducible discrepancy between a stimulus and the way it is perceived under standard conditions”

- No specific epistemological stance
- Avoids the terms ‘truth’ and ‘veridicality’
- Includes constructivist and ecological views
- Perception as inference or interpretation, not as mirroring an external truth

Representational Domains

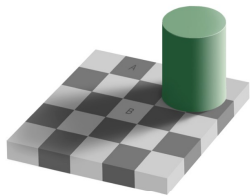
Physical scene → Optical image → Perceived scene



Misnamed Illusions

Illegitimate cross-level comparisons

Adelson Checker Shadow

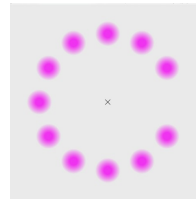


Comparison of
b/w reflectance to
luminance:
Inadmissible

Genuine Illusions

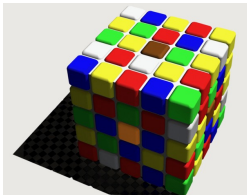
with legitimate within-level comparisons

Lilac Chaser



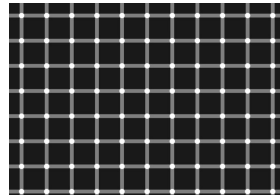
A green negative
afterimage seems
to follow the gap

Purves-Lotto Colour Cube



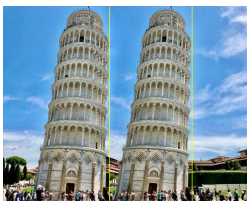
Comparison of
colour to RGB
value: Inadmissible

Scintillating Grid



Black dots appear
even though there
is no basis in lumi-
nance: Legitimate
comparison

Leaning Towers



Comparison of
perceived vertical to
projections from
different vantage
points
Photomontage by MB, after
Kingdom et al. (2007)

Reverspective



Perceived depth is
reversed →
Perceived rotation
is reversed

General explanations

Several visual "illusions" owe their illusory status not to a failure of perception but to an implicit, illegitimate comparison across representational levels – for example, between scene properties and image properties, or between inferred surface reflectance and retinal luminance.

Operational rule: A phenomenon belongs to the cross-level (misnamed) illusions class if its apparent illusory character disappears once the comparison is reformulated within a single representational level.

References

Bach M.. Idea for poster in: Shepard Illusion.. <https://michaelbach.de/ot/sze-ShepardTables/>
Kingdom, Yoonessi & Gheorghiu (2007) The Leaning Tower illusion: a new illusion of perspective.
Perception 36:475–477
Koenderink, J. J. (1990). Solid Shape. Cambridge, MA: MIT Press

Schrauf M, Lingelbach B, Lingelbach E & Wist ER (1995) The Hermann grid and the scintillation effect.
Perception 24: suppl, 88–89
Rogers (2014) Delusions about Illusions. Perception 43:840–845
Todorović (2020) What Are Visual Illusions? Perception 49:1128–1199
Wade, N. J. (1998). A Natural History of Vision. Cambridge, MA: MIT Press