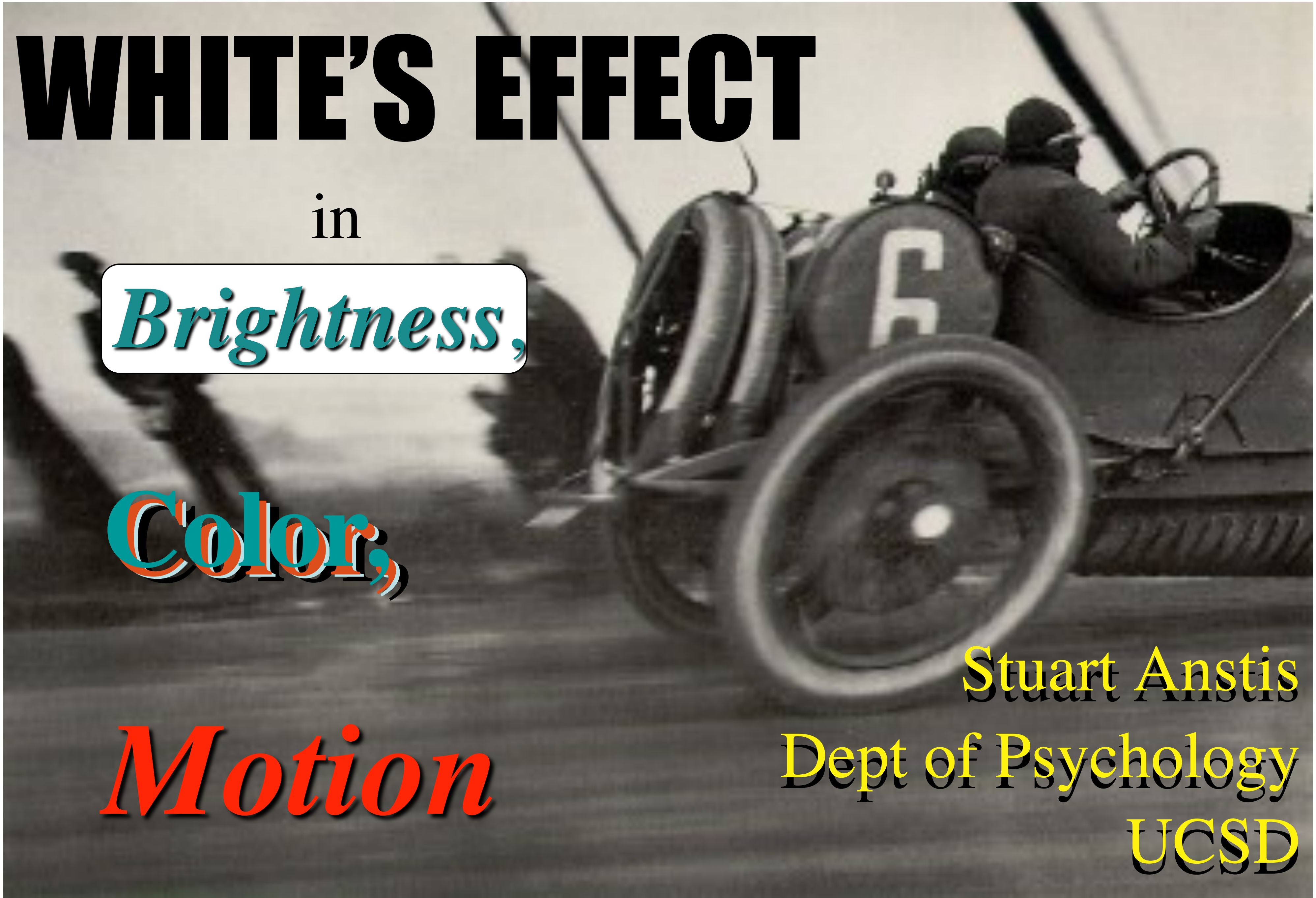
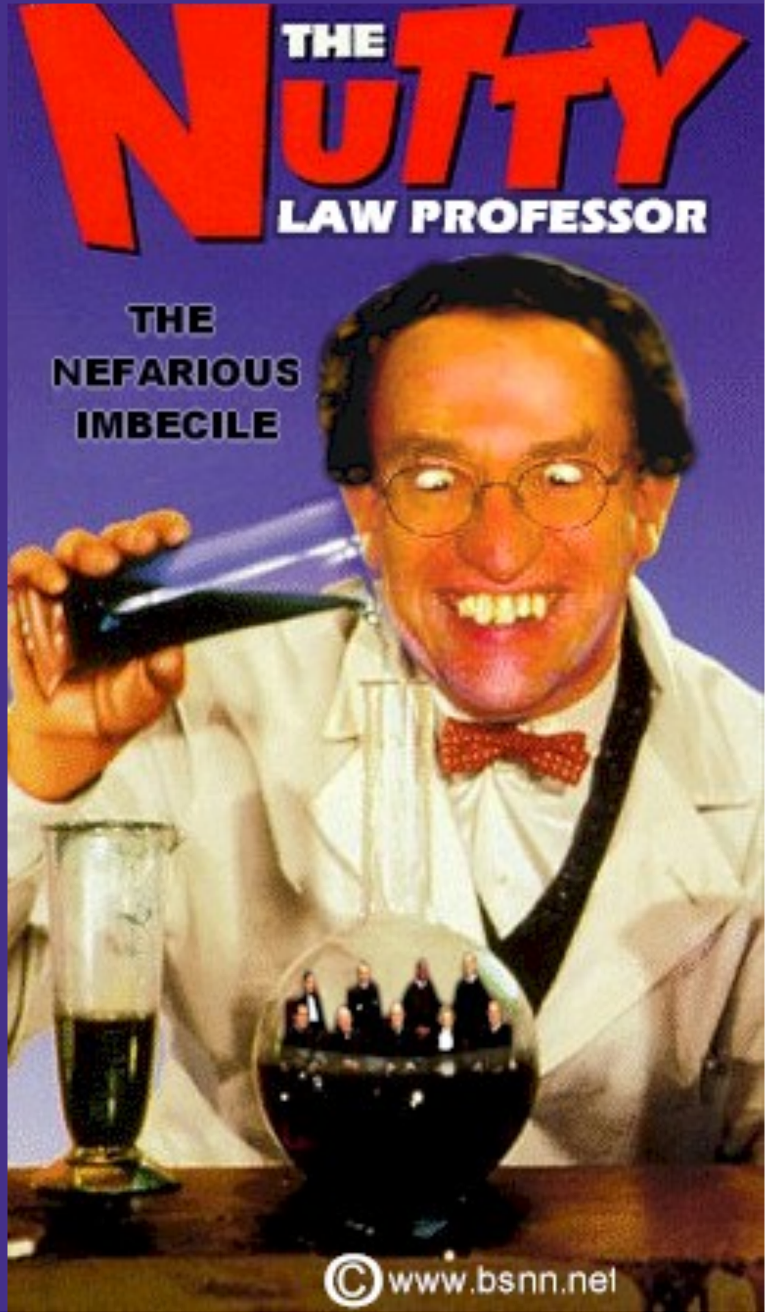


Photo by Jacques-Henri Lartigue, 1913

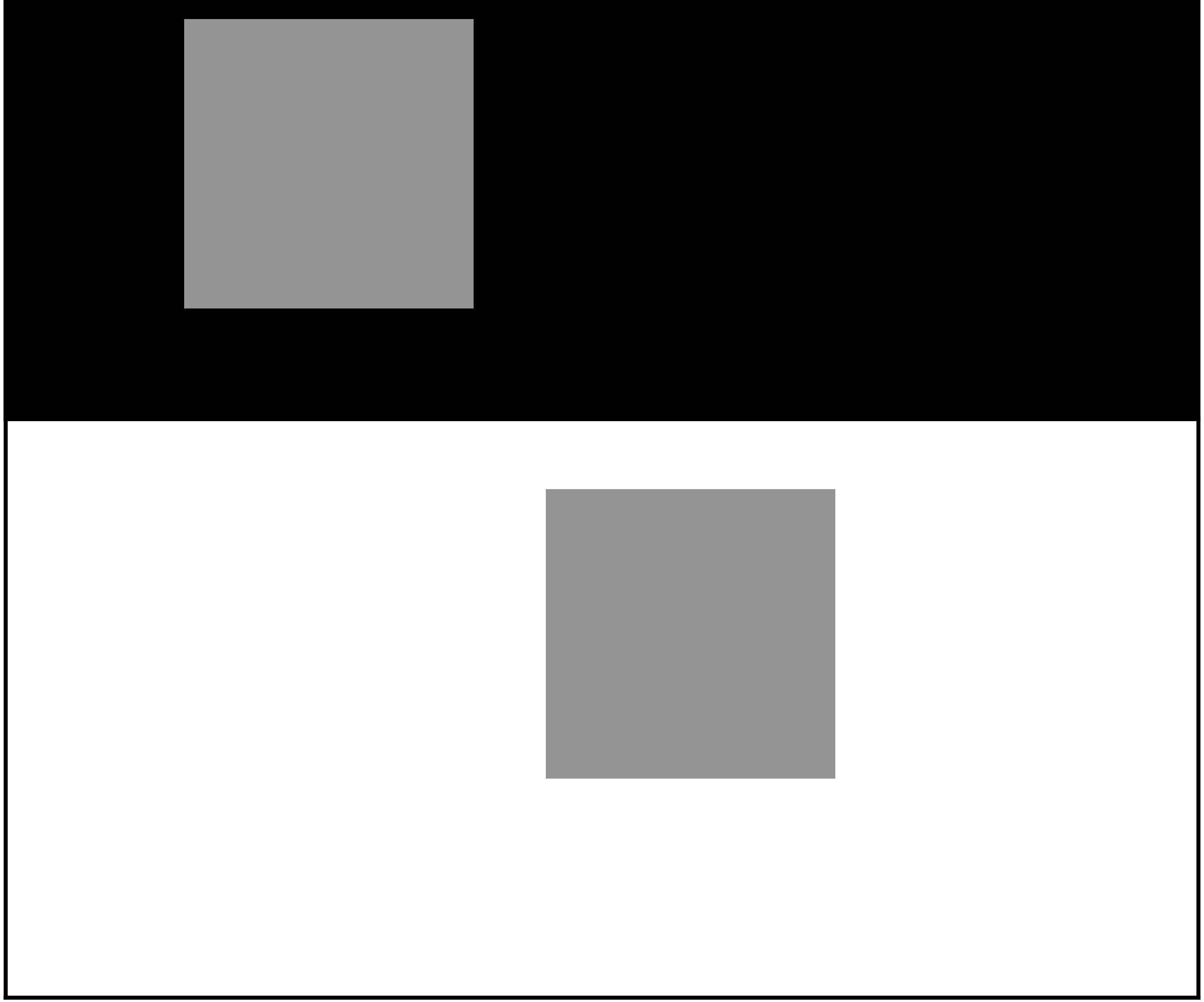
From a conference at York University, 2003, honouring

MARTIN REGAN

Unpublished photos of Martin Regan:



