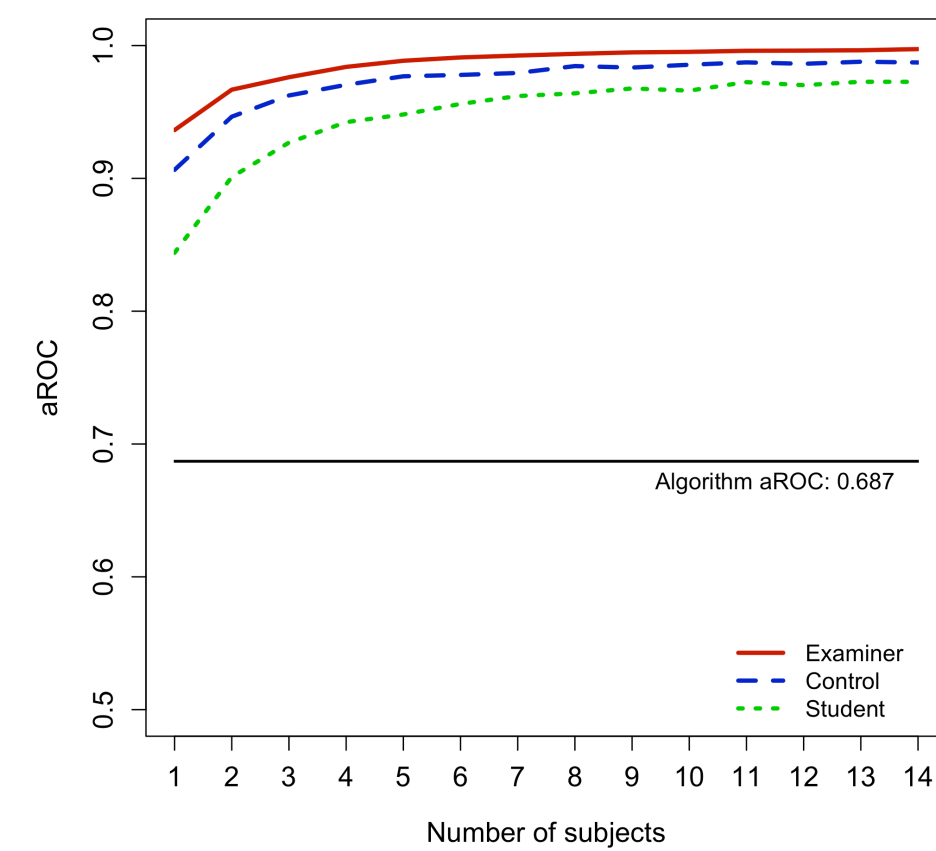


Goal

- **Wisdom-of-crowds** effects in face recognition
 - Combining multiple human face recognition judgments increases accuracy
 - Social collaboration (Dowsett & Burton, 2015)
 - Response averaging of individuals (White, Burton, Kemp & Jenkins, 2013; White, Phillips, Hahn, Hill & O'Toole, 2015)
- Is social or response averaging more powerful?

Background

- **Social Collaboration**
 - Participants achieve higher performance when working in collaborative pairs than when working individually (Dowsett & Burton, 2015)
 - Training for low performers: individual face-matching accuracy increased after collaborating on the task (Dowsett & Burton, 2015)
- **Response Averaging**
 - Face-matching performance is better when the individual responses of multiple participants are averaged on each stimulus pair (White et al., 2013; White et al., 2015)
 - "Near-perfect" accuracy obtained by averaging the response ratings of eight participants (White et al., 2013)



- To date, no direct comparison has been done between social collaboration and response averaging for face recognition.

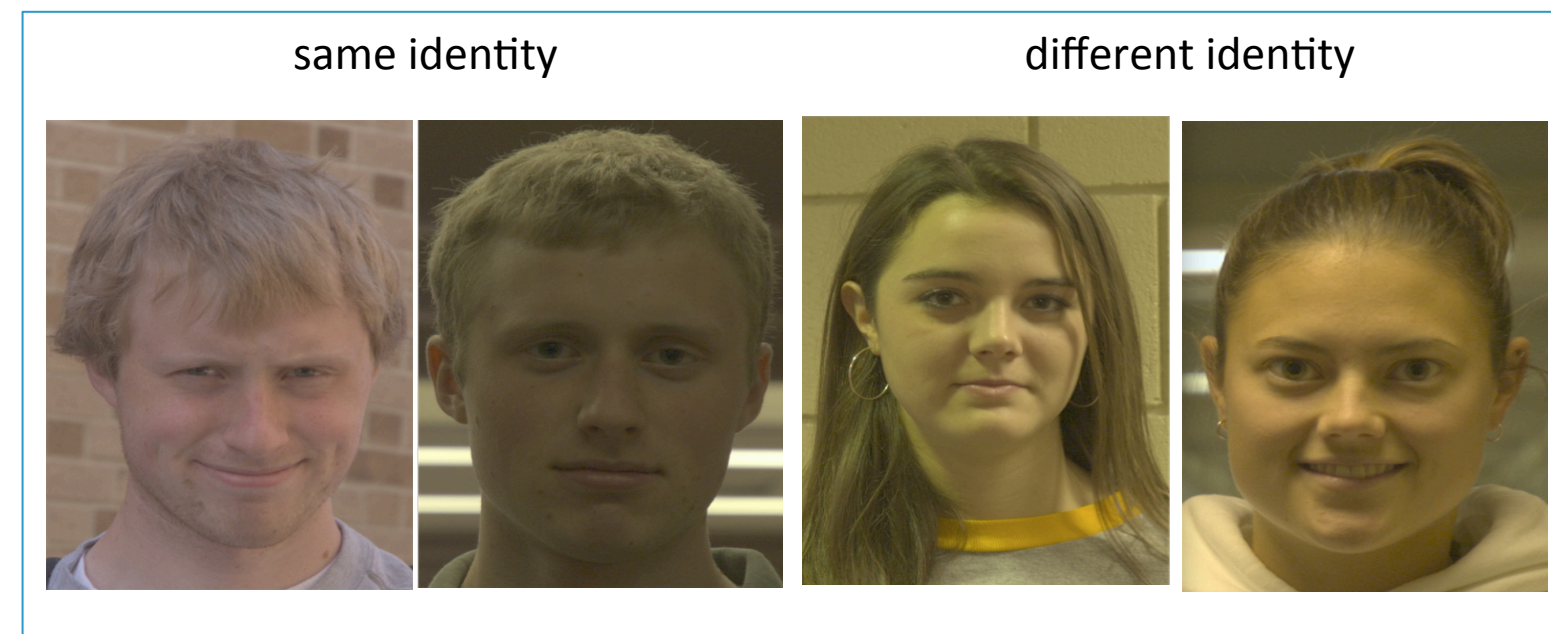
Method

Participants

- 96 undergraduate students (68 female)

Stimuli

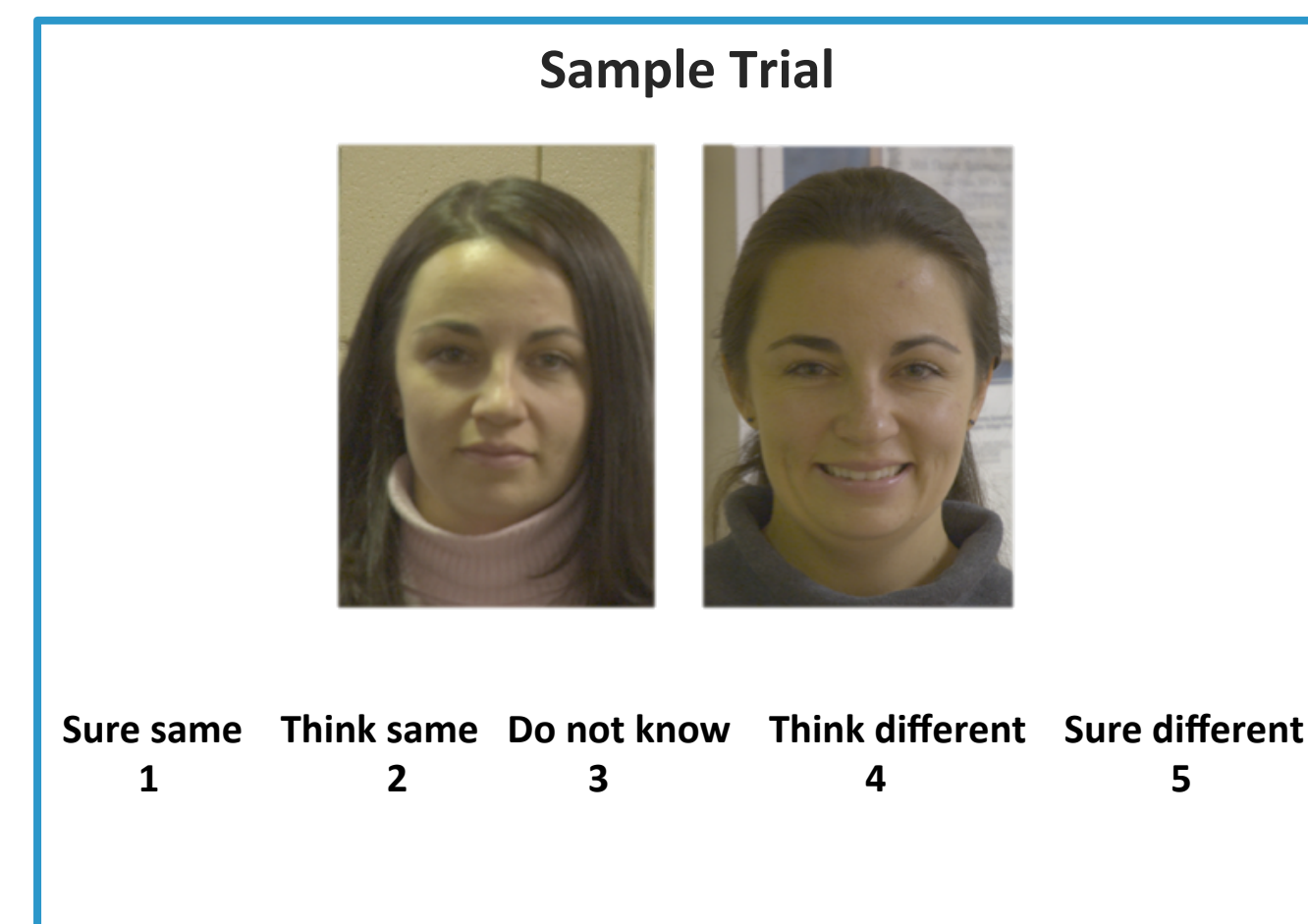
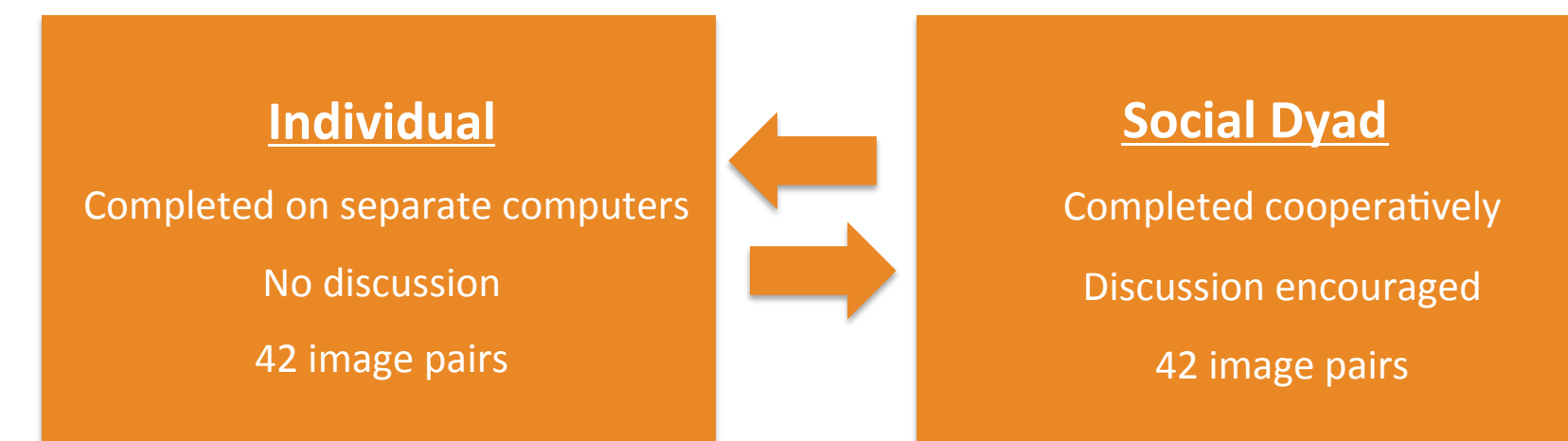
- Expertise in Facial Comparison Test (EFCT)
- Test created by selecting challenging image pairs – with face identification algorithm and untrained individuals (top 25% performers)
- 84 image pairs (42 same-identity; 42 different-identity)



