Facial Attractiveness and Recognition of Faces: Effects of Age and Gender

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Introduction

Recognizing faces is a complex, important, and frequent task. Older compared to younger adults experience declines in face recognition *Bartlett et al., 1989; Crook & Larrabee, 1992; Grady et al., 1995*. Visual attention and face recognition in both age groups is influenced by facial features such as expression, race, or age *Ebner & Johnson, 2009; Meissner & Brigham, 2001; Rhodes & Anastasi, 2012*. In addition, facial attractiveness has been shown to influence face recognition in younger adults *Light et al. 1981*. Using eye tracking, the present study examined the influence of facial attractiveness on attention to and recognition memory for faces in adults of different ages.

Research Questions

(1) **Facial Attractiveness and Face Recognition Memory:** Does facial attractiveness predict successful recognition of faces? Does this relationship vary by age and gender of the viewer?

(2) **Facial Attractiveness and Face Looking Time:** Does facial attractiveness predict time spent viewing faces? Does this relationship vary by age and gender of the viewer?

Methods

Sample
n = 25 younger adults (M = 22.2 yrs., SD = 2.9 yrs., range: 19–29 yrs., 60% women)
n = 24 older adults (M = 73.9 yrs., SD = 7.8 yrs., range: 63–92 yrs., 71% women)

Task

(A) Encoding: Face Viewing (Eye Tracking)

(B) Test: Face Recognition (No Eye Tracking)
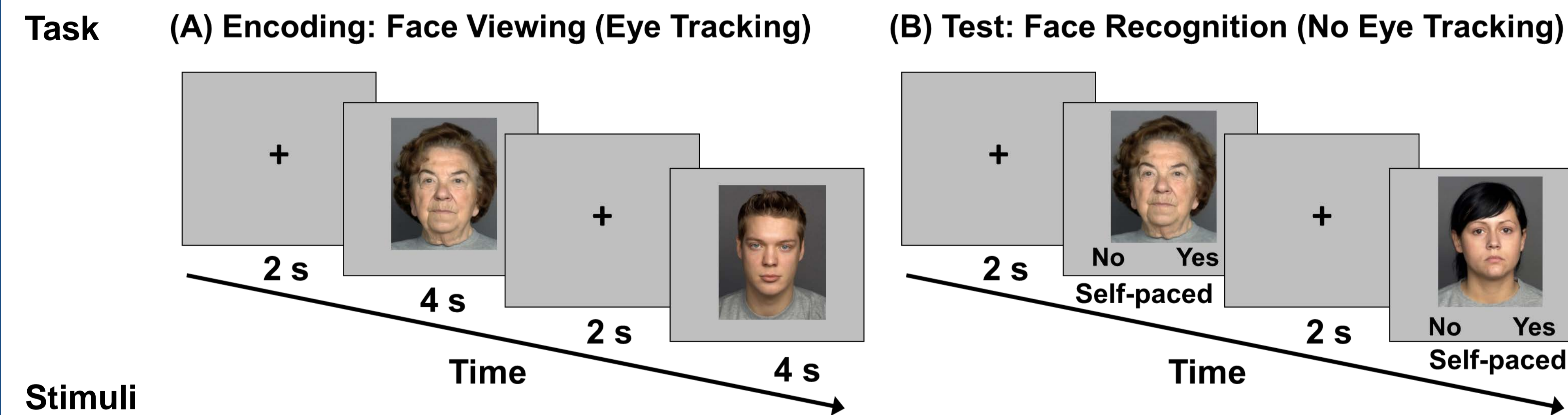
Stimuli
- Neutral faces from FACES Database *Ebner et al., 2010*
- Encoding: 24 younger and 24 older faces; half male, half female
- Test: 48 younger and 48 older faces; half male, half female; half target, half distractor
- Faces varied in facial attractiveness *Ebner et al., 2010*
  - Rated by n = 52 younger (M = 26.5 yrs., SD = 3.0 yrs., range: 20-31 yrs., 54% women) and n = 57 older (M = 73.6 yrs., SD = 2.7 yrs., range: 70-81 yrs., 47% women) adults
  - *How attractive is this person?;* scale: 0 = *not attractive at all* to 100 = *very attractive*

