Background

- Figure assignment entails inhibitory competition between regions on opposite sides of a shared border [1, 2].
  - Winner is perceived as figure
  - Loser is perceived as shapeless ground and suppressed [3]
- Behavioral research suggests the ground is suppressed more when it competes more strongly for figural status [4, 5]
- Representation of ground in extrastriate cortex is suppressed [6, 7]

**Question:**
Does ground suppression in extrastriate cortex vary with the amount of competition for figural status?

Methods

- **Stimuli**
  - Low-competition silhouettes
  - High-competition silhouettes

- **Difficult RSVP task at fixation:**
  - Detect lowercase letter among 4 Hz stream of digits/symbols
  - Task-irrelevant silhouettes appeared in upper LVF or RVF, nearest corner 4º from fixation

- **Block design:**
  - 10 silhouettes (high- or low-comp, RVF or LVF) per block
  - Jittered ISI: 750-1750 ms
  - 3-7 RSVP symbols between each silhouette

Localizing the ground in LVF and RVF:

- Dynamic Gabors presented in a 2º region on ground or figure side of an imaginary line drawn on the edge of silhouette border closest to fixation
- Chose voxels active on ground side but not figure side
  - Ensured that no portions of figure were included as ground
  - Conservative localization method

Localizing visual cortex:

- V1-V4 localized using standard retinotopic mapping procedures [ii]

Results

**Left Hemisphere**

- **V1**
  - Less BOLD activation in ground region of high- vs low-competition silhouettes
  - Only for contralateral presentation (ipsilateral = no difference)

- **V2**

- **V4**

**Right Hemisphere**

- **V1**
  - No significant differences in BOLD activation for grounds of high- vs low-competition silhouettes

- **V2**

- **V4**

Conclusions

- Suppression of the underside of a figure is greater under conditions of greater competition for figural status (low-level features equated)
  - Evident in left hemisphere V2 and V4
- Activation differences observed in V2 are likely mediated by top-down feedback
  - RF size of V2 neurons (~2º) is not large enough to encompass the entirety of the real-world object suggested on the groundside
  - Only in higher-level brain regions is RF size large enough to encompass whole object (~4º)

References

5. Wager et al. (2013). JOCV, 13(9), 137.

Acknowledgements

MAP acknowledges the support of NSF BCS-060529

Contact

Laura Cacciamani
lcacciam@email.arizona.edu