

# A Nonparametric Model for Right-Wing Authoritarianism

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## Introduction

Right-Wing Authoritarianism (RWA) is a measure of one's submissiveness to authority and adherence to traditional norms and social structure.

**Question:** Do there exist differences in RWA across age, gender and/or educational attainment?

## Participant Characteristics

$n = 9,169$  participants ages 13–70 years old

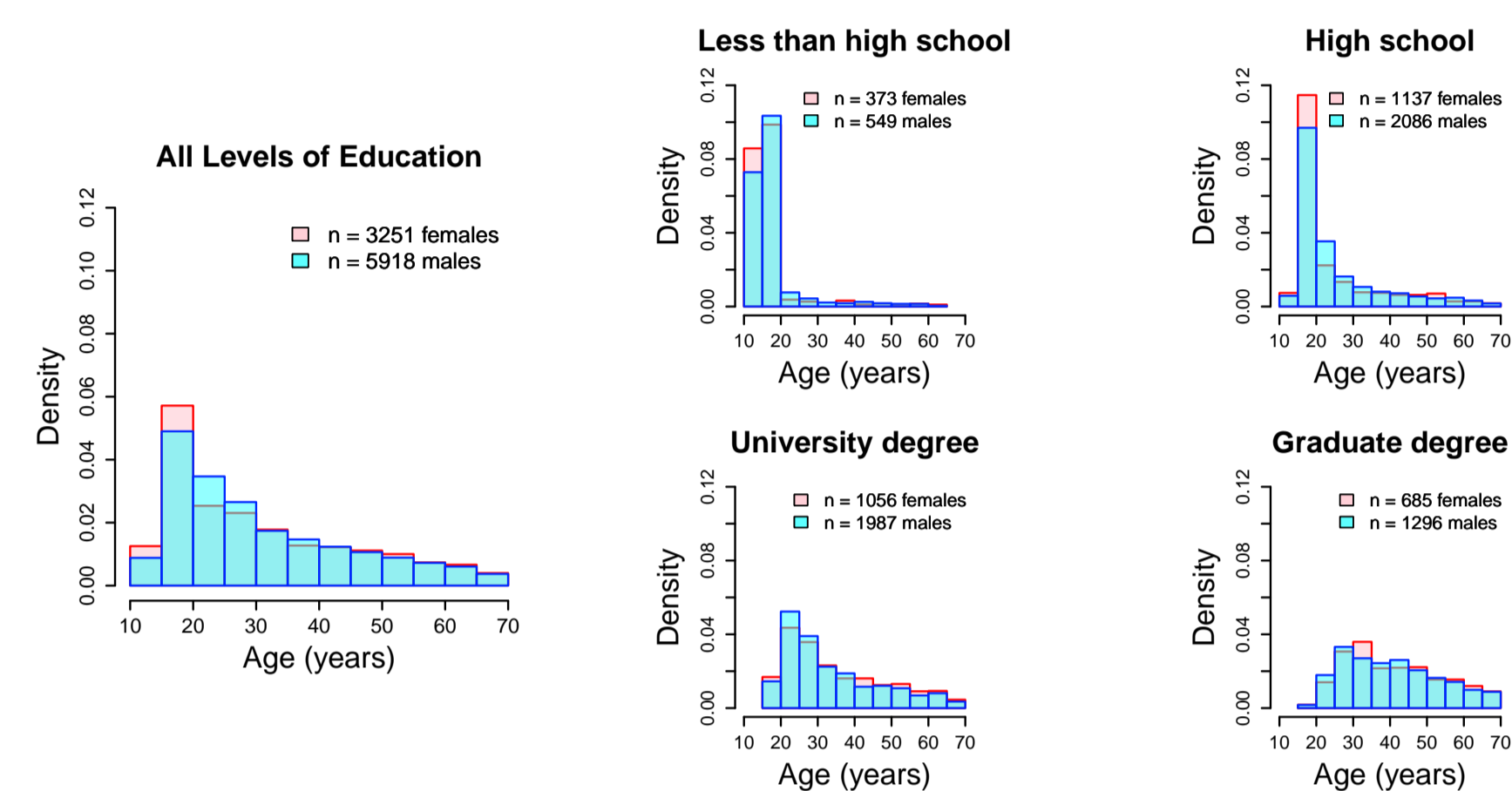


Figure 1: Age/Gender distributions for each level of educational attainment.