Simultaneous contrast

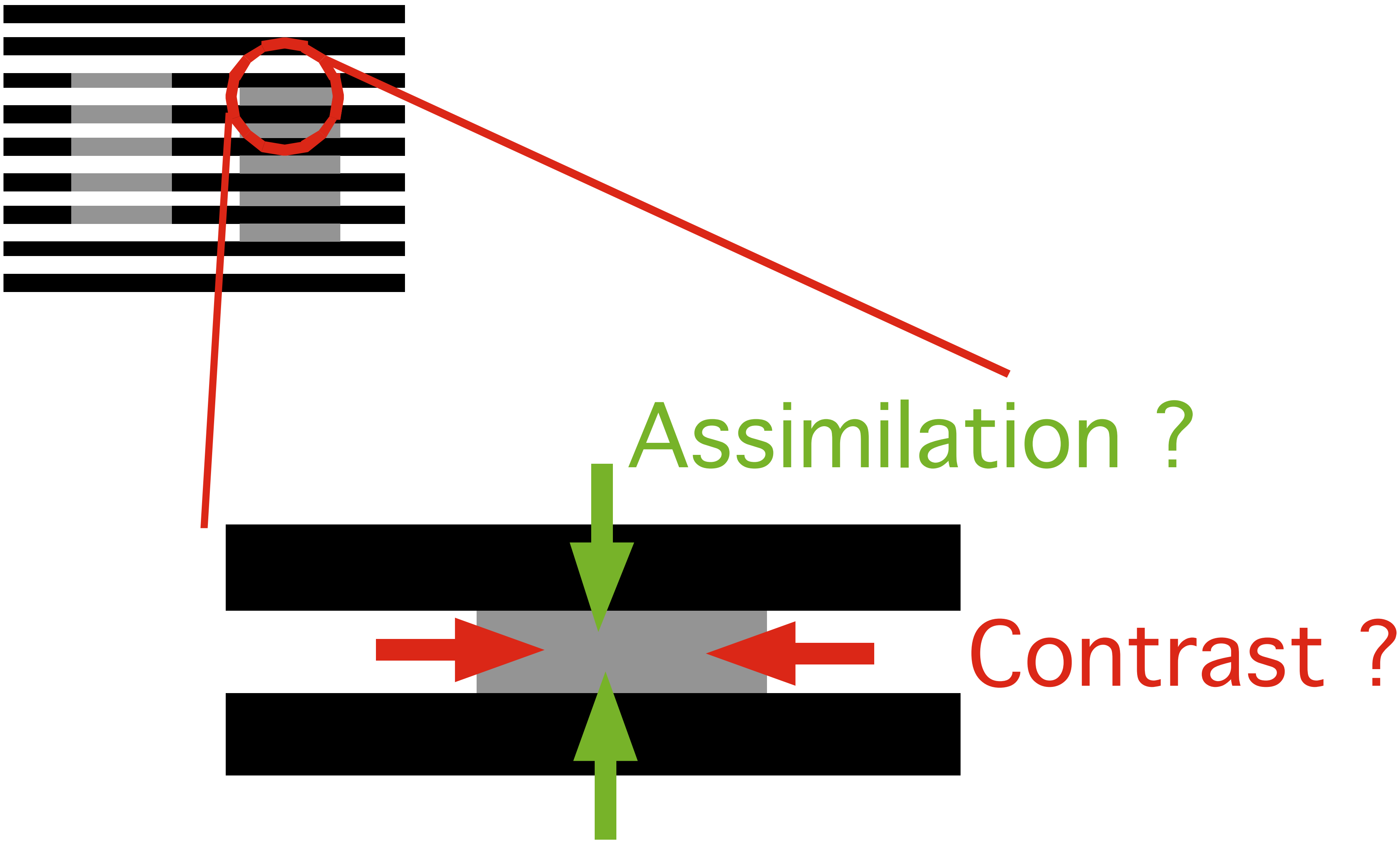


White's Effect

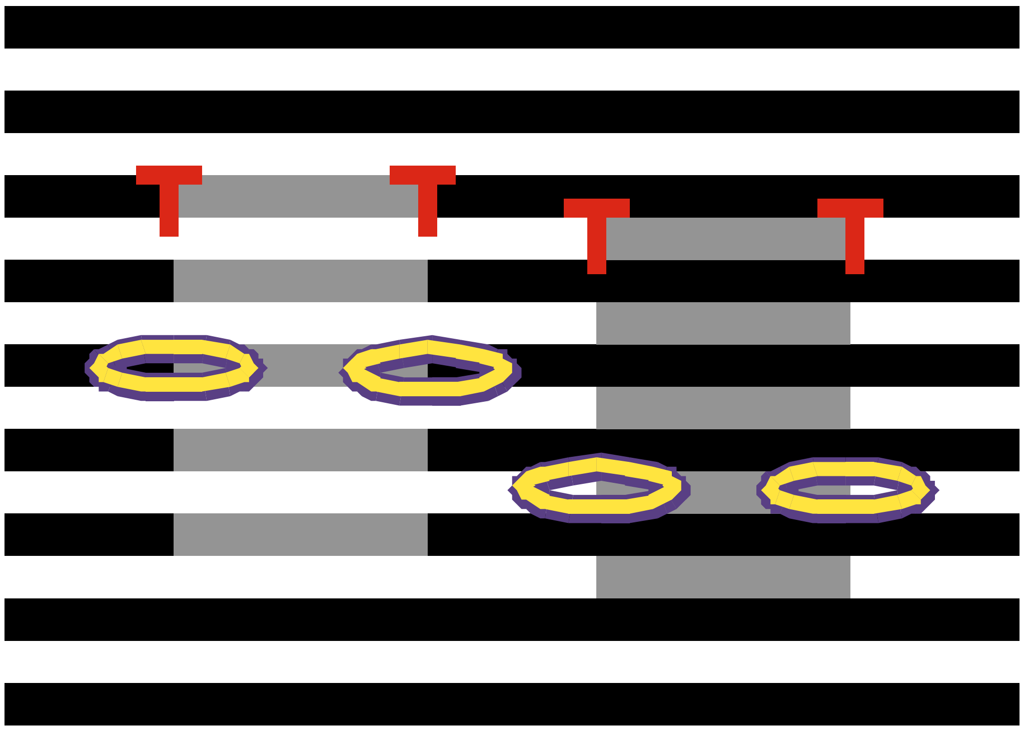
Theories of White's effect

		Level:
1.	Assimilation or contrast ?	Low
2.	Geometry: T-junctions, elongated RFs	Low
3.	Belongingness	High
4.	Transparency	High

Theories of White's effect



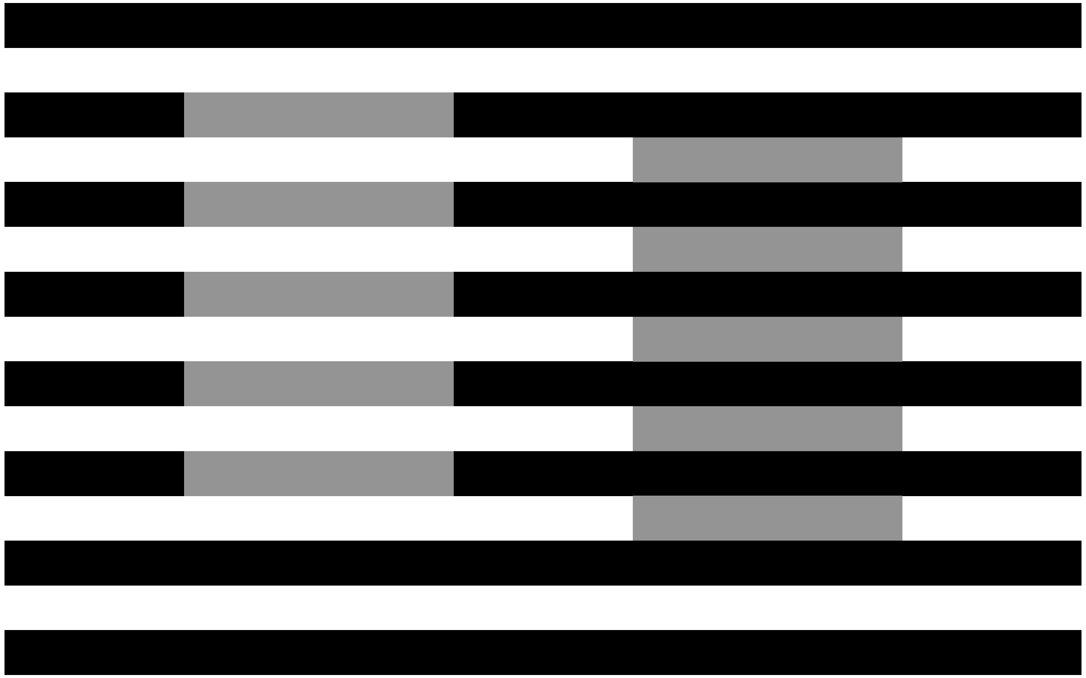
Geometrical theories of White's effect

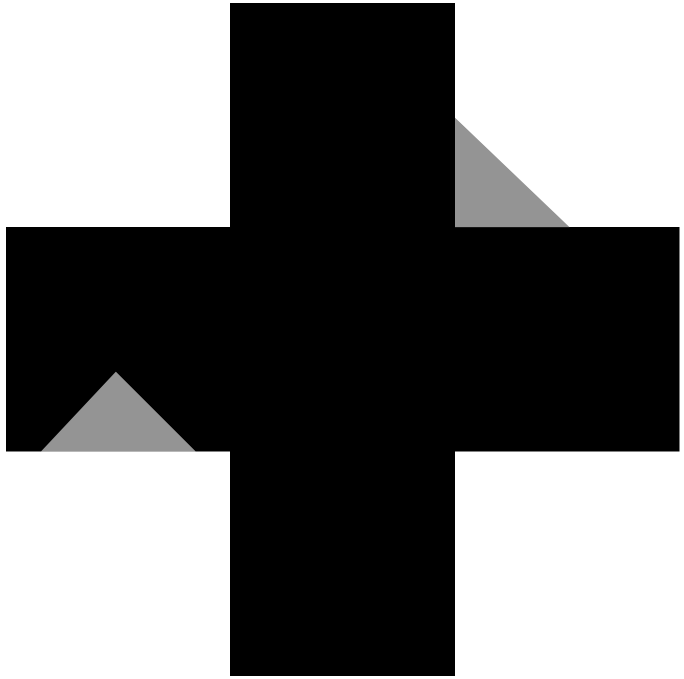


T-junctions ?

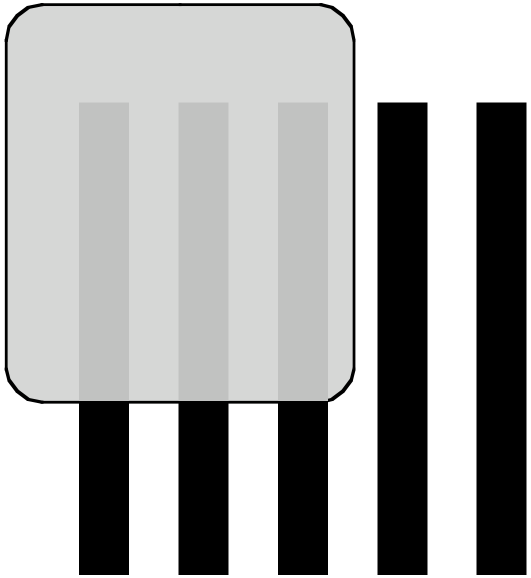
Elongated receptive fields ?

“Belongingness” theory of White’s effect

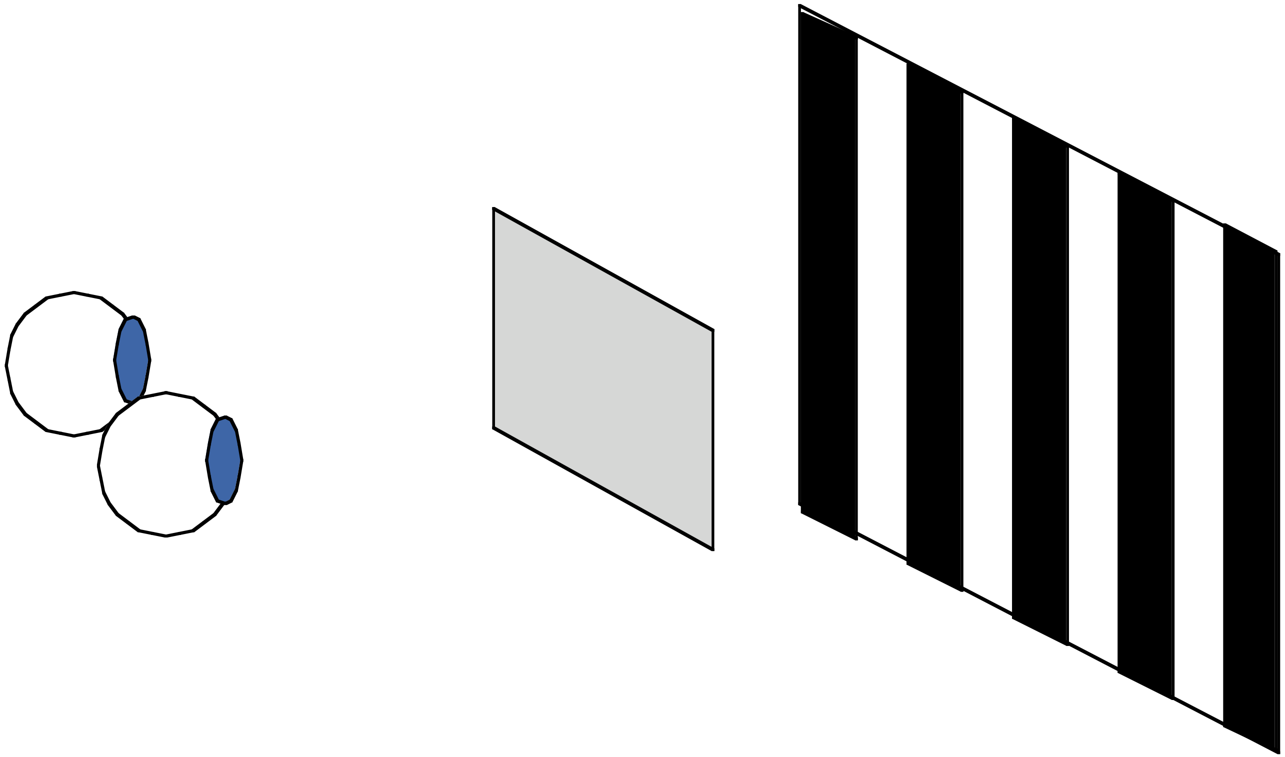




Benary 1924



Transparency theory
(Bart Anderson 1997)



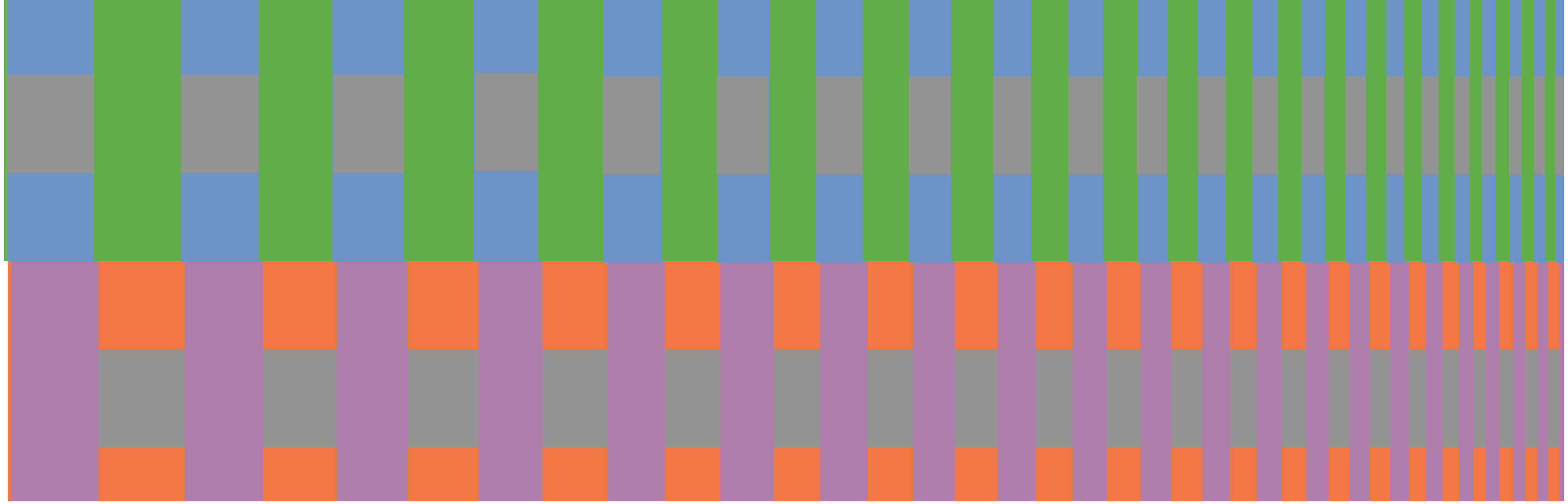
Theories of White's effect

	Level:
1. Assimilation or contrast ?	Low
2. Geometry: T-junctions, elongated RFs	Low
3. Belongingness	High
4. Transparency	High

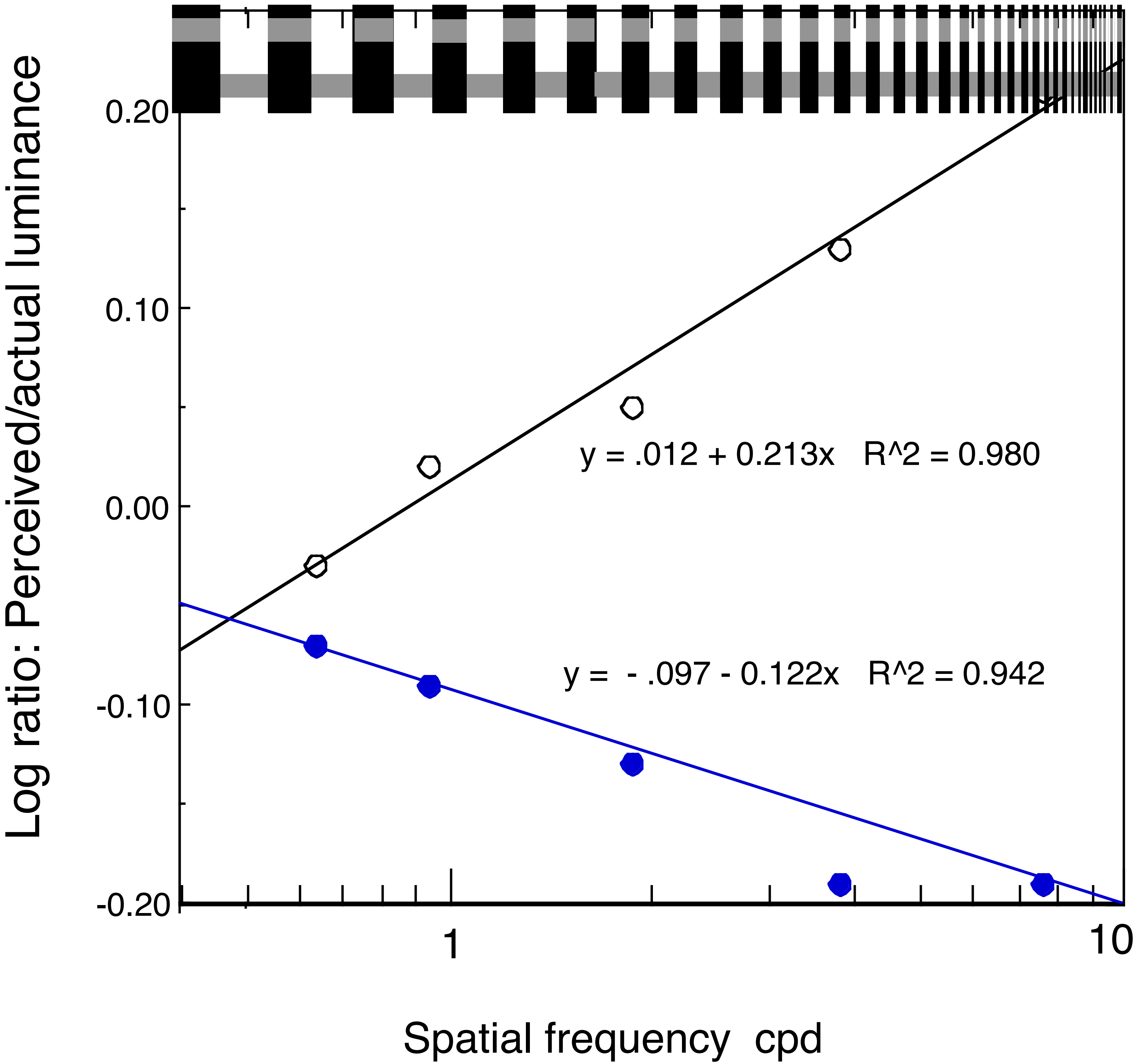
Results

White's effect:

- increases with spatial frequency
- can generalise to colour



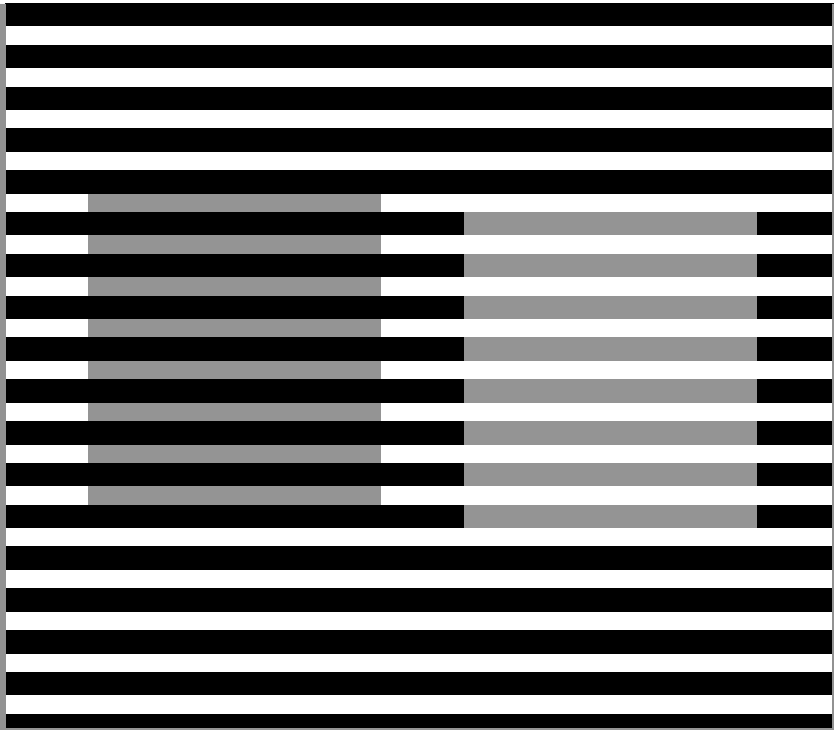
White’s effect increases with spatial frequency

