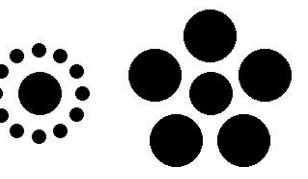




# The role of symmetry in the efficiency of detecting, discriminating and identifying human faces

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## Paradigms

- **Detection:** 1 interval; present/absent judgment
- **Discrimination:** 2 interval; same/different judgment
- **Identification:** 1 interval; 1 of 10 judgment with response screen
- **Classification:** 1 interval; symmetric/asymmetric judgment

## General Methods

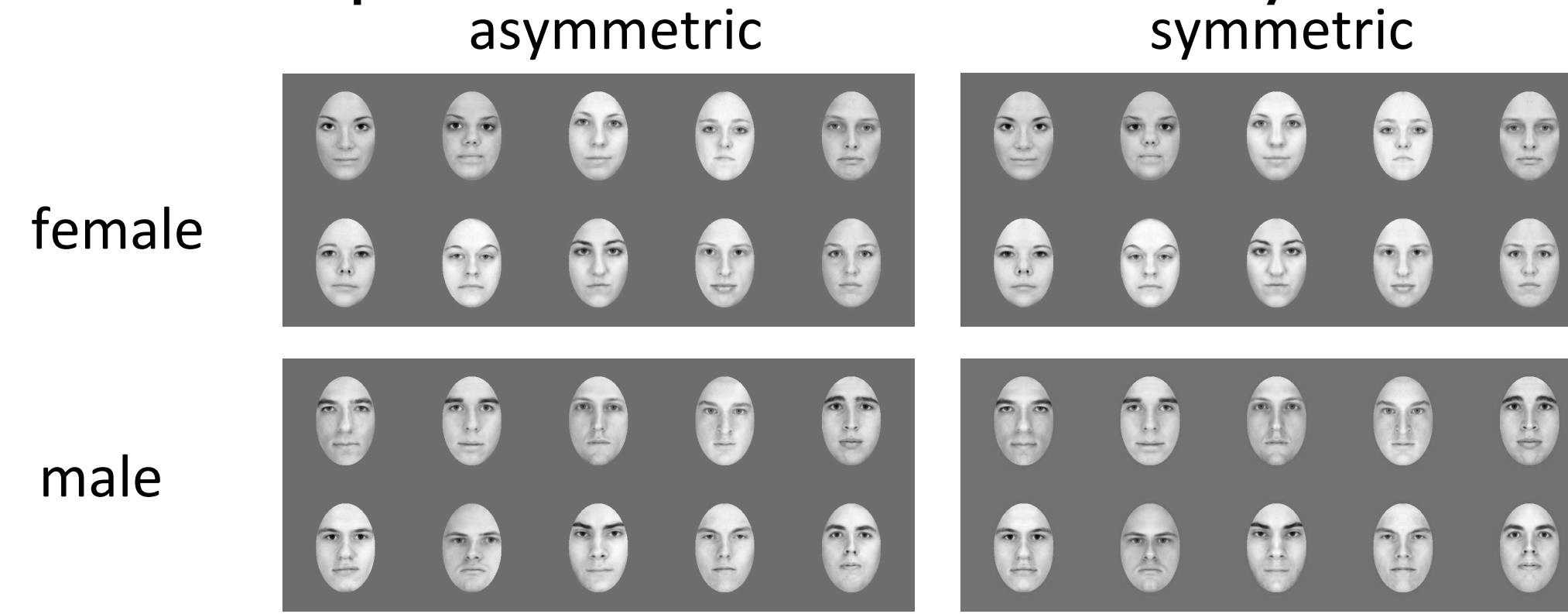
- stimuli presented in Gaussian noise
- contrast adjusted based on staircase procedure
- contrast threshold estimated from a psychometric fit
- blocks for classification: male, female
- blocks for all other paradigms: male-asymmetric, male-symmetric, female-asymmetric, female-symmetric

## Ideal Observer Analysis

- optimal decision strategy
- uses all physical information presented
- 100% efficient
- task specific analysis

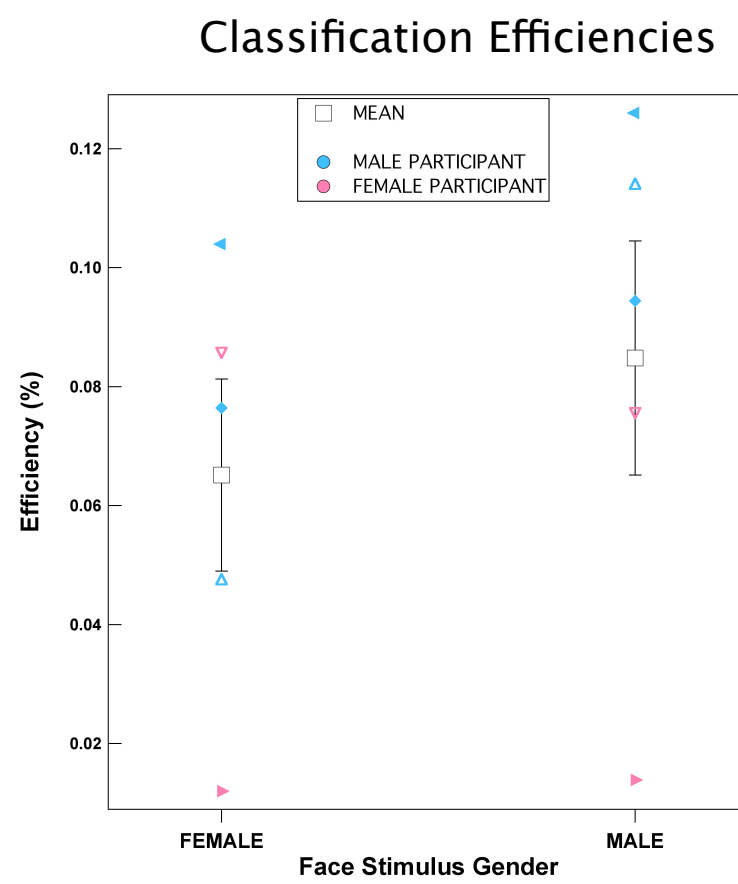
**EFFICIENCY = ideal/human threshold**

## Are symmetric faces processed more efficiently than asymmetric faces?

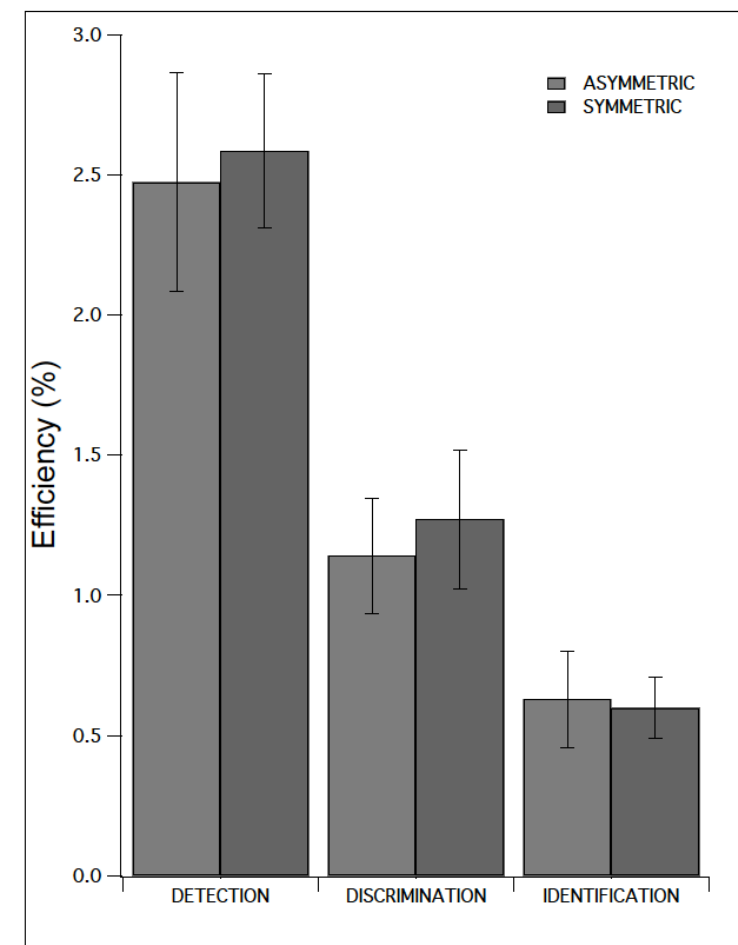


### Experiment 1: Efficiencies across paradigms

- 8 observers: 4M, 4F
- classification 1<sup>st</sup> or last
- other blocks shown in rand order



