Activity in areas MT+ and EBA, but not pSTS, allow prediction of perceptual states during ambiguous biological motion
dichoptic presentations of point-light walkers

goal: study orientation coding of actions

behavioral adaptation paradigm

90 s adaptation to unambiguous direction
75 s ambiguous test - subjs indicated percepts

MORE opposite directions reported

distinct groups of cells coding different orientations

? WHERE ?

important implications

current state-of-the-art models do NOT incorporate orientation

(but see Theusner et al., 2012, VSS)

most models are hierarchical, building upon previous stages

where do we add ORIENTATION to the equation?

@ more 'local' tier regions:
EBA (processing static bodies)?
MT+ (processing optic flow patterns)?
or @ the more final perceptual stage: pSTS?
"if an area would harbor neurons selective for the coding of the orientation of a walker, then we should expect the activation in that area to adhere to the perceptual reports"

How?

- brain activity patterns
- unambiguous directions

CORRELATES

PREDICT

- brain activity patterns
- ambiguous direction
stimulus tweaking
stimulus tweaking
stimulus tweaking

new

old
behavior and eye movements

n=14

point of subjective equality

ns (rep meas Anova)
stable perceptual switching behavior (haemodynamic friendly) with a biological motion stimulus not accounted for by potential eyemovement differences [next fMRI]
overview
fMRI: regions of interest

EBA  FBA
FFA  OFA
LO   pFus
PPA  TOS
MT   pSTS
fMRI: regions of interest

'train runs'

'test runs'
**fMRI: correlations & decoding**

physical (unambiguous)  \[=\]  perceptual (bistable)

- physical
- perceptual

train classifier (SVM)

prediction percepts

correlations
fMRI: correlations & decoding

correlations

average correlation

region of interest
(both hemispheres)
fMRI: correlations & decoding

train classifier (SVM) predict

EBA MT pSTS FBA FFA OFA LO pFus PPA TOS

accuracy (% correct)

region of interest (both hemispheres)
conclusions

- similar to more low-level visual stimuli (rotating ambiguous sphere) biological motion stimuli can be used as a bistable tool probing underlying neural substrates of perception

- for which the percepts are not accounted for by eye movement differences

- hinting at the potential node within action recognition models where orientation of the action is processed (and should be added in the models)

- occurring at the 'lower' tier visual regions, such as EBA and MT+ and not at the end-stage level of visual processing of actions, i.e. pSTS

- [pilot psychophysical data]
overview
behavioral follow-up
QUESTIONS?

travel grants by: