# Attention, Consciousness, & The Richness Debate

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Sensation Cognition Attention Language Perception

www.reed.edu/psychology/scalp







Seeding the debate...

1. attention & ensemble perception

2. inattentional blindness in everyday life



## Attention & ensemble perception

Research Article

#### We See More Than We Can Report: "Cost Free" Color Phenomenality Outside Focal Attention

# Zohar Z. Bronfman<sup>1,2</sup>, Noam Brezis<sup>1</sup>, Hilla Jacobson<sup>3</sup>, and Marius Usher<sup>1,4,5,6</sup>

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Psychological Science 2014, Vol. 25(7) 1394–1403 © The Author(s) 2014 Reprints and permissions: sagepub.com/journalsPermissions.nav DOI: 10.1177/0956797614532656 pss.sagepub.com





# color diversity above chance

100%

80%

60%

40%

20%

0%

Accuracy

no diff in letter recall single vs. dual task



Bronfman et al. (2014)



3-AFC: Which looks most like what you just saw?







Jackson-Nielsen, Cohen, & Pitts (2017)

Our single-task on letters

Bronfman et al.'s weighted dual-task

Our balanced dual-task

Our single-task on colors



#### **Color Diversity Judgments**



single-task letters
dual-task (Bronfman et al., 2014)
dual-task (Jackson-Nielsen et al., 2017)
single-task color

## Inattentional blindness in the lab



Neisser (1979)



Mack & Rock (1998)



Simons & Chabris (1999)



Ward & Scholl (2015)



Pitts et al. (2014)



Shafto & Pitts (2015)

## Inattentional blindness in the lab



Neisser (1979)



Mack & Rock (1998)



Simons & Chabris (1999)



Ward & Scholl (2015)





Melloni et al. (2023)

# Inattentional blindness in everyday life

## How to notice what you don't notice...

- 1. Out and back runs
  - Distract yourself on the way out, look for salient things on way back
- 2. Run with a partner
  - Distract yourself and let them be your "awareness probe"



Chabris et al. (2011)



Hyman et al. (2010)

# Inattentional blindness in everyday life

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Chabris et al. (2011)



Unicycling Darth Vader playing flaming bagpipes (Portland OR)













Castel et al. (2012)



adapted from Koch & Tsuchiya (2007) & Tsuchiya & Koch (2015)

- ٠
- Mack & Clarke (2012) ٠
- Mack et al. (2015)
- Huang (2015) ۰
- Cohen et al. (2011) Mack et al. (2016)
  - Luo & Zhao (2018) •
  - Baek & Chong (2020)
  - Liu et al. (2023) •

review paper: Pitts, Lutsyshyna, & Hillyard (2018)

# If attention is necessary for conscious perception...

and we define attention as:

"<u>selection</u> of a <u>subset</u> of information for further processing"

then, conscious perception must be *relatively* sparse

relative to what?

o all of the incoming sensory information?

o perception in general (including unconscious perception)?

## Thanks for your attention ... which is necessary for conscious perception!

#### **Collaborators (Reed students in bold):**

- Steve Hillyard
- Antigona Martinez
- Enriqueta Canseco-Gonzalez
- Michael Cohen
- Molly Jackson-Nielsen
- Lydia (Anton) Lutsyshyna
- Juliet Shafto
- Kathryn Schelonka
- **Chris Graulty**
- Dan Fennelly

#### Funding:

- NSF
- TWCF
- Reed College