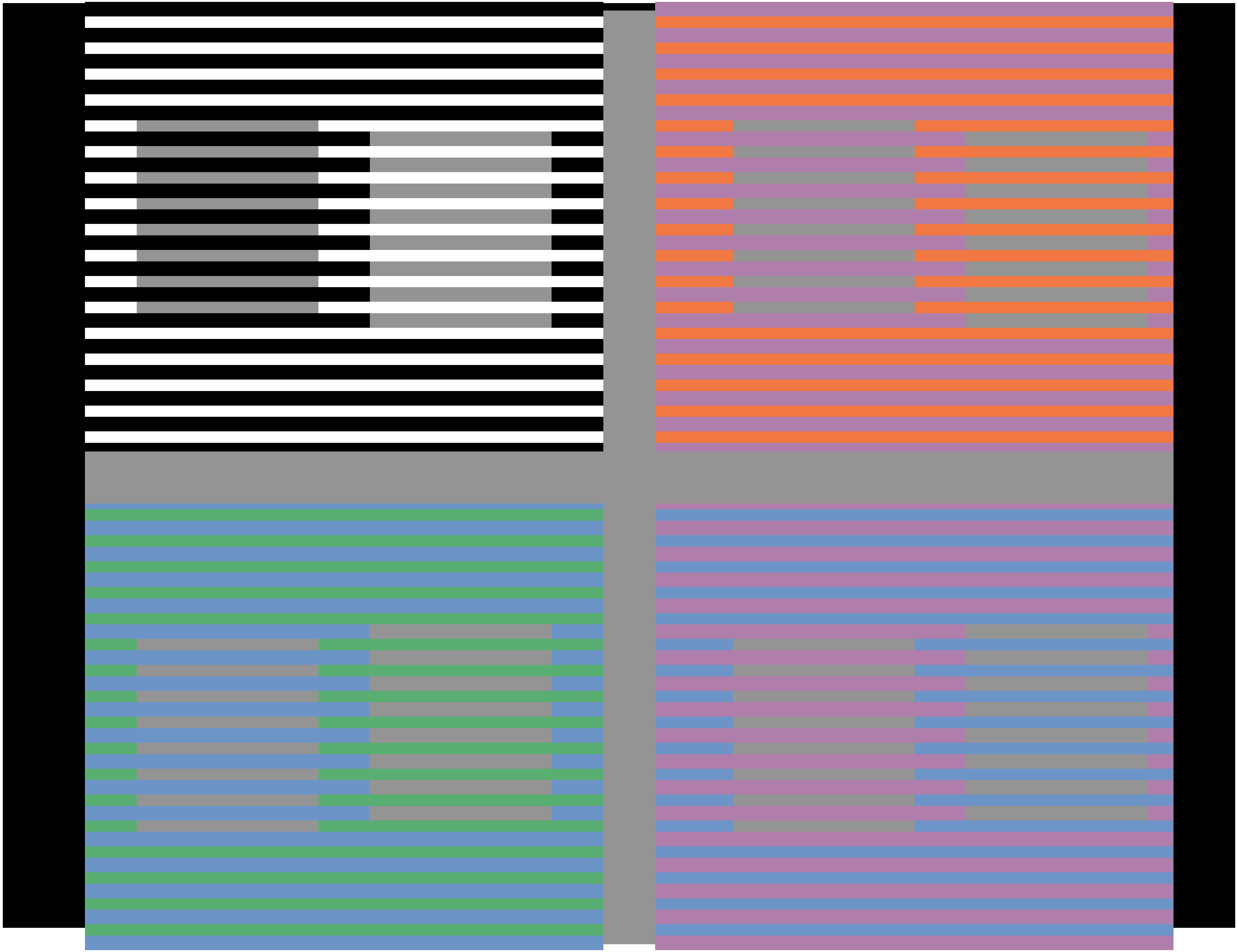


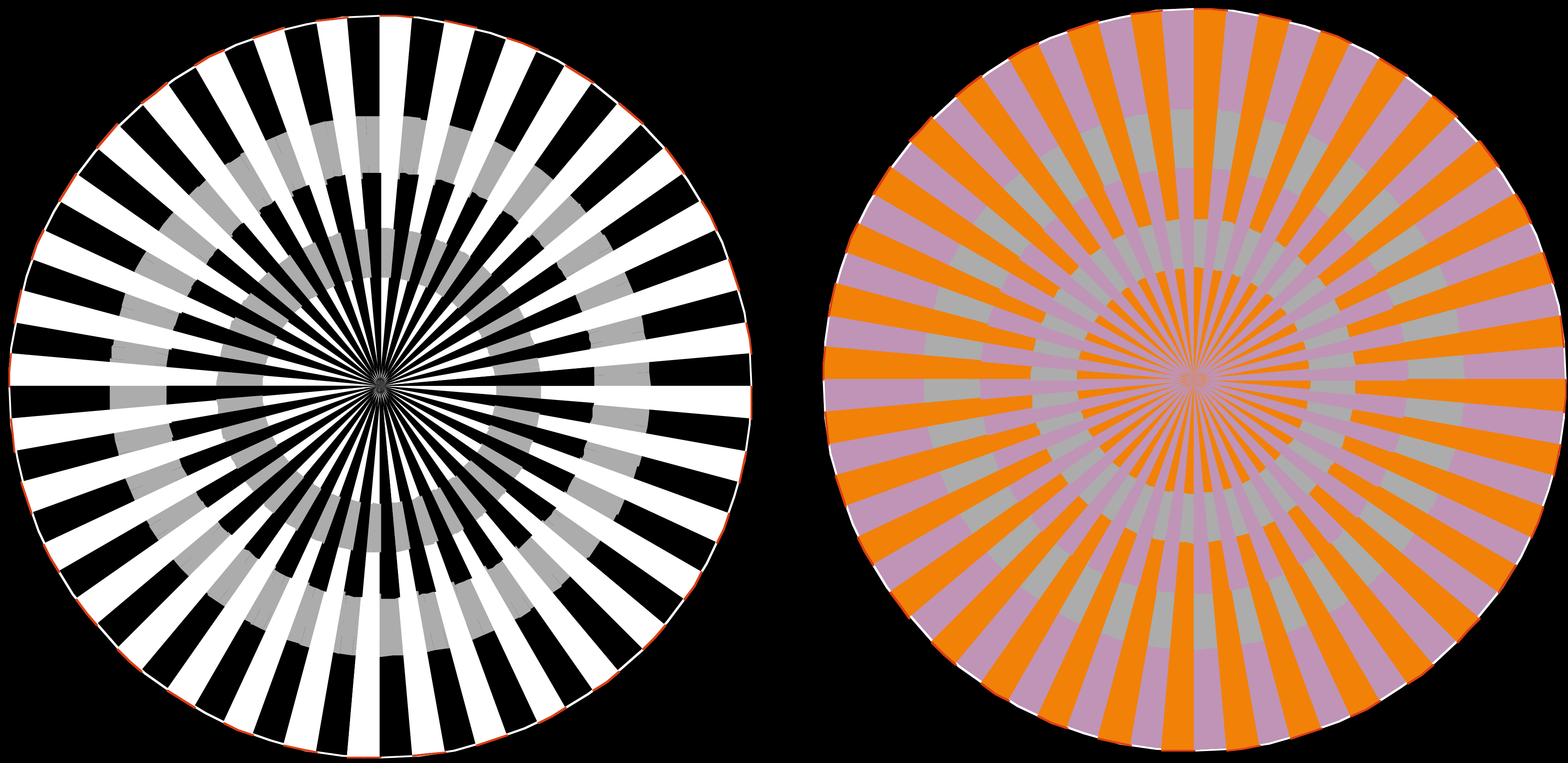
Log ratio: Perceived/actual luminance
0.20
0.10
0.00
-0.10
-0.20
y = .012 + 0.213x R^2 = 0.980
y = - .097 - 0.122x R^2 = 0.942
1
10
Spatial frequency cpd

Colored White’s effect

(All grays in the next four slides are the same)

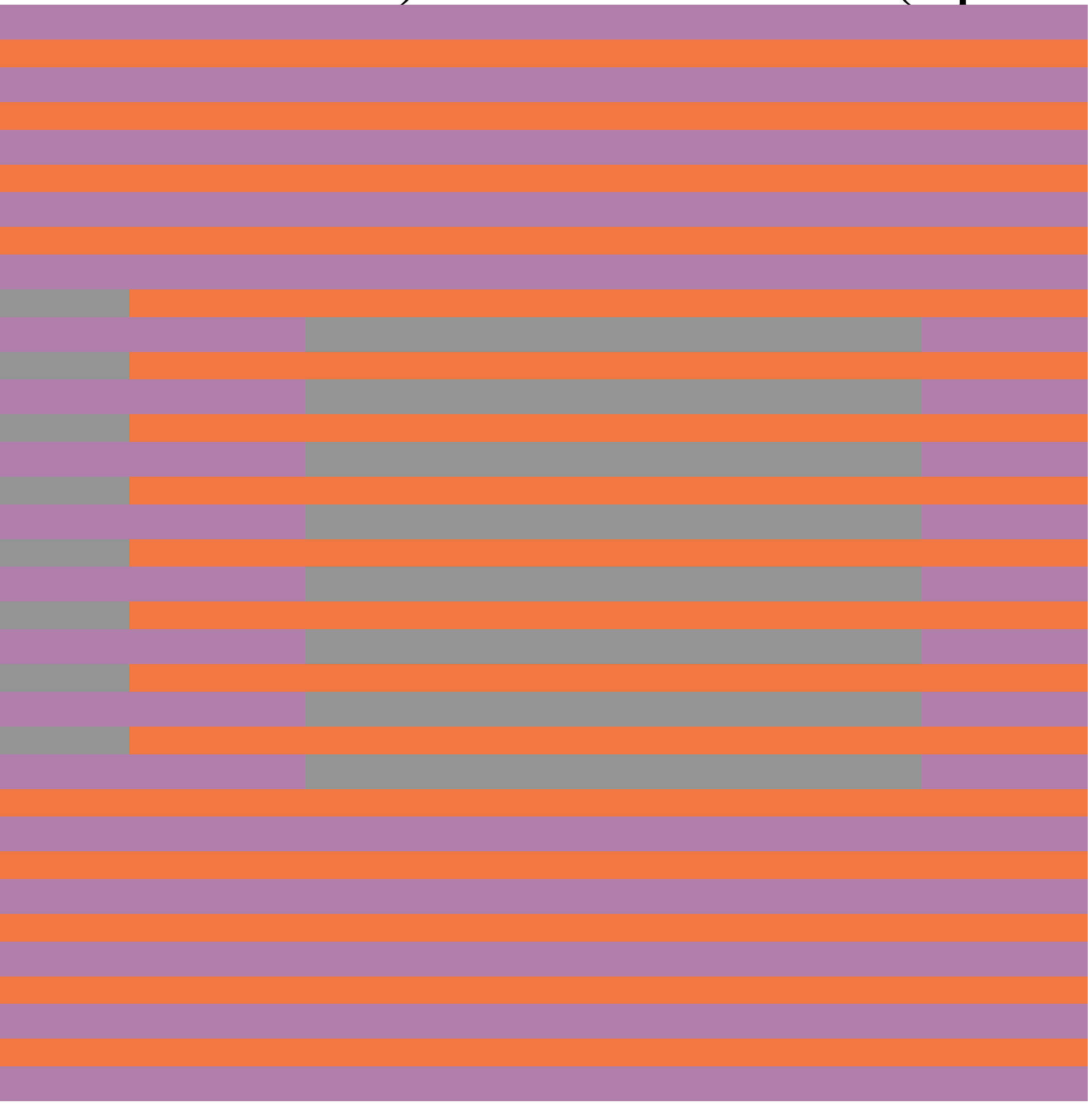






All annuli are the same gray

Colored White's effect: Why does grey test patch look yellow-green? Contrast (=negative induced hues) or assimilation (=positive induced hues) ?