## Right-Wing Authoritarianism Measure

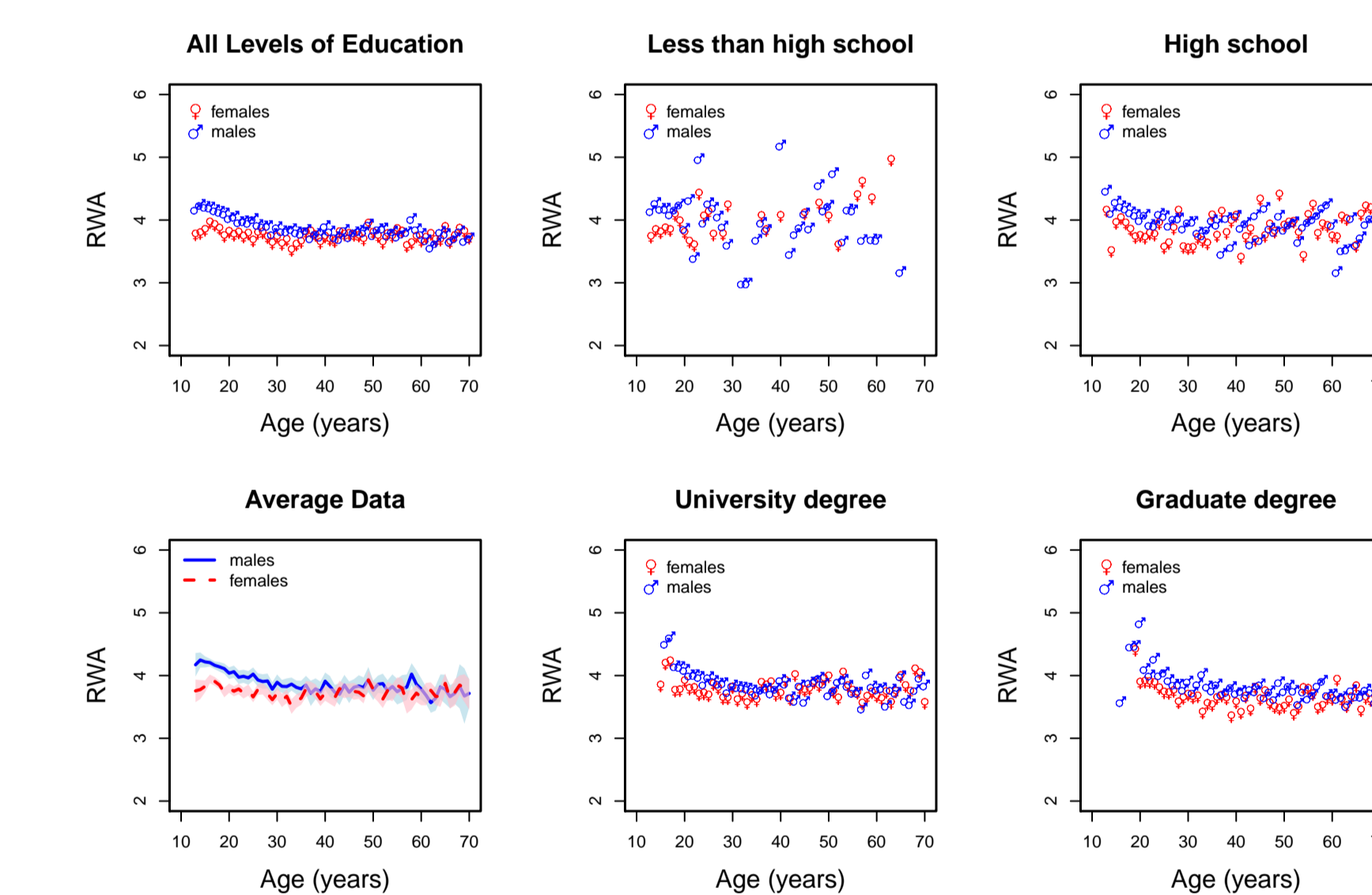


Figure 2: Average score on Right-Wing Authoritarianism Scale (Altemeyer, 1981).

## Openness to Experience Measure

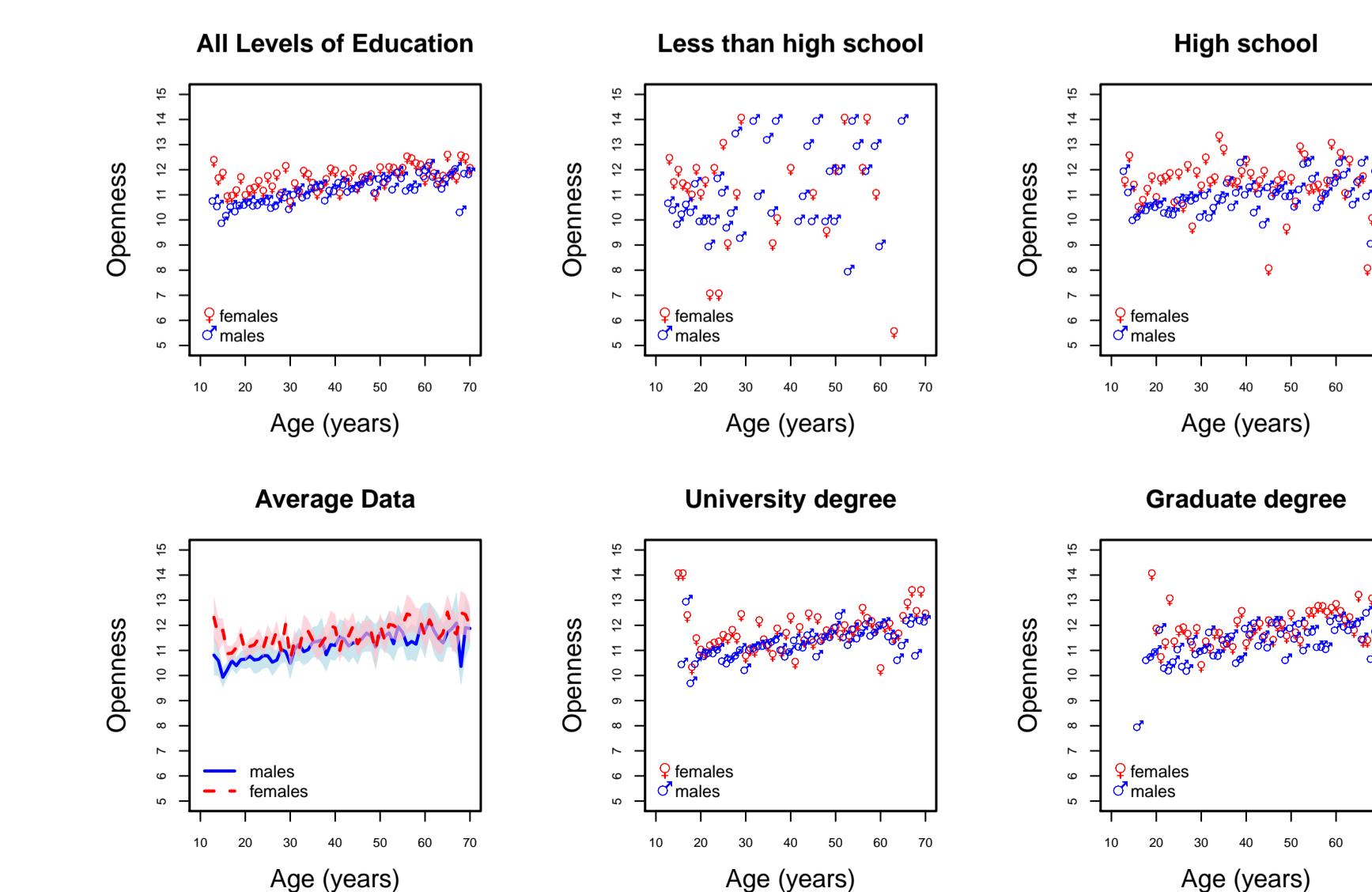


Figure 3: Average score on two-item Openness Inventory (Gosling et al., 2003).

## Age-Gender + Openness Model

We use a two-way smoothing spline analysis of variance model:

$$y_i = \eta(a_i, g_i) + \eta(o_i) + \epsilon_i$$

- $y_i$  is the right-wing authoritarianism score for the  $i$ -th subject
- $a_i$  and  $g_i$  are age and gender of  $i$ -th subject
- $o_i$  is the Big Five openness score of the  $i$ -th subject
- $\eta$  is the unknown smooth function that we will estimate
- $\epsilon_i \sim N(0, \sigma^2)$  is the unknown, normally distributed error term

Two possible models that we could consider:

Additive:  $\eta(a, g) = \eta_I + \eta_A(a) + \eta_G(g) + \eta_O(o)$

Interaction:  $\eta(a, g) = \eta_I + \eta_A(a) + \eta_G(g) + \eta_{AG}(a, g) + \eta_O(o)$

- $\eta_I$  is a baseline (intercept) term
- $\eta_A$ ,  $\eta_G$  and  $\eta_O$  are main effects of age, gender and openness
- $\eta_{AG}$  is age-gender interaction effect function

## Results: Age-Gender + Openness Model

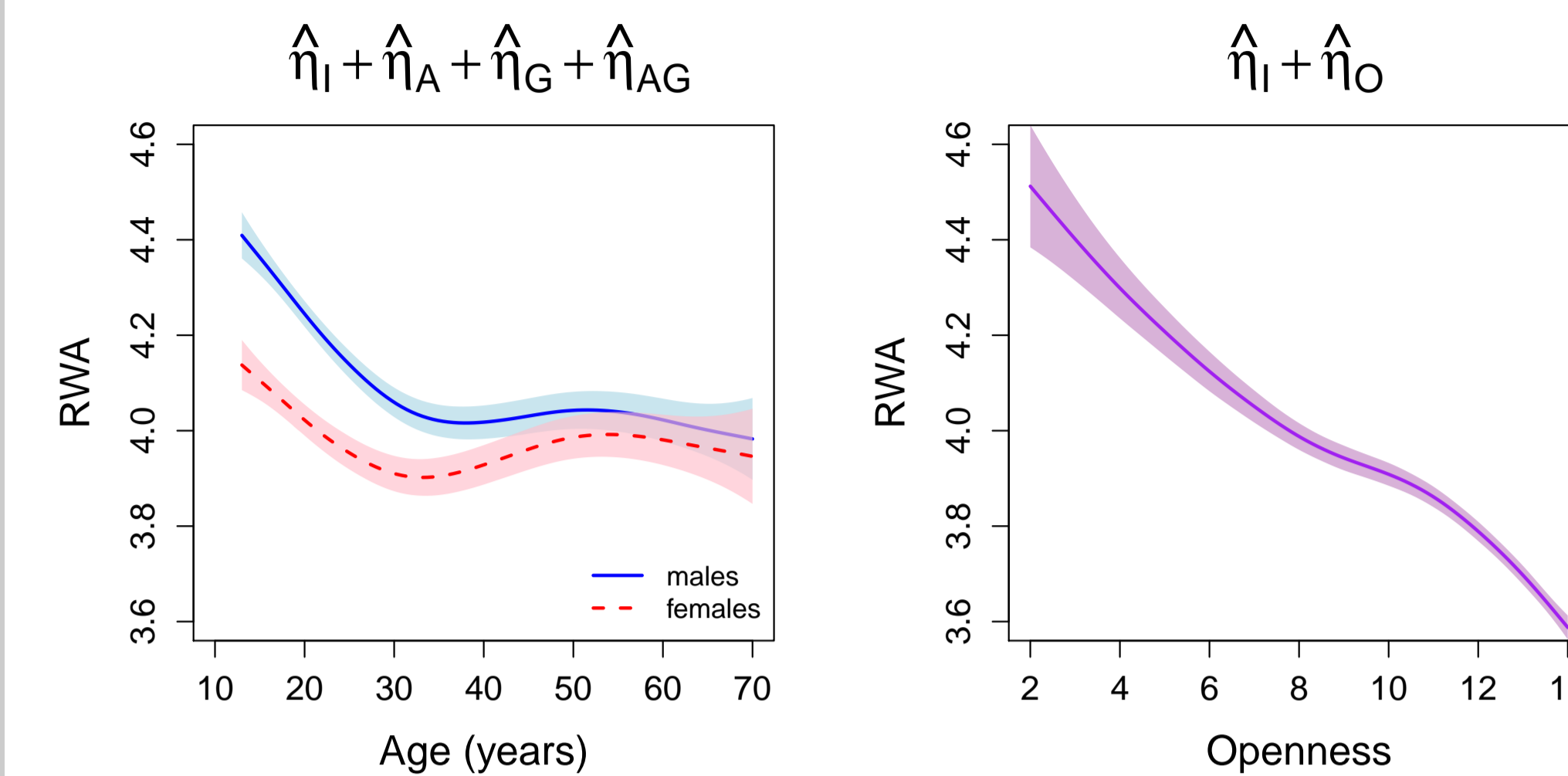


Figure 4: Predicted right-wing authoritarianism with age and gender model effects (left) and the openness model effect (right).

## Age-Gender-Education + Openness Model

We use a three-way smoothing spline analysis of variance model:

$$y_i = \eta(a_i, g_i, e_i) + \eta(o_i) + \epsilon_i$$

- $e_i$  is the educational attainment for the  $i$ -th subject

Nine possible models that we could consider (see Table 2).

All models were fit with bigsplines (Helwig, 2016) package in R software environment (R Core Team, 2016).

## Fit Stats: Age-Gender + Openness Model

Table 1: Fit statistics for two-way (age-gender) SSANOVA model.

Model	$R^2$	Akaike IC	Bayesian IC
1. Additive	0.150	14223.4	14300.8
2. Interaction	0.155	14175.1	14264.8

Note. IC = Information Criterion

## Fit Stats: Age-Gender-Education + Openness Model

Table 2: Fit statistics for three-way (age-gender-education) SSANOVA model.

Model	$R^2$	Akaike IC	Bayesian IC
1. $\eta_{\bullet} + \eta_{AG} + \eta_{AE} + \eta_{GE} + \eta_{AGE}$	0.163	14124.0	14337.1
2. $\eta_{\bullet} + \eta_{AG} + \eta_{AE} + \eta_{GE}$	0.162	14124.2	14290.9
3. $\eta_{\bullet} + \eta_{AG} + \eta_{AE}$	0.161	14134.0	14280.9
4. $\eta_{\bullet} + \eta_{AG} + \eta_{GE}$	0.158	14157.2	14280.1
5. $\eta_{\bullet} + \eta_{AE} + \eta_{GE}$	0.157	14173.9	14323.5
6. $\eta_{\bullet} + \eta_{AG}$	0.156	14167.9	14268.1
7. $\eta_{\bullet} + \eta_{AE}$	0.156	14182.8	14317.3
8. $\eta_{\bullet} + \eta_{GE}$	0.153	14207.5	14315.2
9. $\eta_{\bullet}$	0.151	14216.3	14306.0

Note. IC = Information Criterion and  $\eta_{\bullet} = \eta_I + \eta_A + \eta_G + \eta_E + \eta_O$

AIC selects Model 1 and BIC selects Model 6. We prefer Model 1.