Approach

Evaluate face-matching performance across:

- Individuals
 - Social Dyads
 - Blind Fusion groups (response averaging)
- Each participant completed the task once individually and once as a member of a social dyad



Fusion Analysis

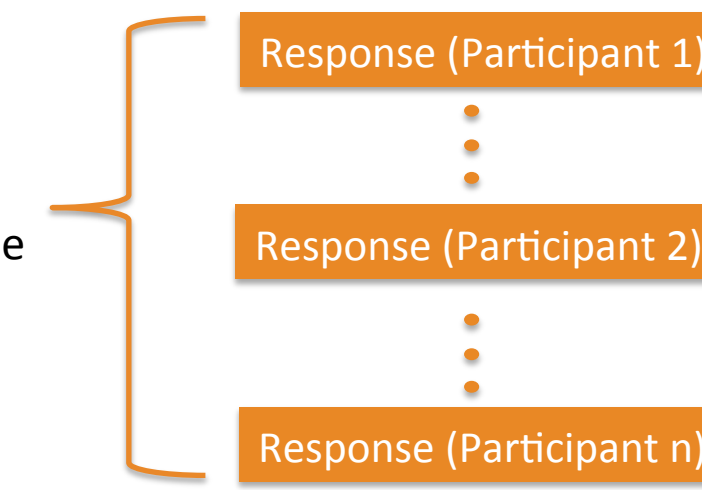
Blind Fusion Dyads

- Responses of members in each social dyad

Random Blind Fusion Groups

- Formed groups of varying sizes (n=1:10)
- Sampled random individuals

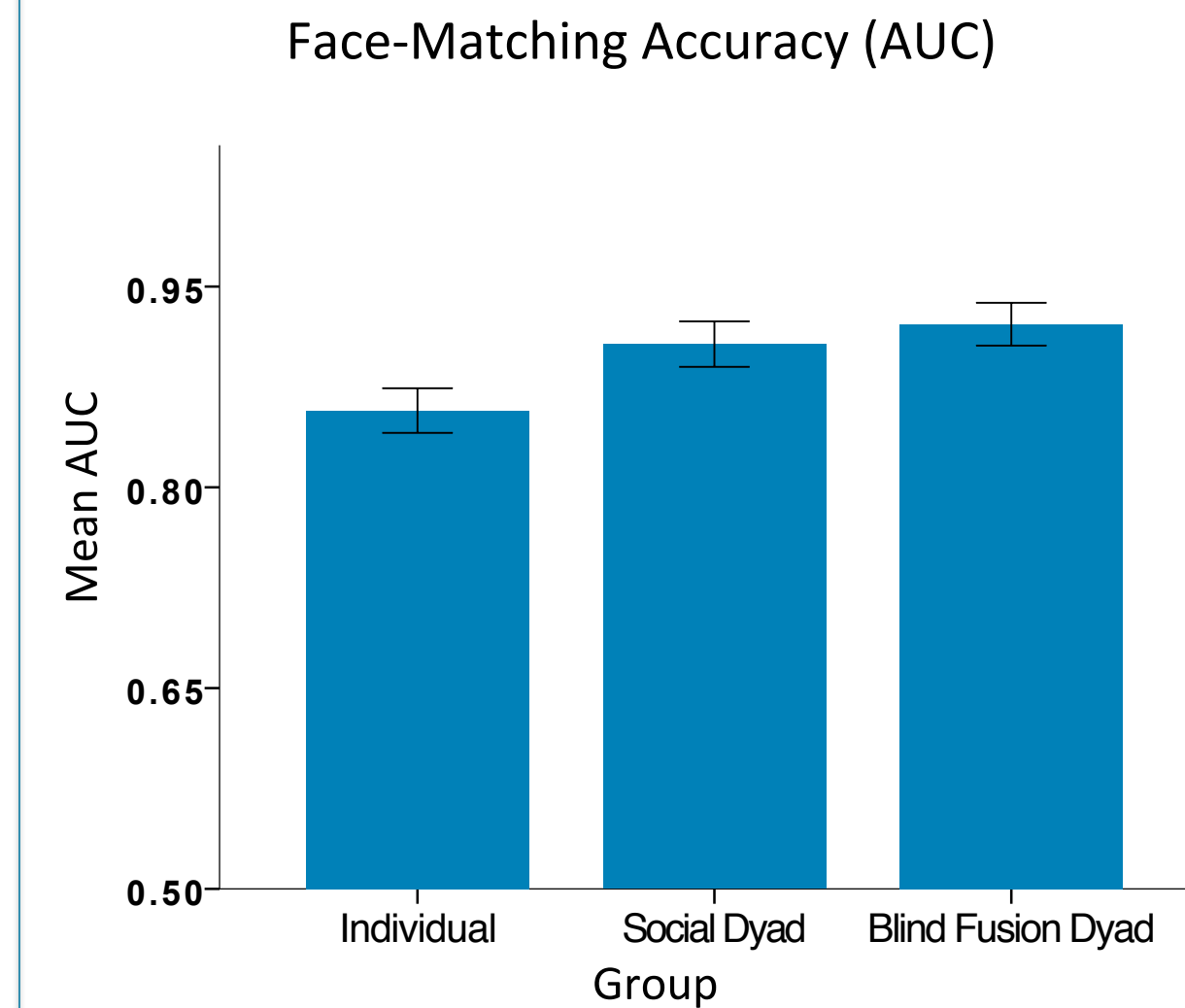
"simple averaging" of the responses at the level of the individual stimulus pair