Equipment
Applied Science Laboratories Model 504 Eye Tracker: Eye movement recoding rate of 60 Hz
GazeTracker Software (Eye Response Technologies, Inc.): Stimulus presentation and data processing

Dependent Measures
Hits: Percentage of successful recognition of target faces
Gaze Time: amount of time participants' pupil and corneal reflection were recorded during encoding

Analytic Approach
Multilevel Random Coefficient Modeling using HLM6 *Raudenbush & Bryk, 2002; Nezlek, 2008*

Facial Attractiveness and Face Recognition Memory Model

η (Hits) = β_{00} + β_{01} (Age Group) + β_{02} (Gender) + β_{03} (Age Group X Gender) + β_{10} (Attractiveness) + β_{11} (Age Group X Attractiveness) + β_{12} (Gender X Attractiveness) + β_{13} (Age Group X Gender X Attractiveness) + r_0 + r_1(Attractiveness)

Facial Attractiveness and Gaze Time Model

Gaze = β_{00} + β_{01} (Age Group) + β_{02} (Gender) + β_{03} (Age Group X Gender) + β_{10} (Attractiveness) + β_{11} (Age Group X Attractiveness) + β_{12} (Gender X Attractiveness) + β_{13} (Age Group X Gender X Attractiveness) + r_0 + r_1(Attractiveness) + e
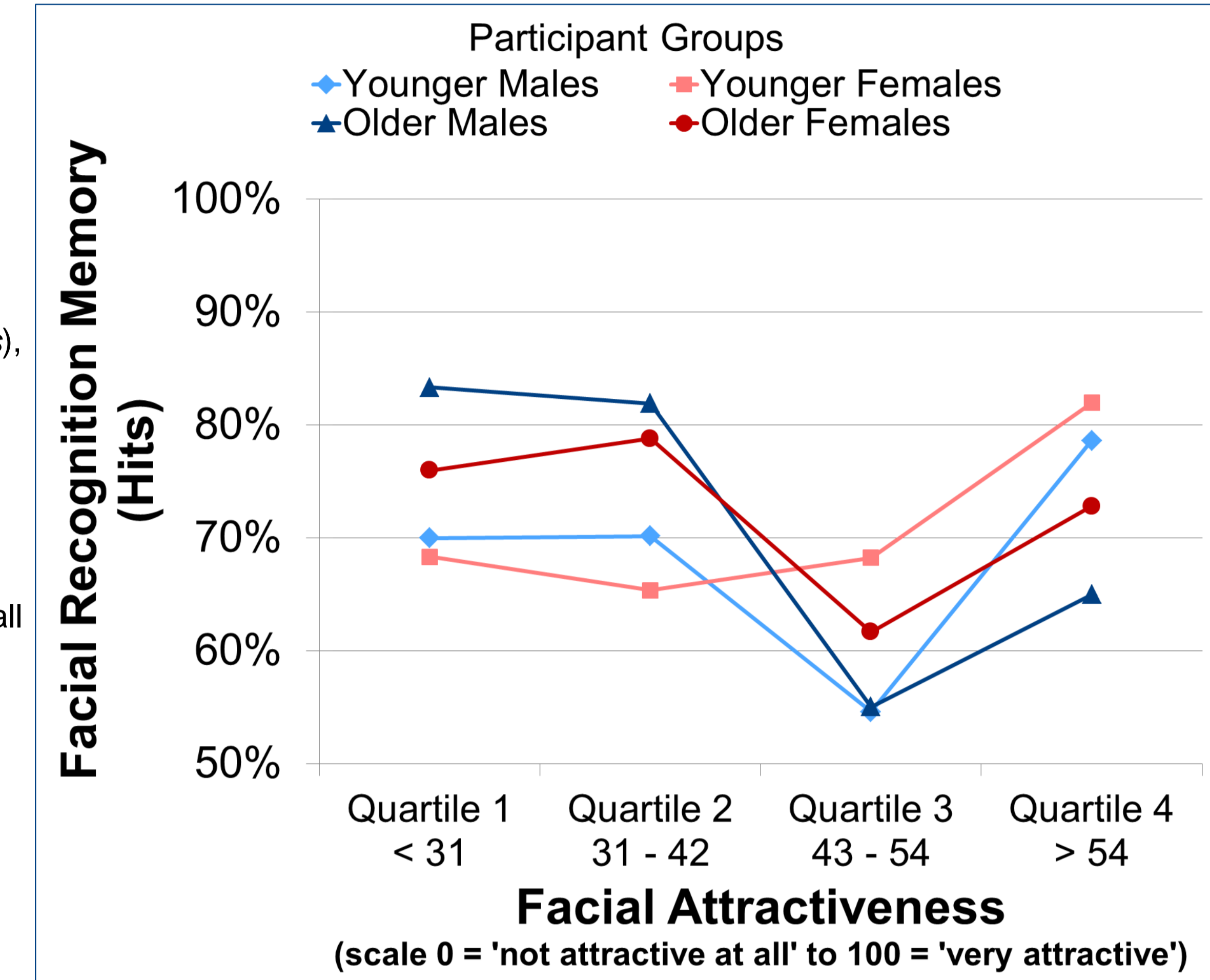
Results

(1) Facial Attractiveness and Face Recognition Memory
Older adults were better at remembering faces rated as less attractive; younger adults were better at remembering faces rated as more attractive

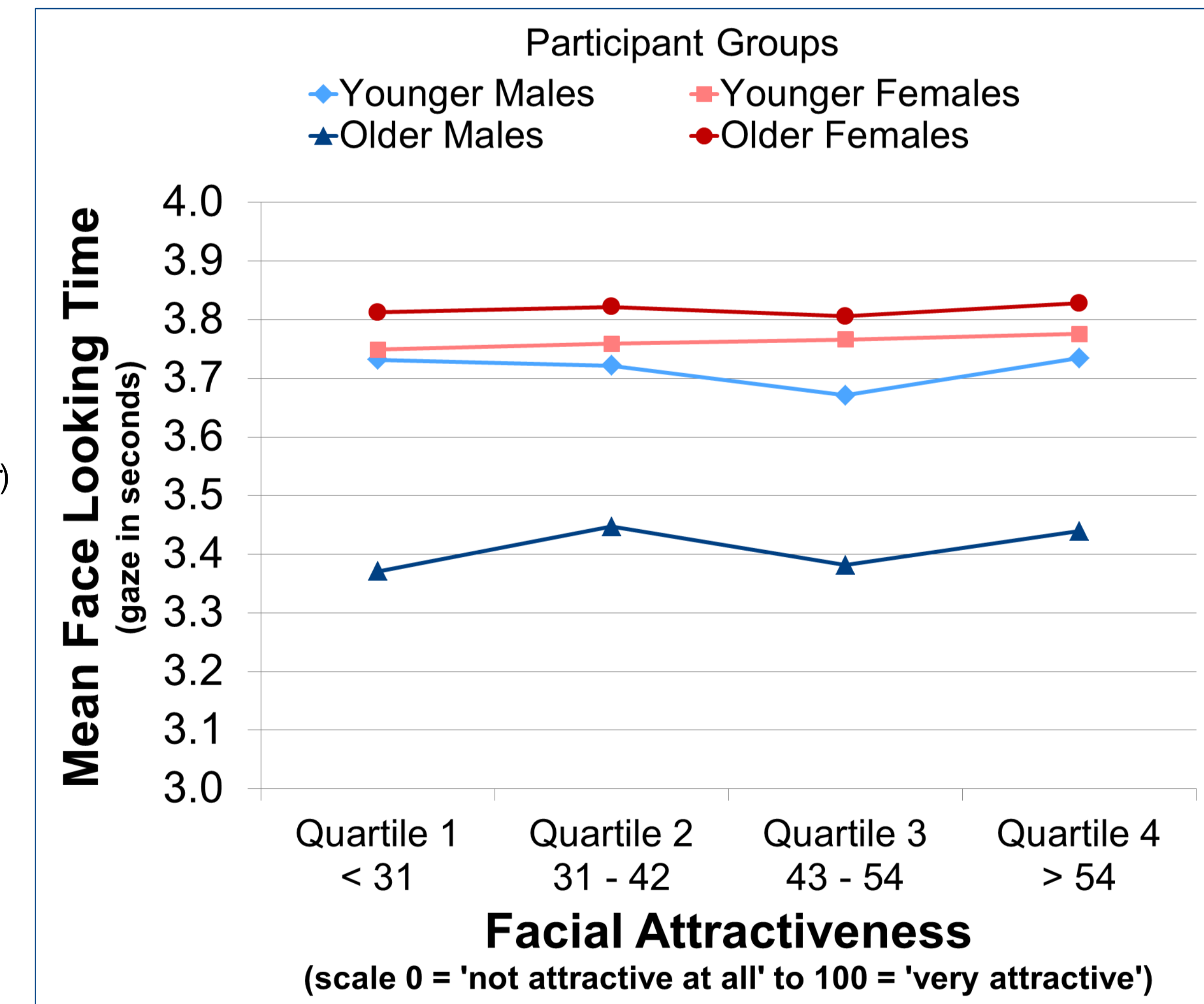| Variable	Face Recognition Memory (Hits)
Fixed effects	
Intercept	2.24
Age group of participant	1.27
Gender of participant	1.14
Age group of participant X Gender of participant	0.88
Attractiveness rating of face	1.00
Age group of participant X Attractiveness rating of face	**0.96 ***
Gender of participant X Attractiveness rating of face	**1.02 +**
Age group of participant X Gender of participant X Attractiveness rating of face	1.01
Random Effects	
Attractiveness rating of face	0.00

* $p < .05$
+ $p < .10$

- Logistic regression
- Face recognition memory: 0 (*miss*), 1 (*hit*)
- Age group: 0 (*younger*), 1 (*older*)
- Gender: 0 (*female*), 1 (*male*)
- Reported parameter estimates: odds ratios
- Odds ratio of 1 indicates face recognition to be equally likely in all groups
- Odds ratios greater than 1 indicates face recognition to be more likely in the group coded 1 than in the group coded 0

Participant Groups — Younger Males, Younger Females, Older Males, Older Females

Facial Recognition Memory (Hits) vs **Facial Attractiveness** (scale 0 = 'not attractive at all' to 100 = 'very attractive'); Quartile 1 < 31, Quartile 2 31 - 42, Quartile 3 43 - 54, Quartile 4 > 54

(2) Facial Attractiveness and Face Looking Time
Older males had shorter looking time overall than all other groups; overall face looking time effect was independent of facial attractiveness

Variable	Face Looking Time (Gaze
Fixed effects	
Intercept	3.72
Age group of participant	**-0.41 ***
Gender of participant	0.02
Age group of participant X Gender of participant	**0.48 ***
Attractiveness rating of face	0.00
Age group of participant X Attractiveness rating of face	0.00
Gender of participant X Attractiveness rating of face	0.00
Age group of participant X Gender of participant X Attractiveness rating of face	0.00
Random Effects	
Intercept	0.07
Attractiveness rating of face	0.00
Residual	0.08

* $p < .05$

- n = 2.277
- Gaze time: M = 3.72, SD = .39, range: 1.7 – 4.0 seconds
- Age group: 0 (*younger*),1 (*older*)
- Gender: 0 (*female*), 1 (*male*)
- Fixed effects: Unstandardized regression coefficients
- Random effects: Estimated variance components

Participant Groups — Younger Males, Younger Females, Older Males, Older Females

Mean Face Looking Time (gaze in seconds) vs **Facial Attractiveness** (scale 0 = 'not attractive at all' to 100 = 'very attractive'); Quartile 1 < 31, Quartile 2 31 - 42, Quartile 3 43 - 54, Quartile 4 > 54

Discussion

- Attractive faces may be less distinctive *Light et al., 1981,* and thus harder for older adults to recognize

- Younger adults may have better recognition for more attractive faces because of mating and competition goals; these motivations may become less salient with age

- Differences between younger and older men and women in ratings of facial attractiveness may affect effects observed in the study

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