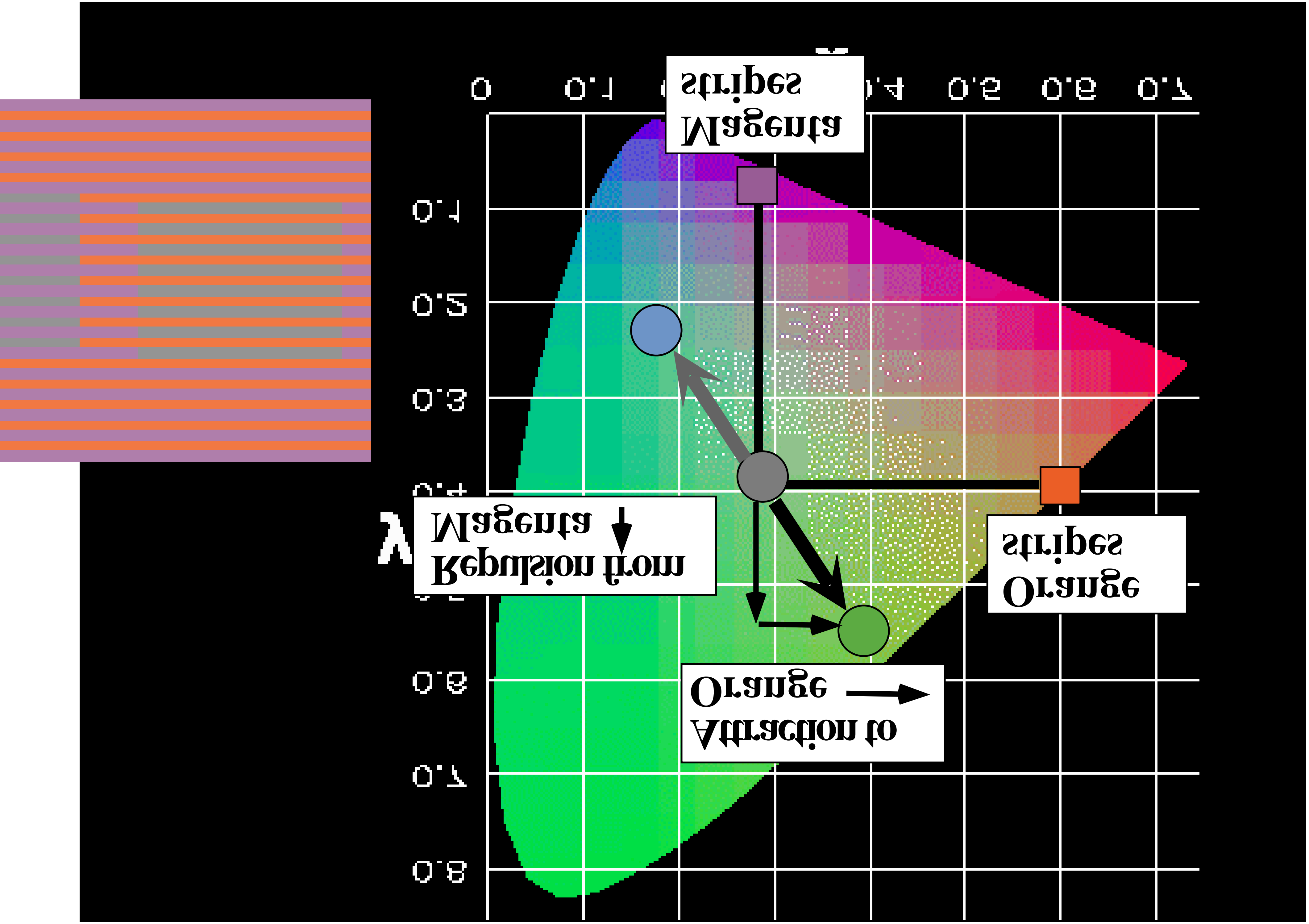


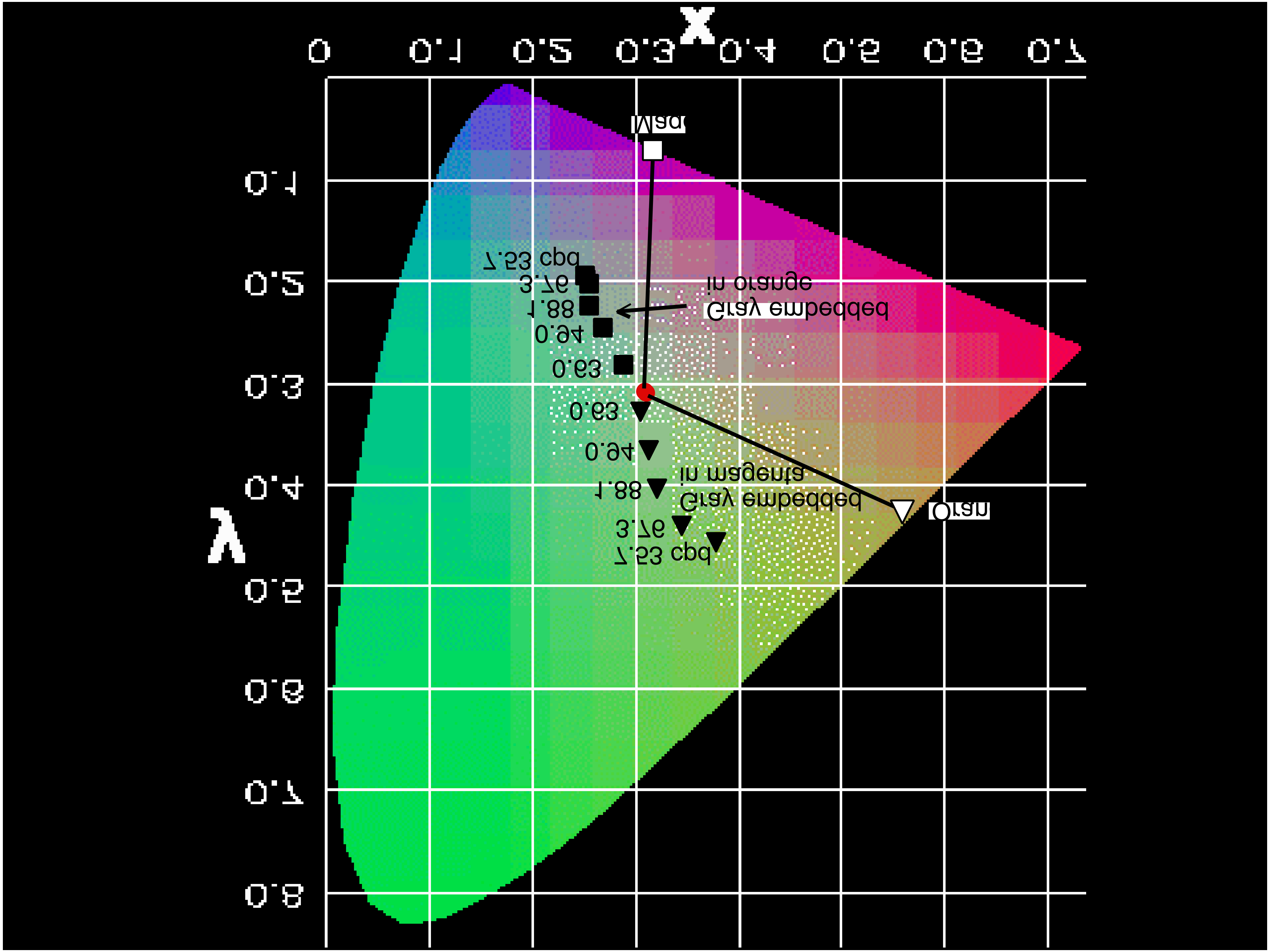
Use non-complementary colored stripes

End-wise contrast from embedding magenta stripes (to minus-magenta = green)?

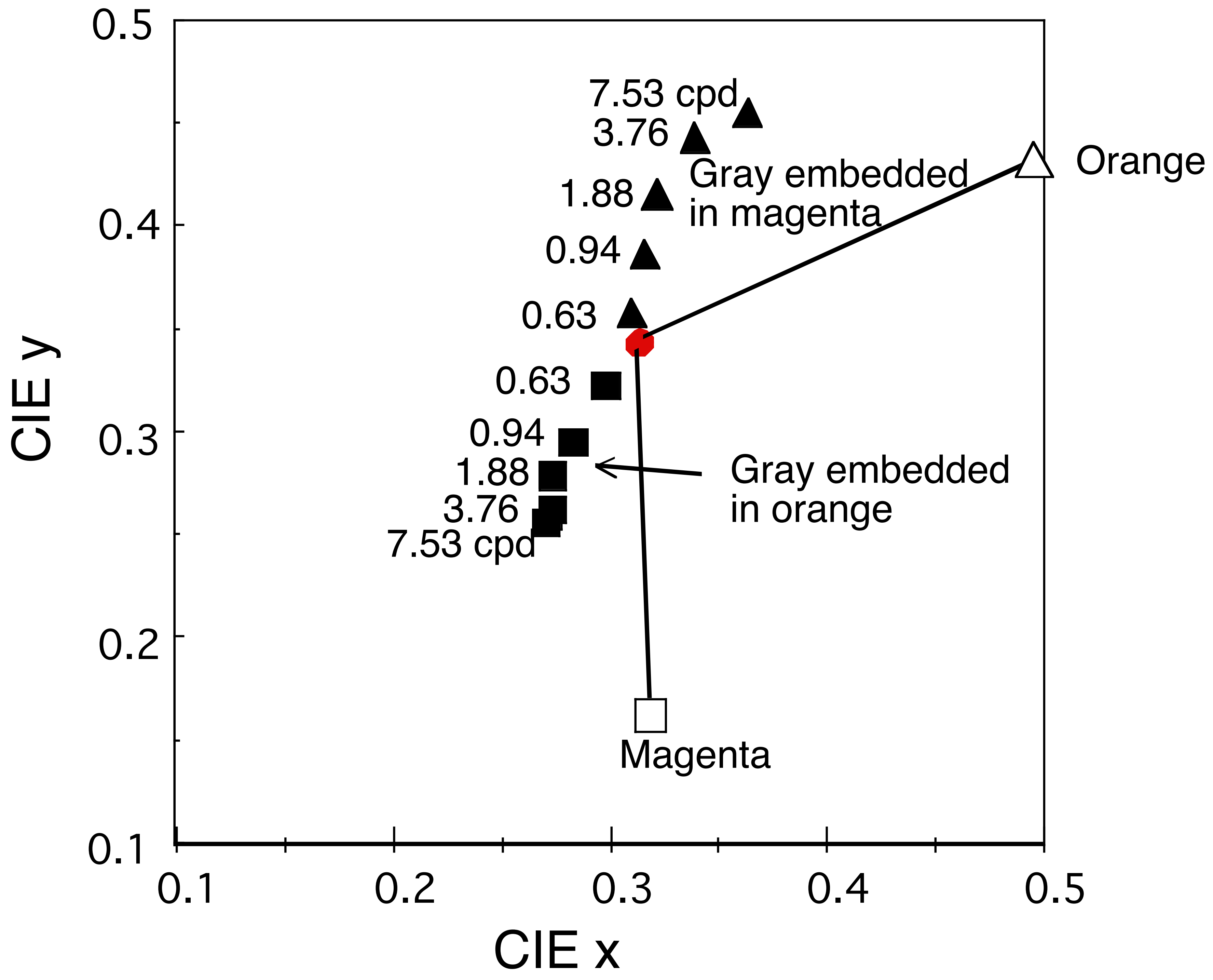
Or:

Assimilation (to orange) from flanking orange stripes?

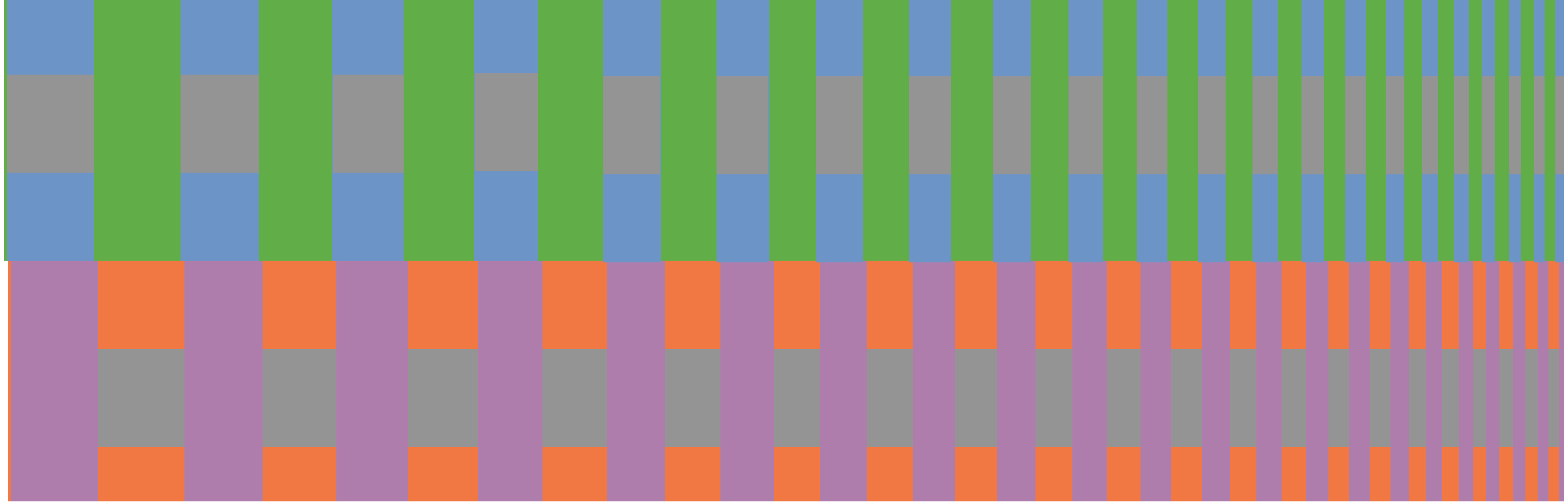

Magenta stripes
Orange stripes
Repulsion from Magenta
Attraction to Orange
x
y
0
0.1
0.4
0.5
0.6
0.7
0.2
0.3
0.8



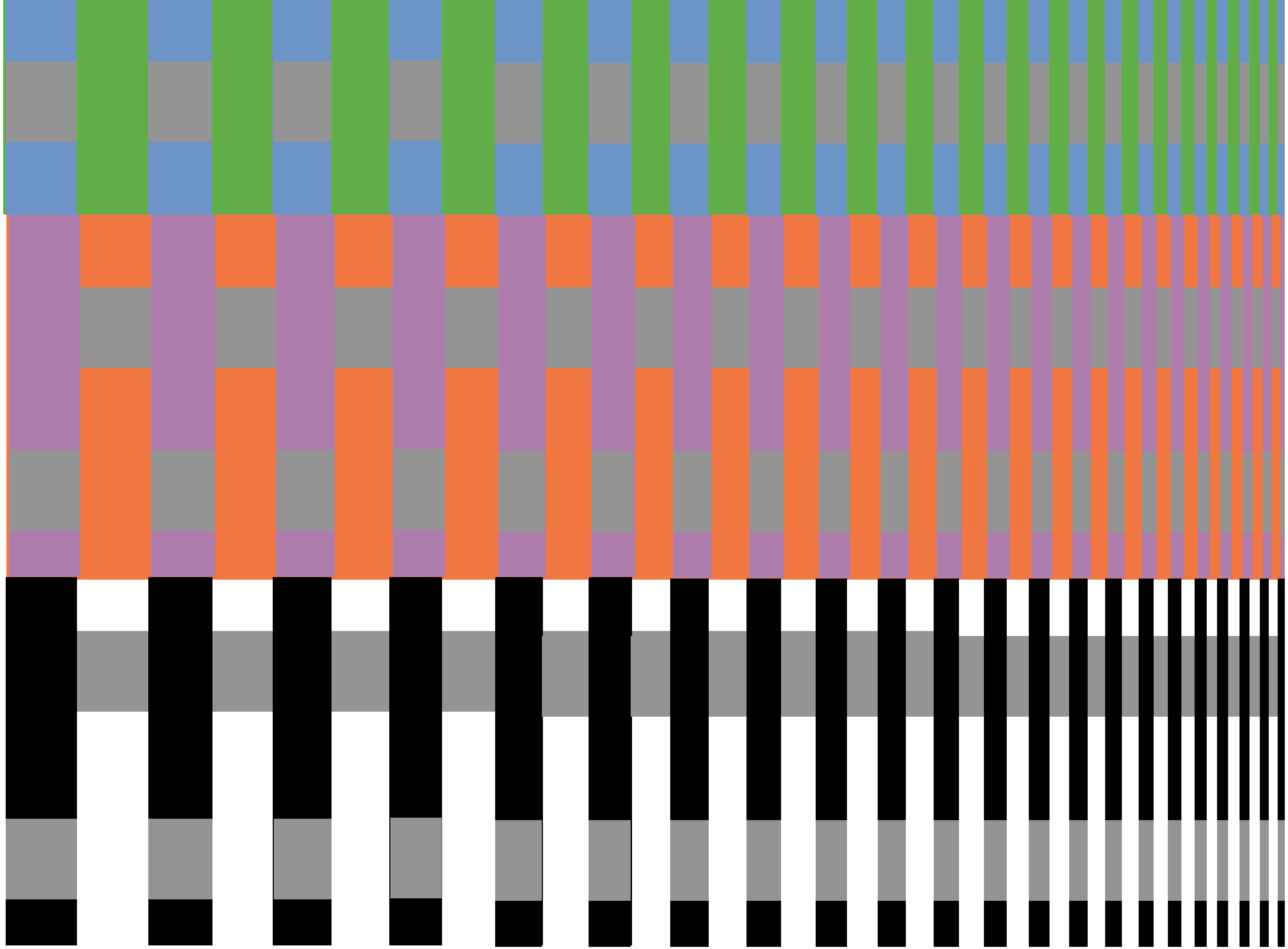
x
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
y
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Mag
Oran
Gray embedded
in orange
Gray embedded
in magenta
7.53 cpd
3.76
1.88
0.94
0.63



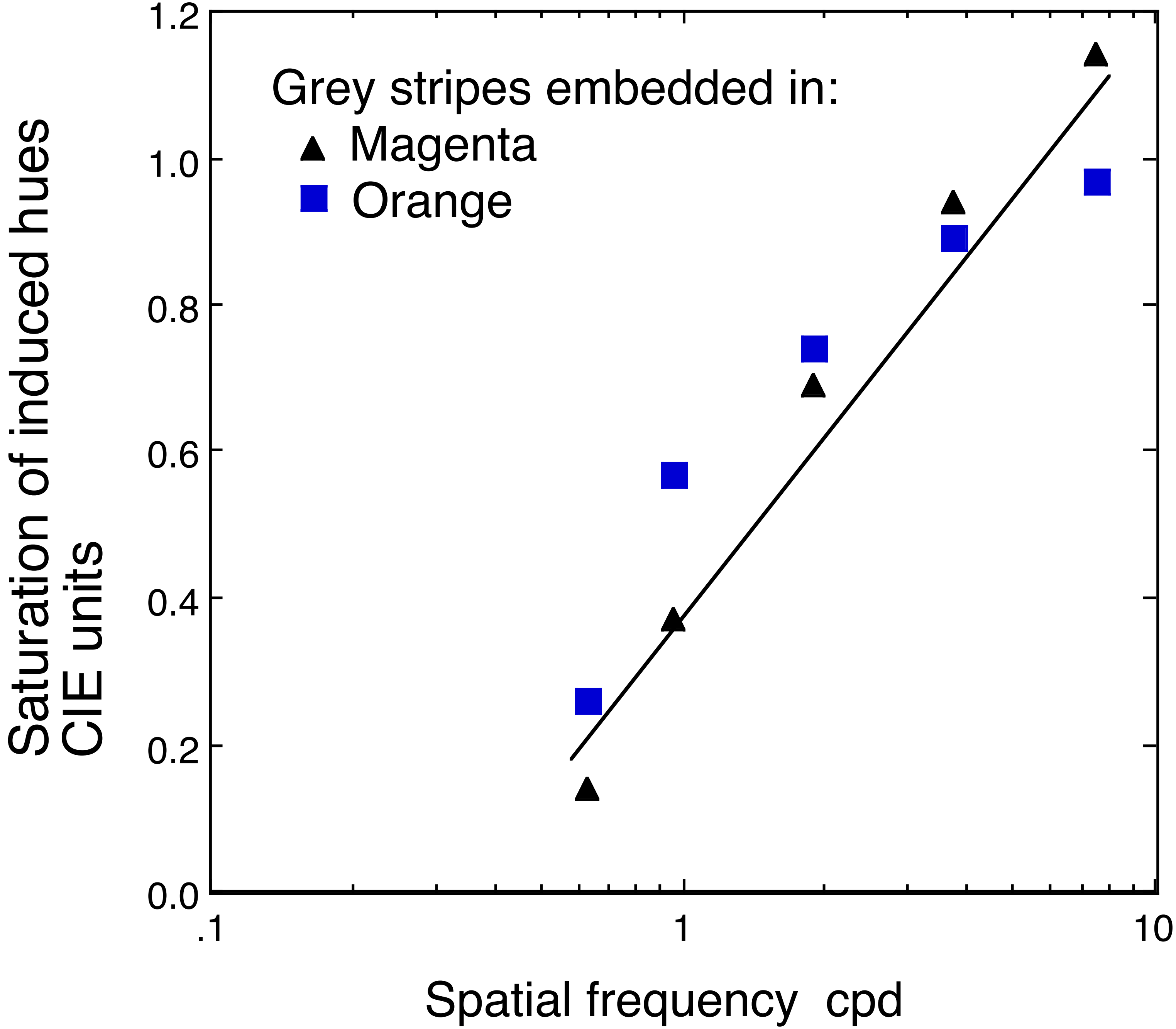
7.53 cpd
3.76
Gray embedded in magenta
1.88
0.94
0.63
Orange
0.63
0.94
1.88
3.76
7.53 cpd
Gray embedded in orange
Magenta
CIE y
CIE x
0.5
0.4
0.3
0.2
0.1
0.1
0.2
0.3
0.4
0.5



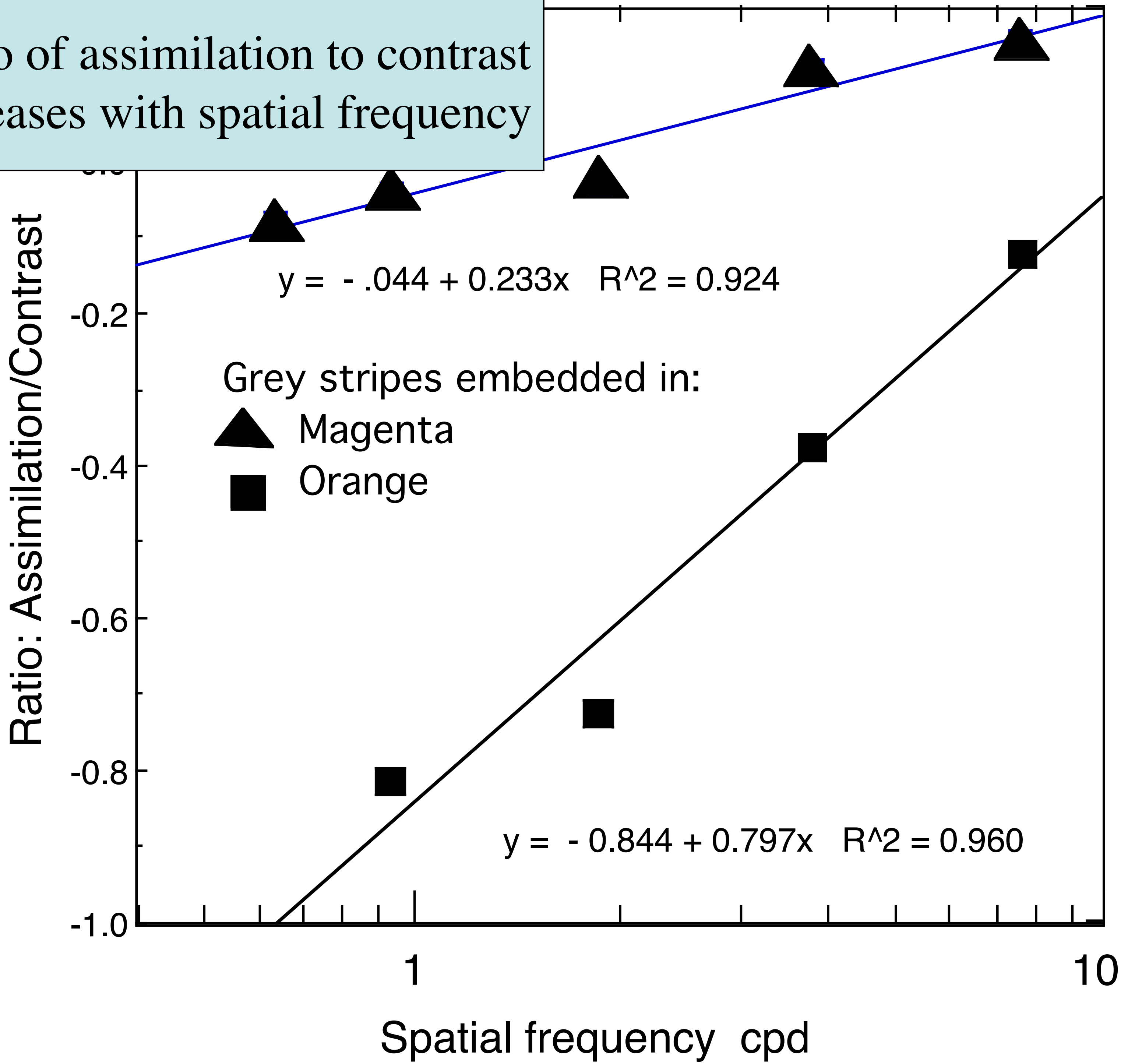
White’s effect increases with spatial frequency, for black/white and also for color.



Colored White's effect increases with spatial frequency



Ratio of assimilation to contrast increases with spatial frequency



Conclusion from coloured White's effect:

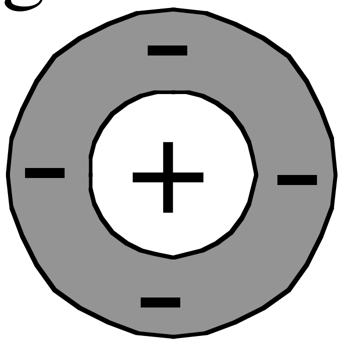
- At low spatial frequencies

  Contrast > Assimilation
- At high spatial frequencies

  Assimilation > Contrast

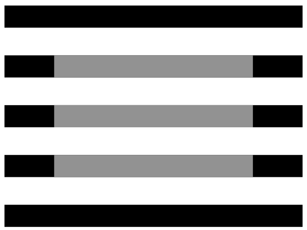
  (& big overall effect)

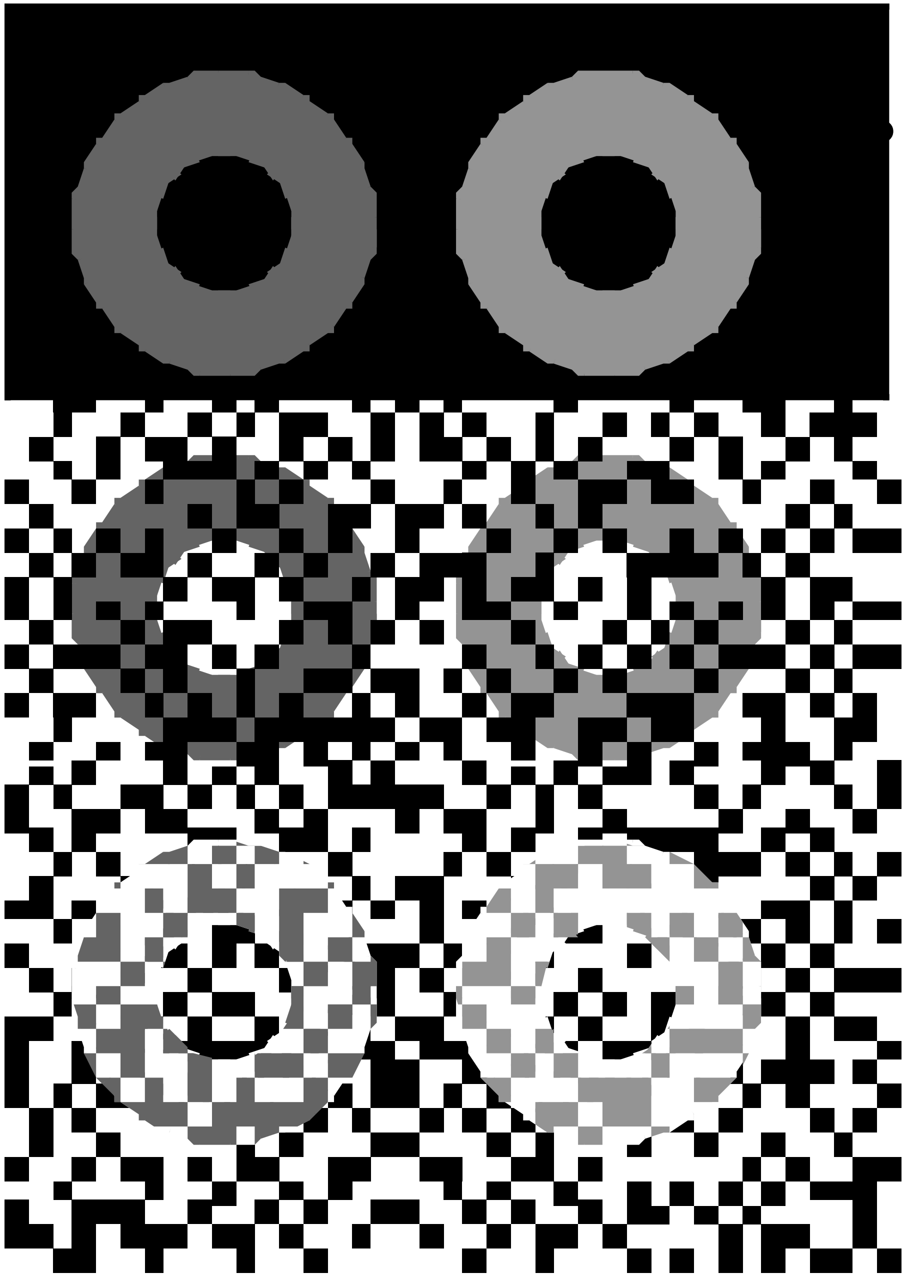
So: Assimilation has smaller spatial range!