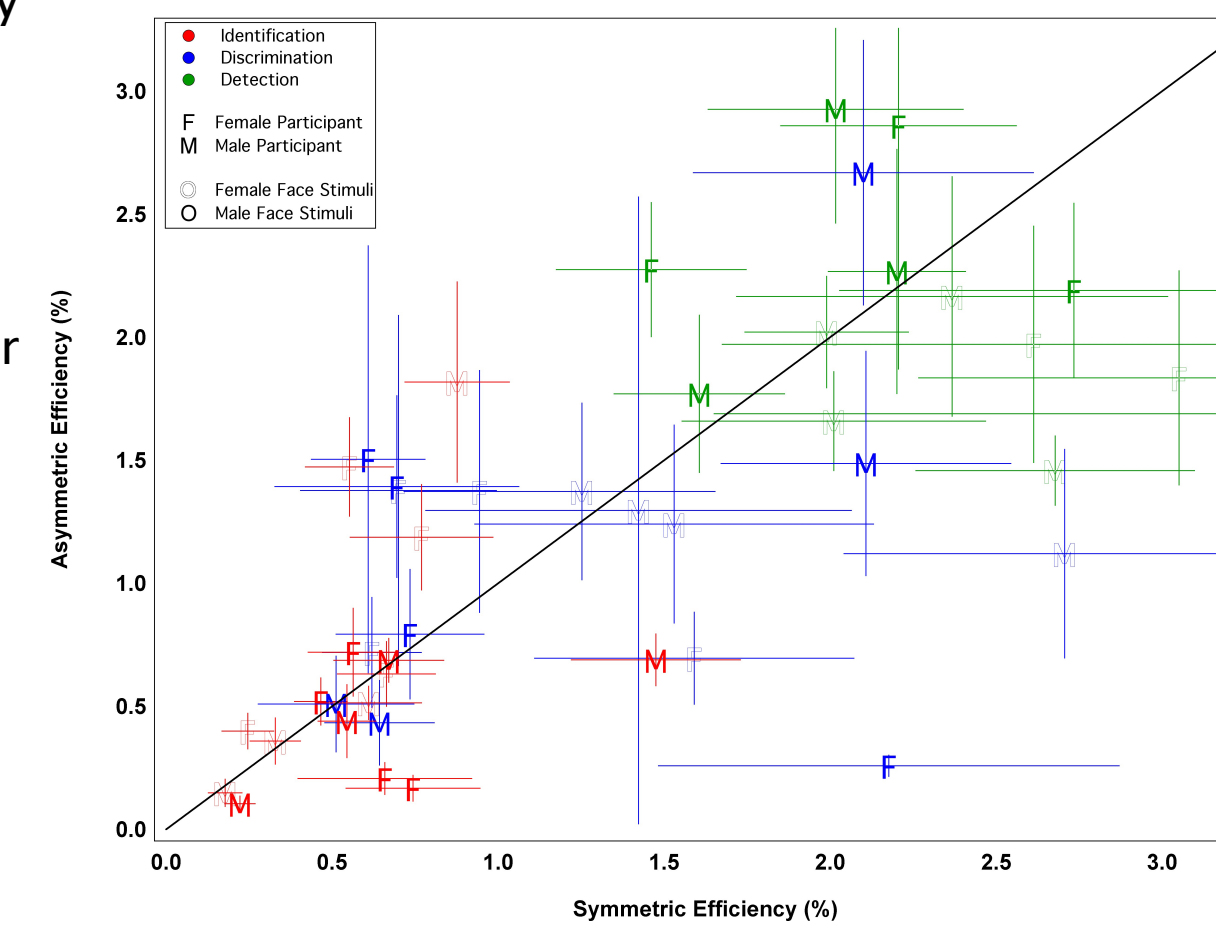
Mean Human Efficiencies



### Results

- mean efficiencies statistically equal for symmetric and asymmetric faces
- consistent findings across paradigm, observer gender, gender of stimulus, class 1<sup>st</sup> or last
- classification threshold estimation not possible for all observers
- equal mean efficiencies for male and female faces

Individual Observer Effects



- individual participant data indicate instances of symmetric and asymmetric differences
- no consistency of pattern in differences

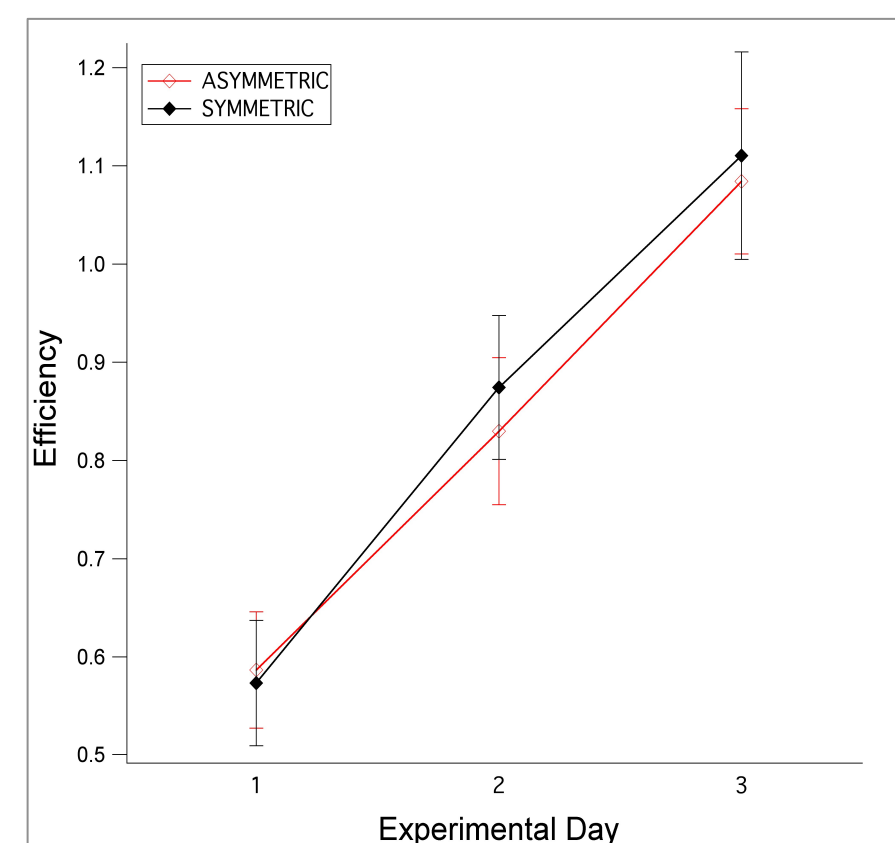
### Experiment 2: Learning effects within identification

