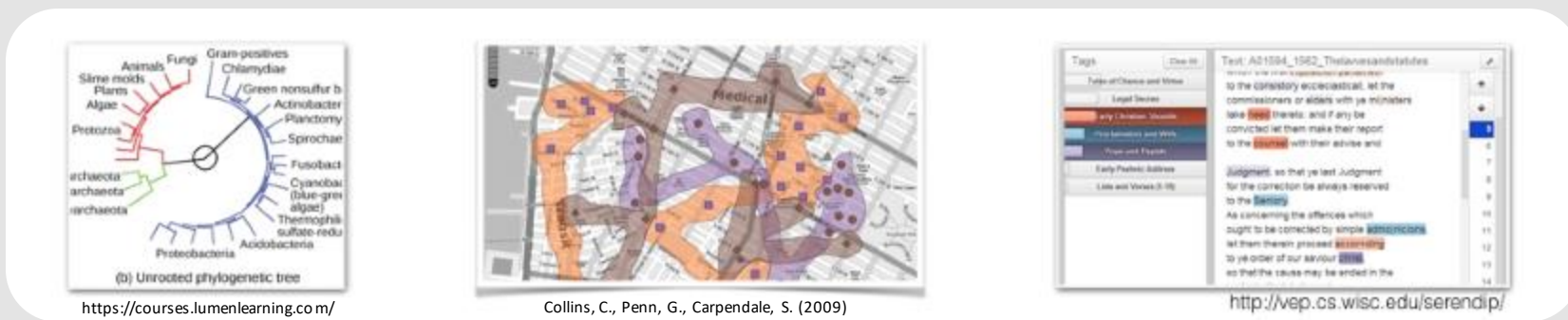


Background

Grouping influences crowding^{1,2}:

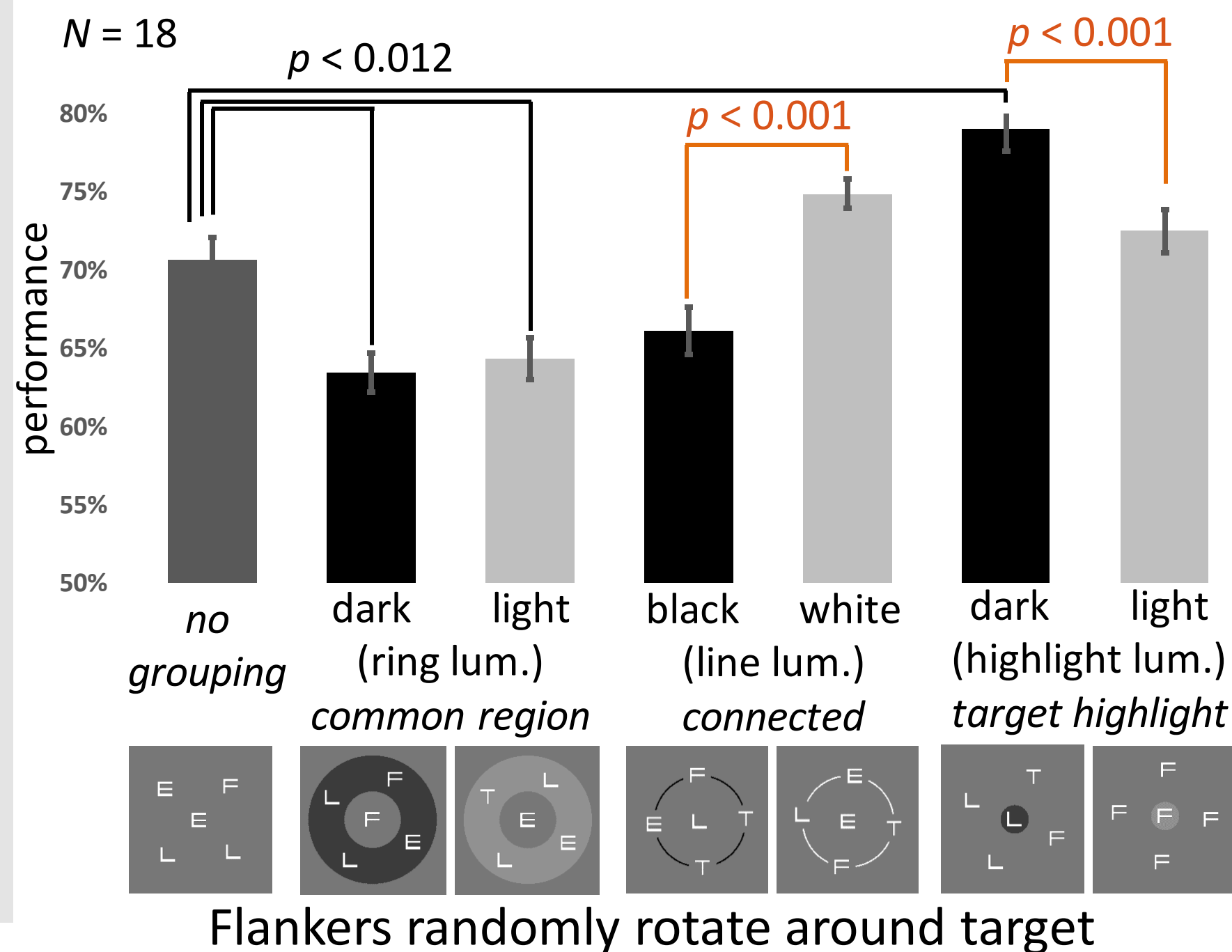
- Behavior and modelling suggest that **grouping targets away from flankers**, even using task-irrelevant features, **can reduce crowding**^{1,3,4}
- Grouping is widely used in information visualizations^{5,6}