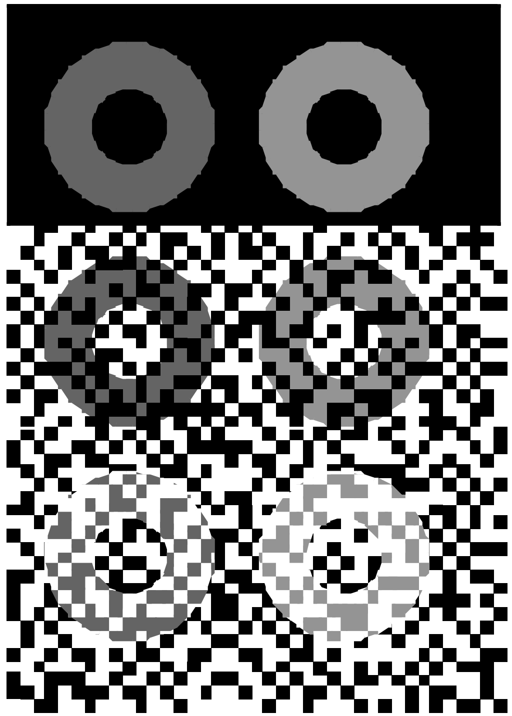
Why geometrical theories are WRONG

“Stuart’s Rings” in next slide are isotropic -- no bars or T-junctions -- yet give brightness illusions like White’s Effect.



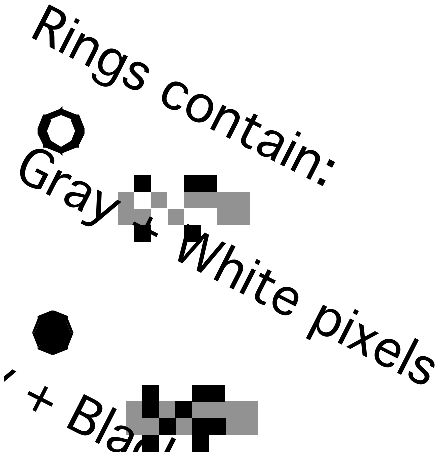


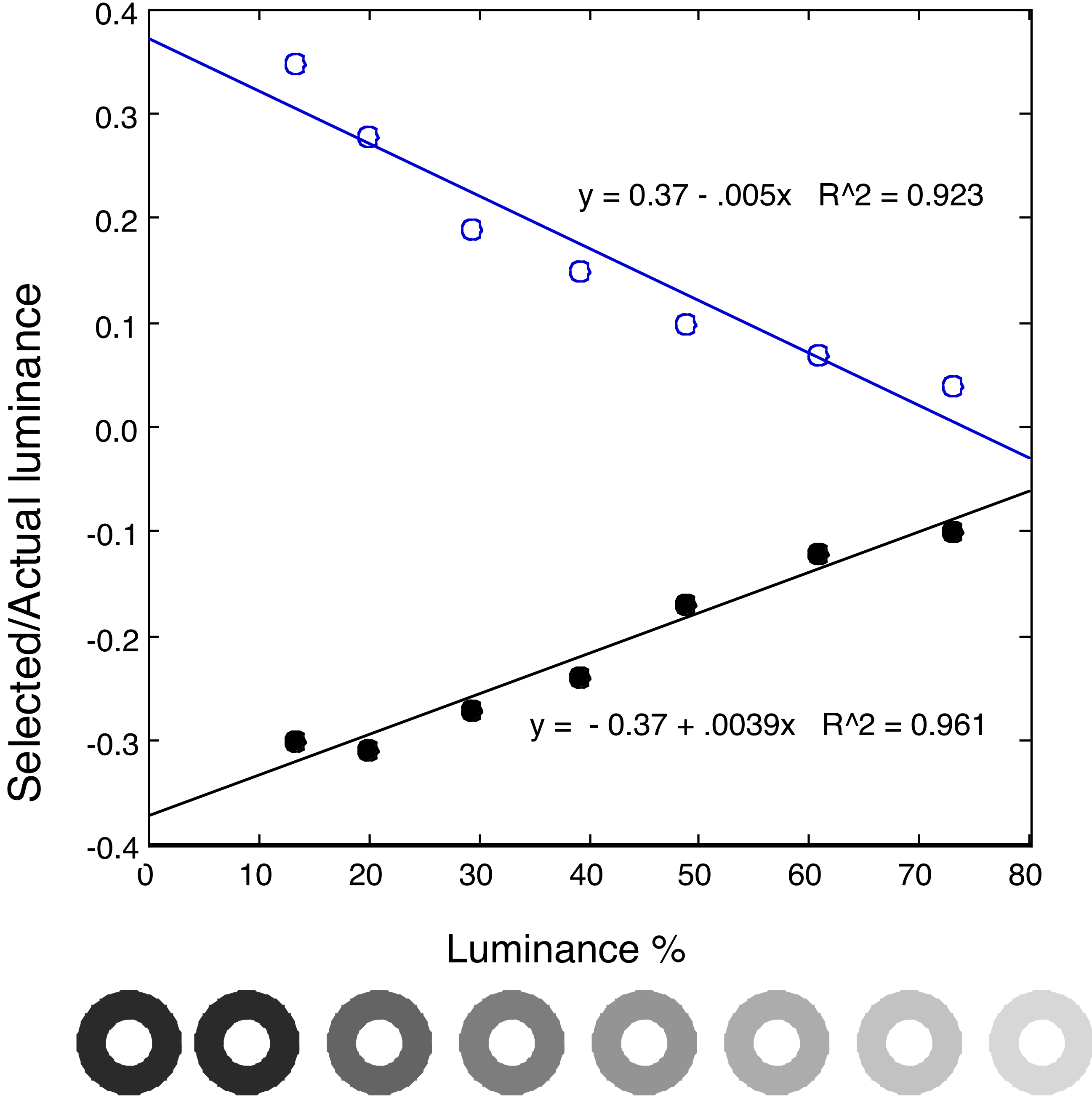
- 3 rings in each column are the same grey



“Stuart’s Rings”

“Stuart’s Rings” stronger **(=larger vertical gap)** for dark rings





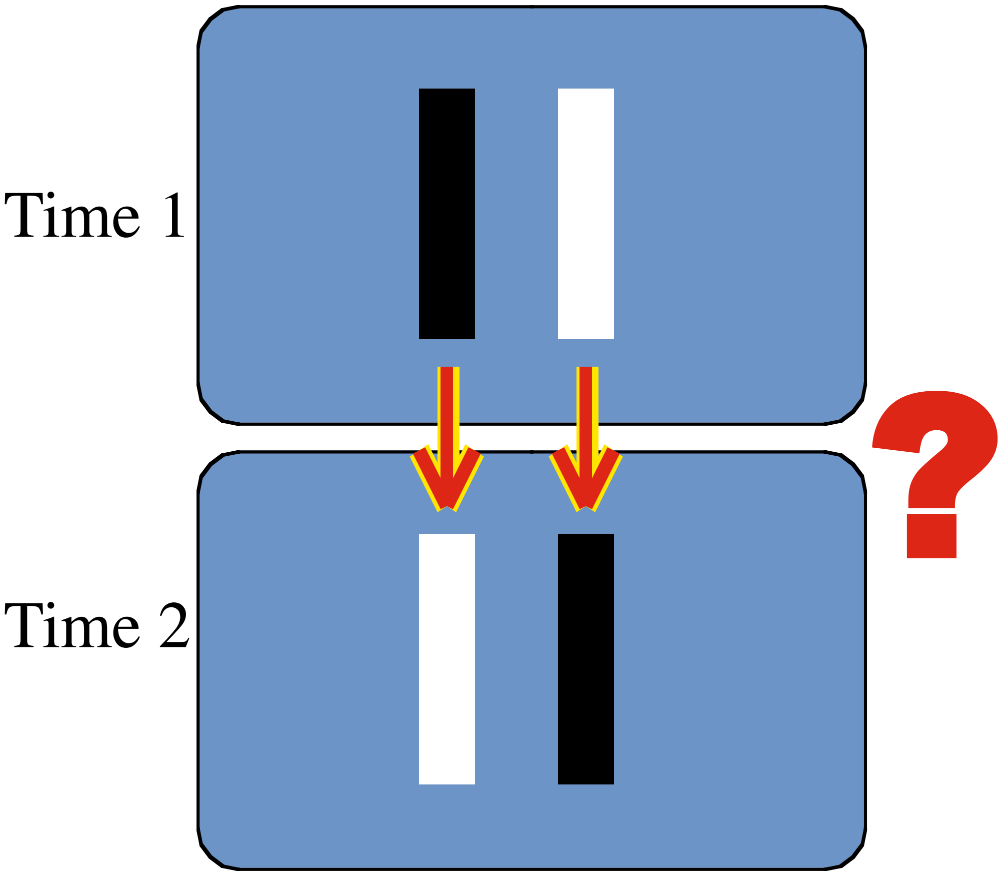
Theories of White's effect

	Level:
1. Assimilation or contrast ?	Low
2. Geometry: T-junctions, elongated RFs	Low
3. Belongingness	High
4. Transparency	High

White’s effect
and
MOTION


Movie :
1 Footsteps illusion:
Contrast affects apparent speed

A black & a white bar exchange luminances.
Do you see…



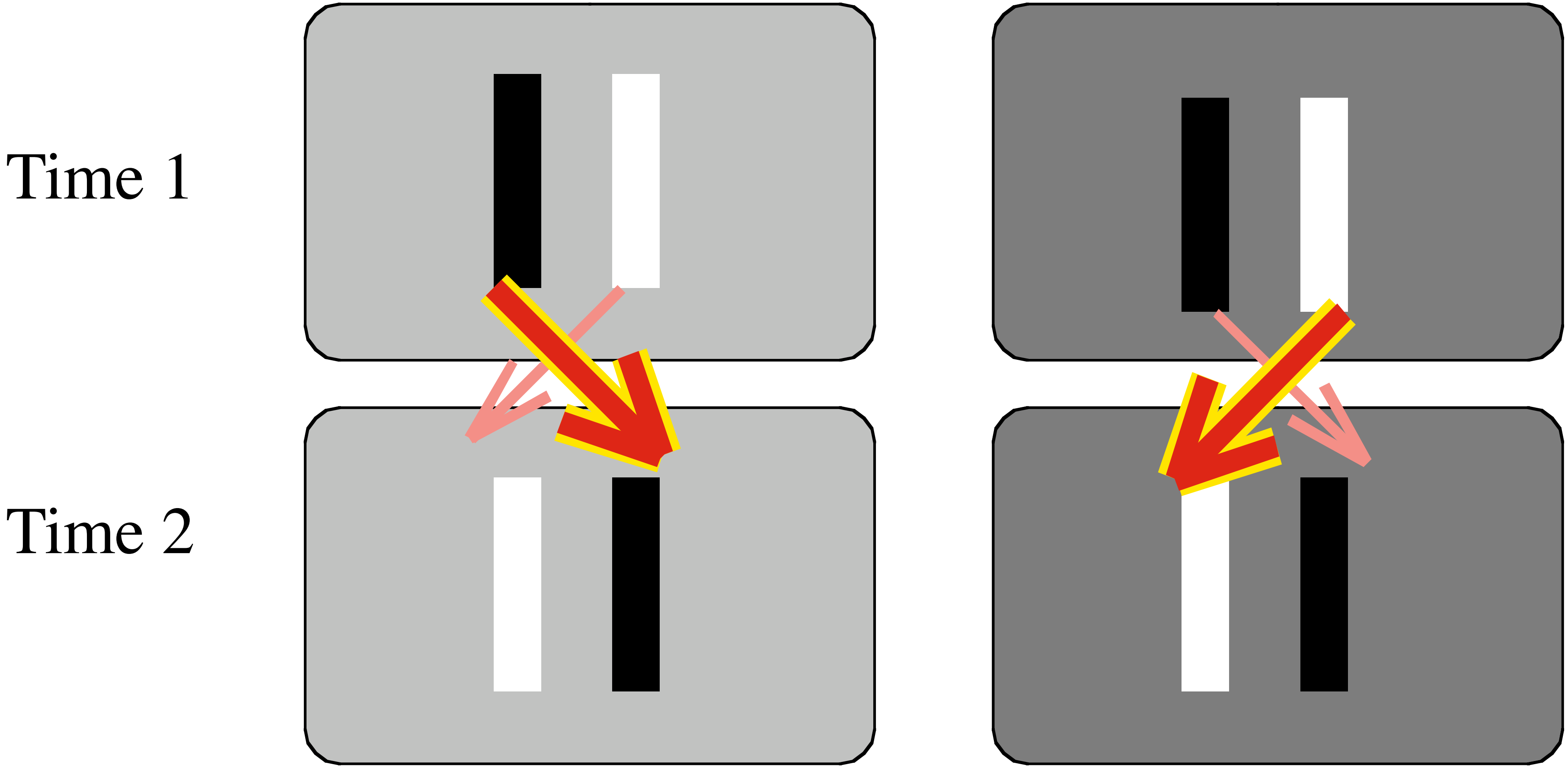
Two bars flickering in place?