- 16 observers: 8M, 8F
- each day rand order MF; rand order sym/asy

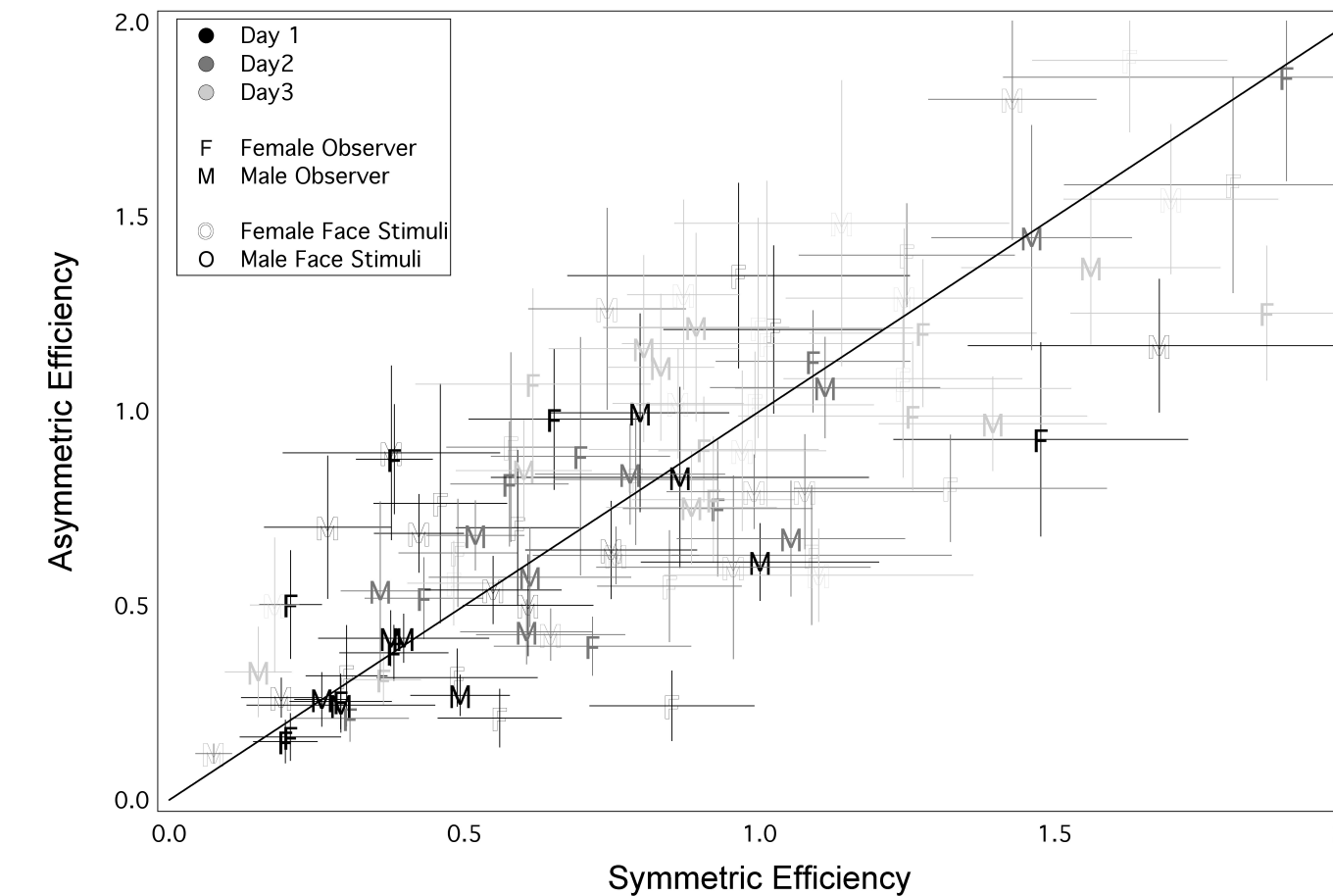
### Results

- general increase in efficiency across experimental days
- no statistical differences between symmetric and asymmetric efficiencies within experimental days

Mean Human Efficiencies by Day



Individual Observer Effects by Day



- very few sym/asy efficiency differences in individual participant data.
- again no consistent pattern in differences

## General Conclusions

- equal efficiencies for symmetric and asymmetric stimuli found across paradigms, observer gender, stimulus gender, and learning
- found no evidence to support the idea that facial symmetry is processed with greater ease and efficiency

## Future Work

- stimuli: are results specific to faces?
- learning: have looked at efficiency changes across time, have not yet examined familiarity of stimulus
- axis of symmetry: are results specific to bilateral symmetry?
- does degree of asymmetry play a role?

**Note: references available upon request**