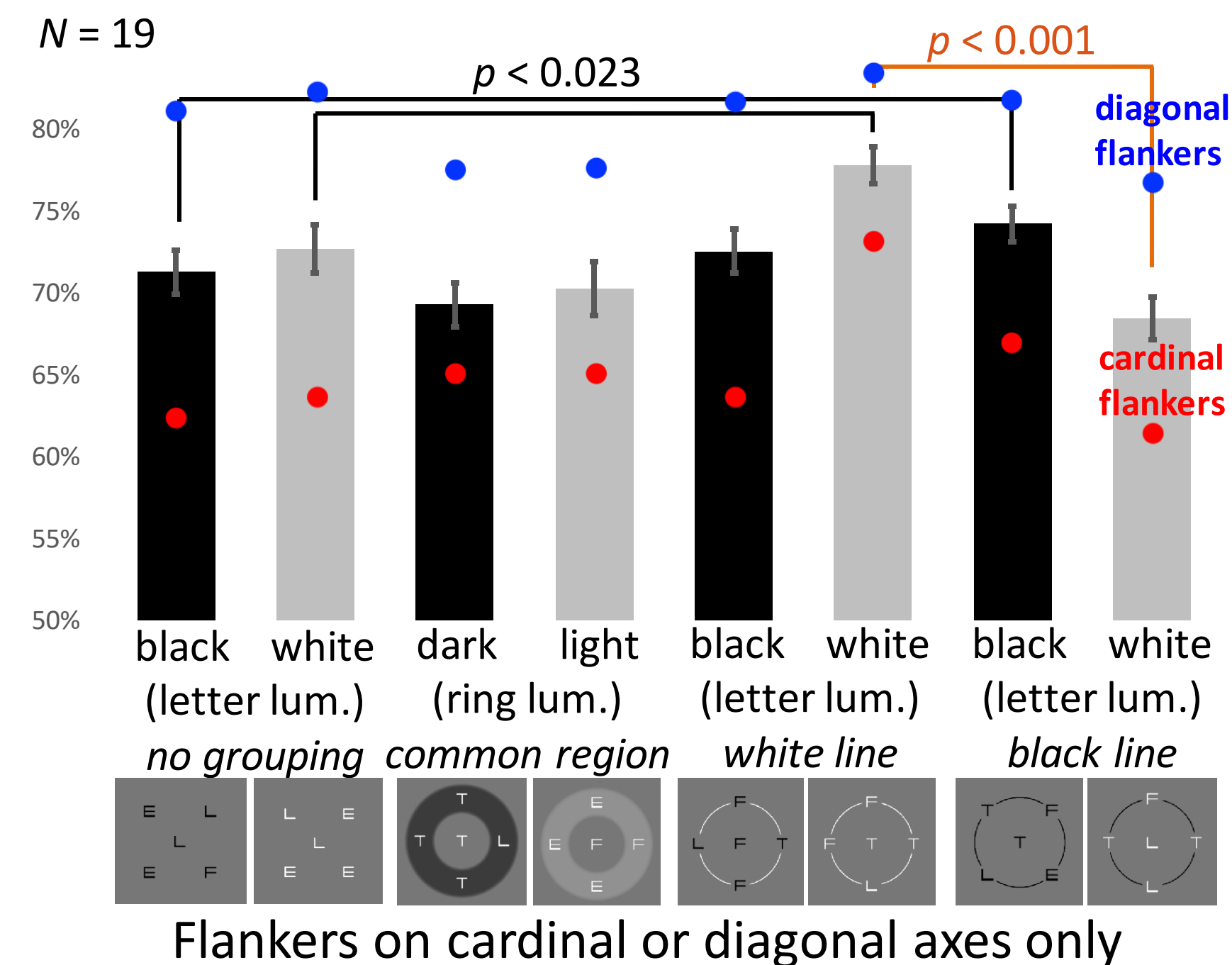
Question

Does grouping by **common region** or **connectedness** alleviate letter crowding?

EXPERIMENT 1



EXPERIMENT 2



Results

- **Common region** hurts performance
- **Dark target highlight** helps performance
- **Connection**: white > black
- **Highlight**: dark > light

Could the grouping techniques introduce high spatial frequencies that increase crowding?
Is absolute or relative contrast polarity relevant?

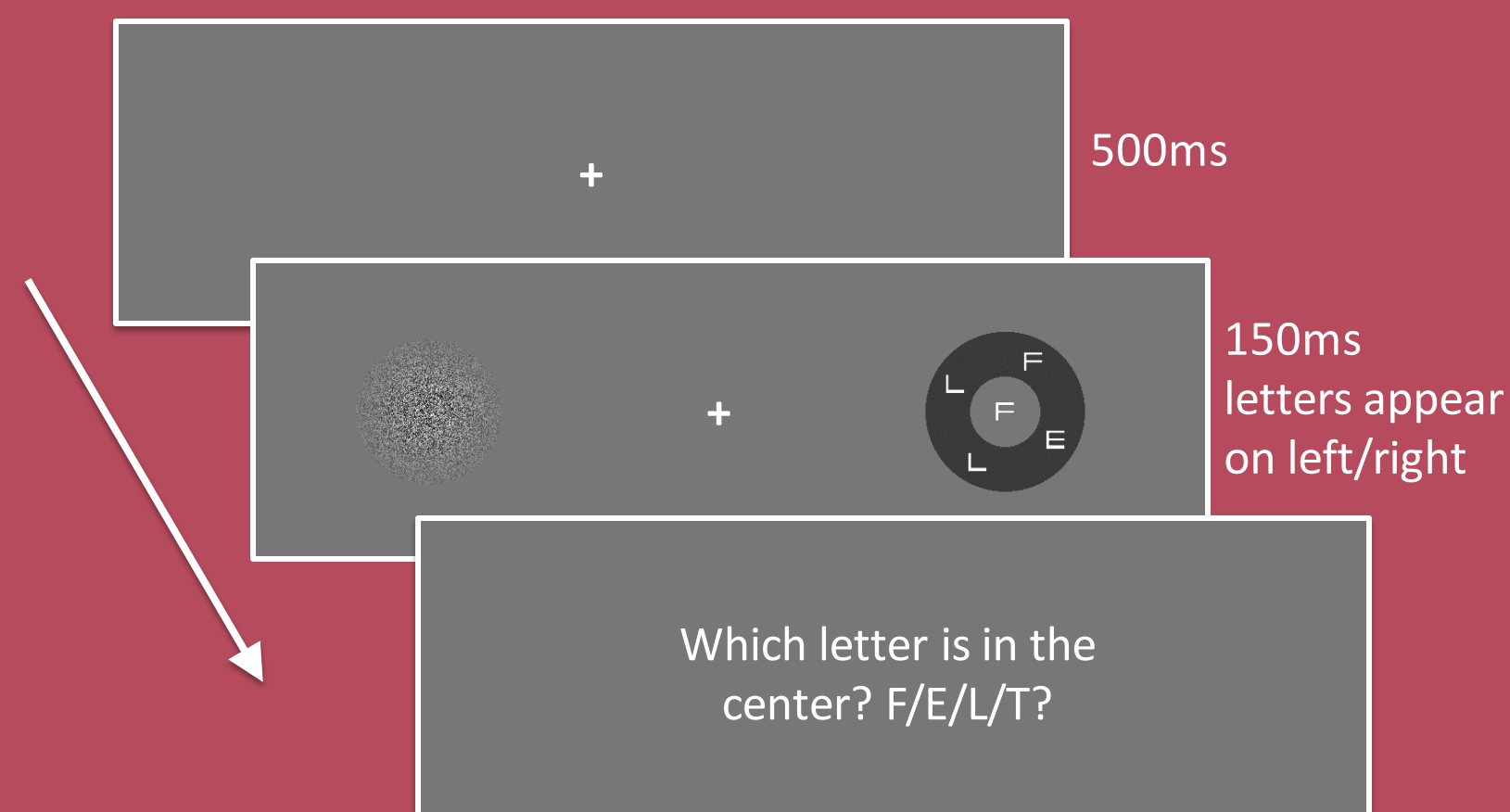
Results

- **Soft common region** no longer hurts performance
- **Connection**: Relative contrast polarity matters
same > opposite
- Diagonal flankers > cardinal flankers

References

- [1] Rosen & Pelli, in prep
[2] Rosenholtz, R. (2014, 2016)
[3] Pöder, E. (2006)
[4] Manassi, M., Sayim, B., Herzog, MH. (2012)
[5] Collins, C., Penn, G., Carpendale, S. (2009)
[6] Ware, C. (2008)

GENERAL METHODS



Eccentricity chosen for 50% - 80% correct (avg. 7.8°)
Letters 0.5 x 0.5°, target-flanker distance 2°
Trials from all conditions mixed together

GENERAL DISCUSSION

- Grouping targets away from flankers does not always reduce crowding
- Highlighting target by increasing target-background

contrast helps target identification

- We recommend using a soft edge (common region) and same contrast polarity (connectedness) in information visualizations