NO; a "suspicious coincidence", so brain applies Occam's Razor:

What minimum hypothetical real world events can explain max no. of visual inputs?

Ans: Not 2 flickering, but one moving bar!

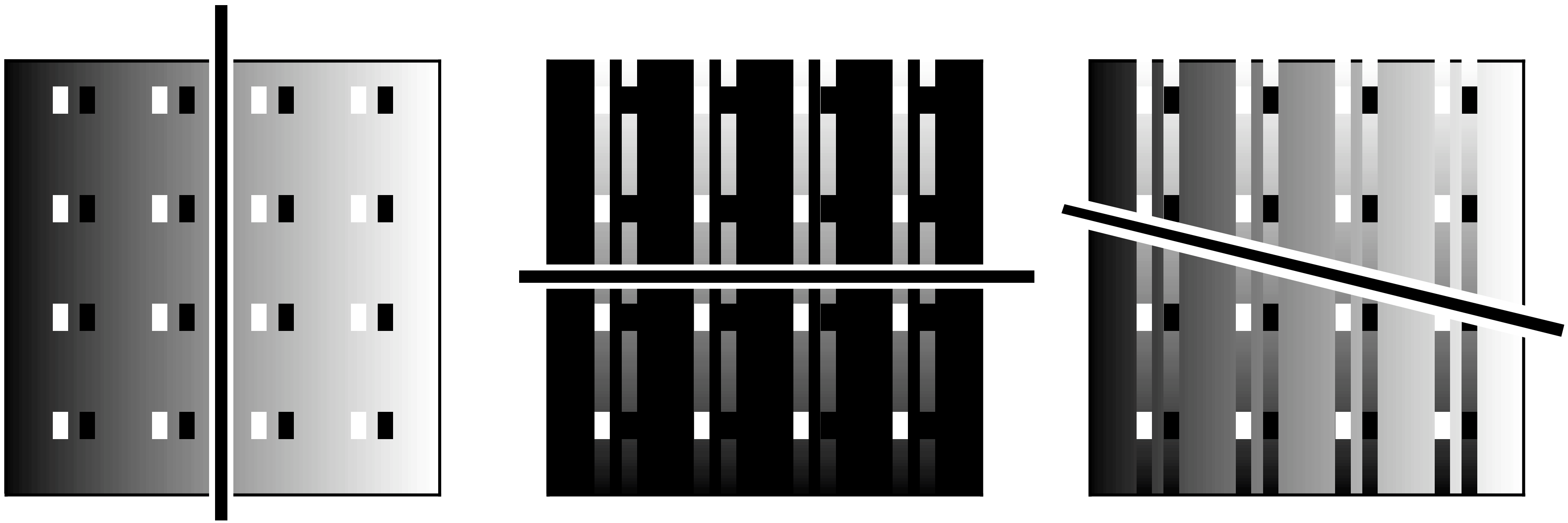
So WHICH bar jumps?
Ans: Bar with higher contrast.



Now: White's effect and contrast…

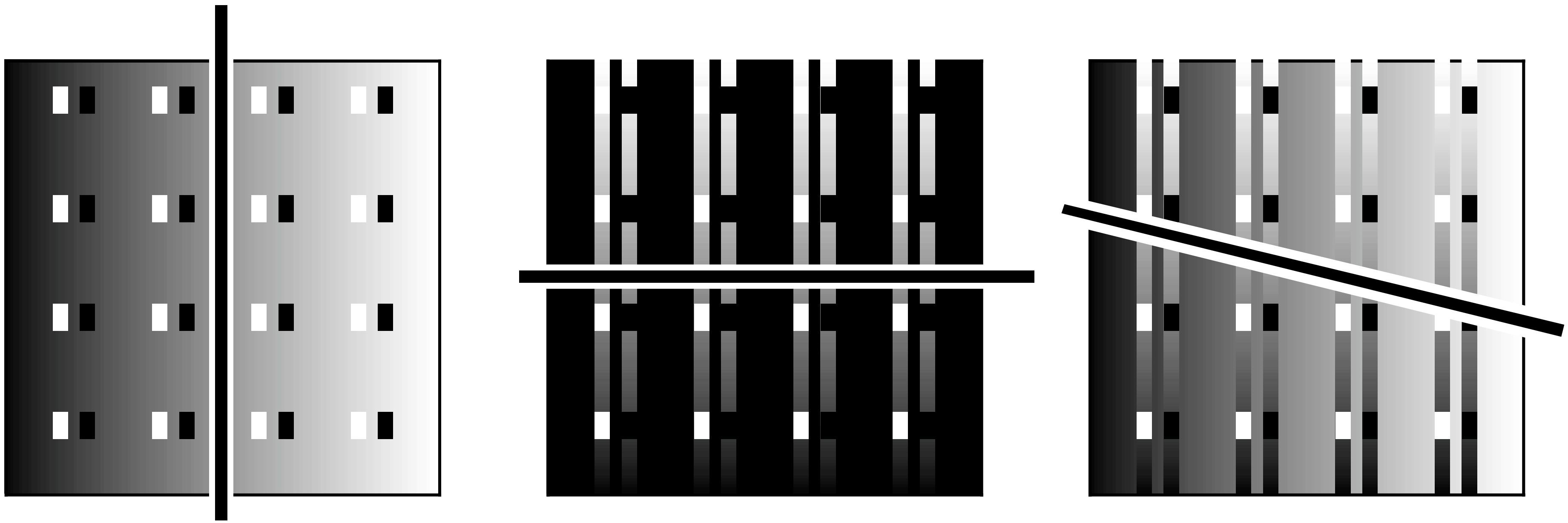
Movie:
2 WhiteDemo

White's effect and apparent motion

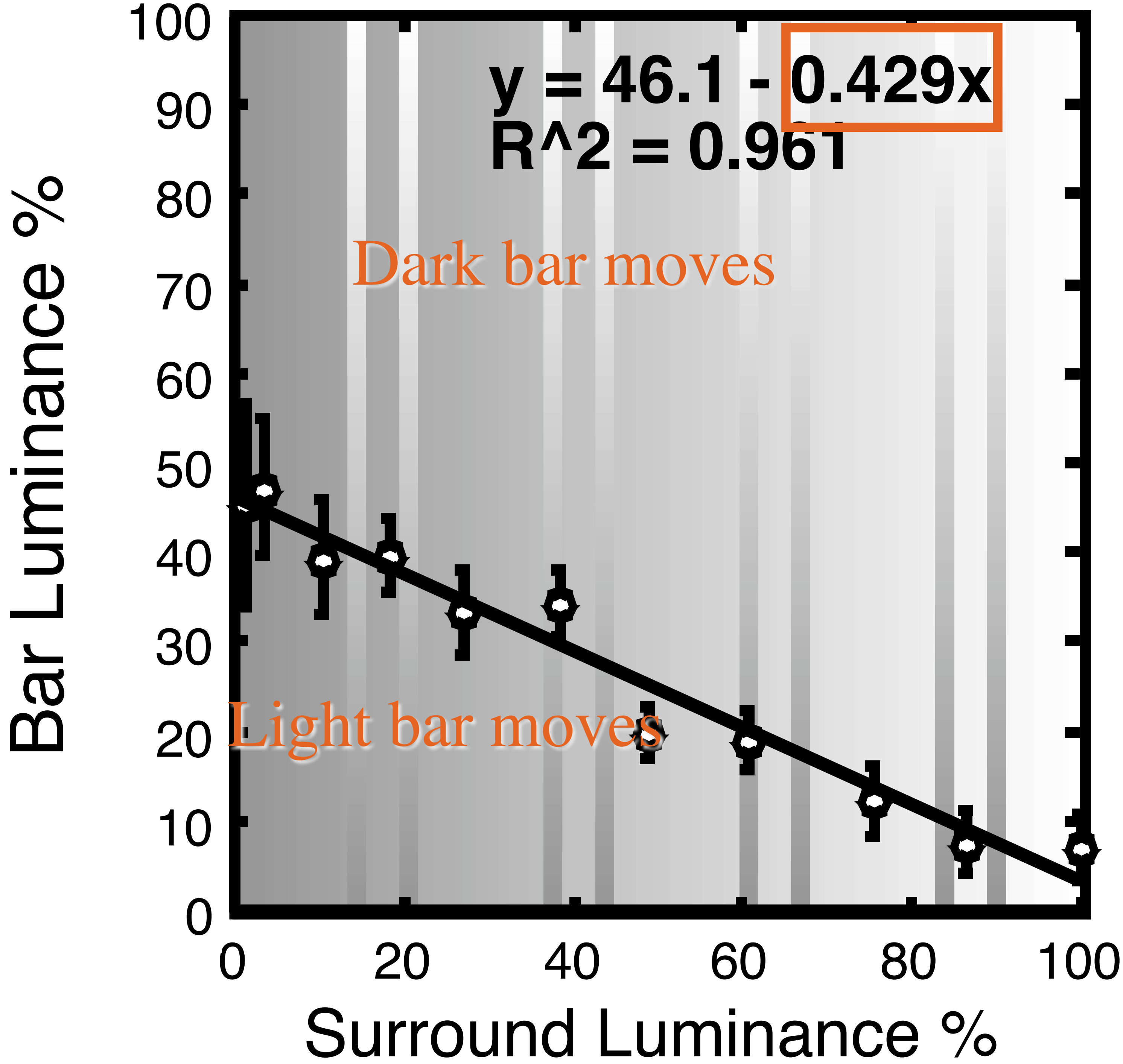



Movie:
3 WhiteDemo

White’s effect and apparent motion



Movie:
4 WhiteDemo


y = 46.1 - 0.429x
R^2 = 0.961
Dark bar moves
Light bar moves
Bar Luminance %
Surround Luminance %
0
10
20
30
40
50
60
70
80
90
100
0
20
40
60
80
100

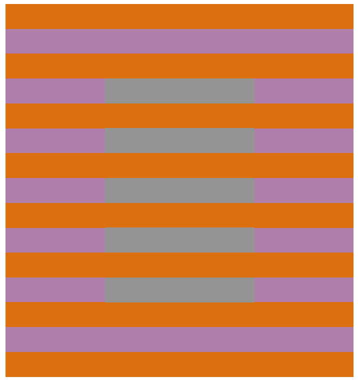
Slope = -0.429,
so embedding bars are **2.33**
(=1/0.429) times more important
than surround in setting motion
strength.

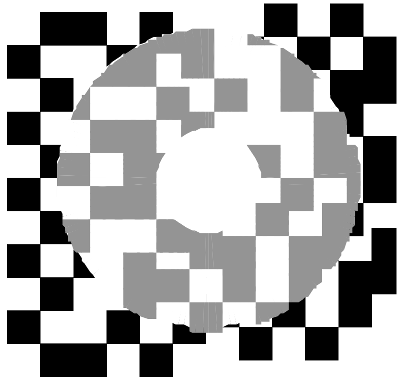

Movie:
5 WhiteJump

Conclusions

- Assimilation AND contrast
- NOT geometry [T-junctions, elongated RFs]
- White's effect precedes motion perception

6 CogMovie





thank you

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www-psy.ucsd.edu/~sanstis

the end

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Ed. Michael Jenkin & Laurence Harris