Results

Individual, Social Dyad, & Blind Fusion Dyad

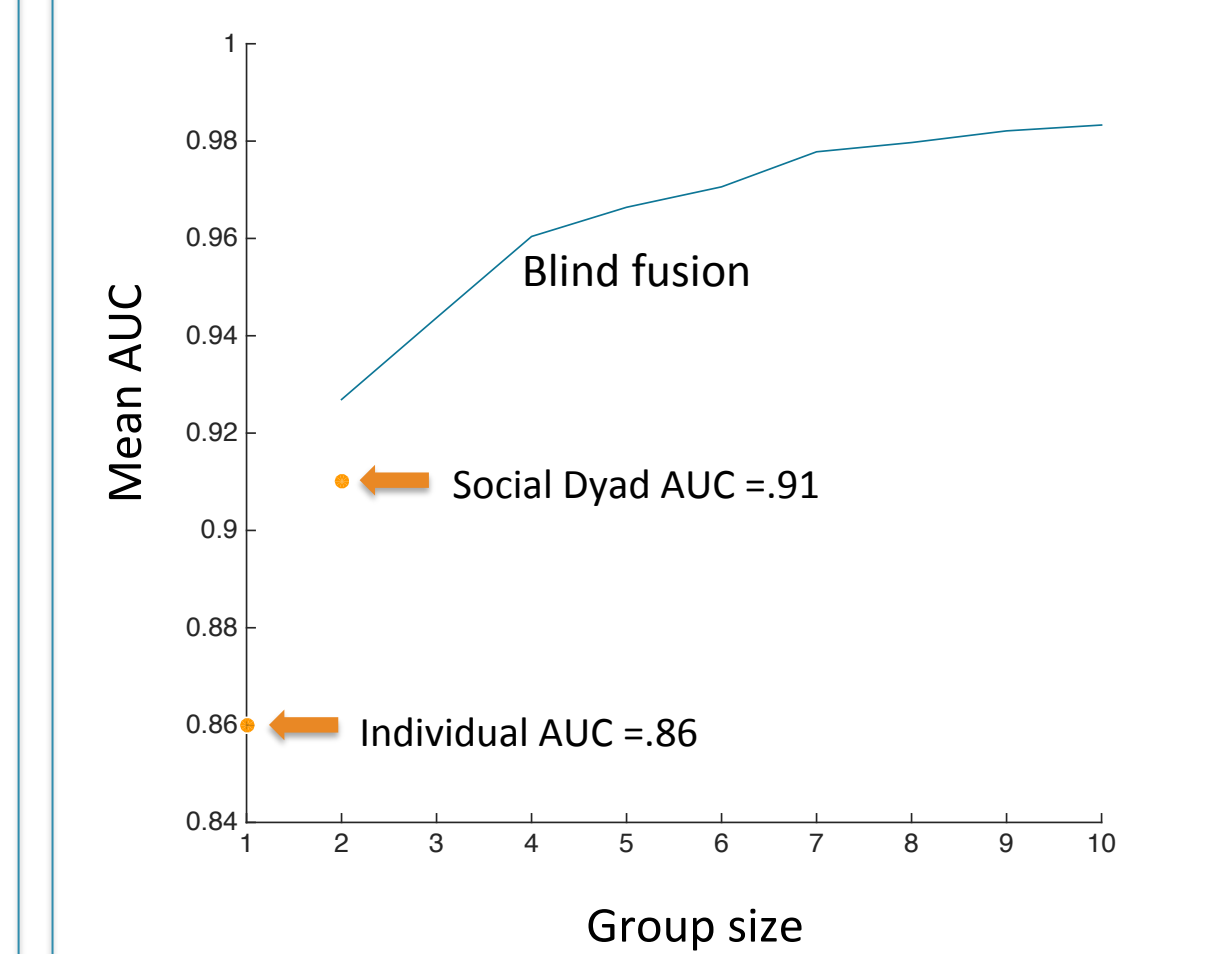
- ANOVA – group (individual, social dyad, blind fusion dyad)
- Group effect: $F(2,189)=16.25, Mse=.005, p<.0001$
- Social dyad > individual [$F(1, 189)=15.86, p<.0001$]
- Blind fusion dyad > individual [$F(1, 189)=26.76, Mse=.005, p<.0001$]
- Social Dyad versus Blind Fusion, n.s. [$F(1, 189)=1.06, Mse=.005, p<.30$]



Random Blind Fusion – adding more participants

- Face-matching performance increases with group size
- AUC=.98 for groups of size 7

Face-Matching Accuracy (AUC) and Group Size



Result Summary

- Social dyads outperformed individuals
- Blind fusion dyads outperformed individuals
- No difference between social dyads and blind fusion dyads
- Increase in face matching accuracy with group size

Discussion

Conclusion

- Wisdom-of-crowds phenomenon does not depend on social aspect of collaboration
 - No difference between social dyads and blind fusion dyads
- Wisdom-of-crowds applies to challenging face-matching tests (EFCT)
 - Social dyads and blind fusion dyads both outperform individuals

Future Directions

- Can dyad composition affect group performance (blind fusion versus social dyad)?
 - Individual performance level (top and bottom performers)
 - Gender (FF, MM, FM)
 - Personality traits (agreeableness, extraversion)
- Strategies used during social collaboration
- Does face-matching performance also increase with greater social collaboration groups?

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