## Results: Age-Gender-Education + Openness Model

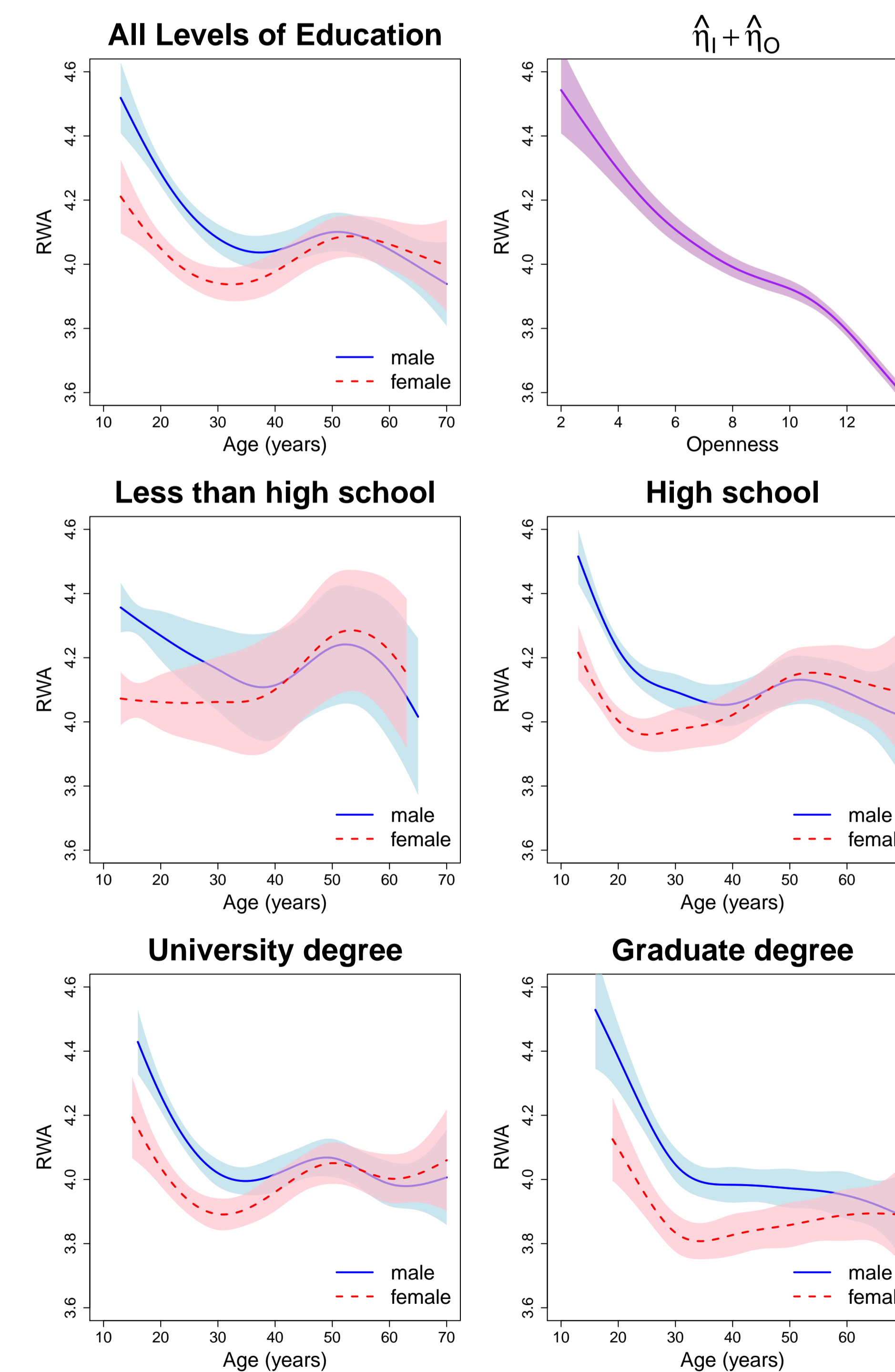


Figure 5: Model predicted right-wing authoritarianism by openness effect (top-right) and controlling for openness across age, gender, and educational attainment (all others).

## Openness and Educational Attainment

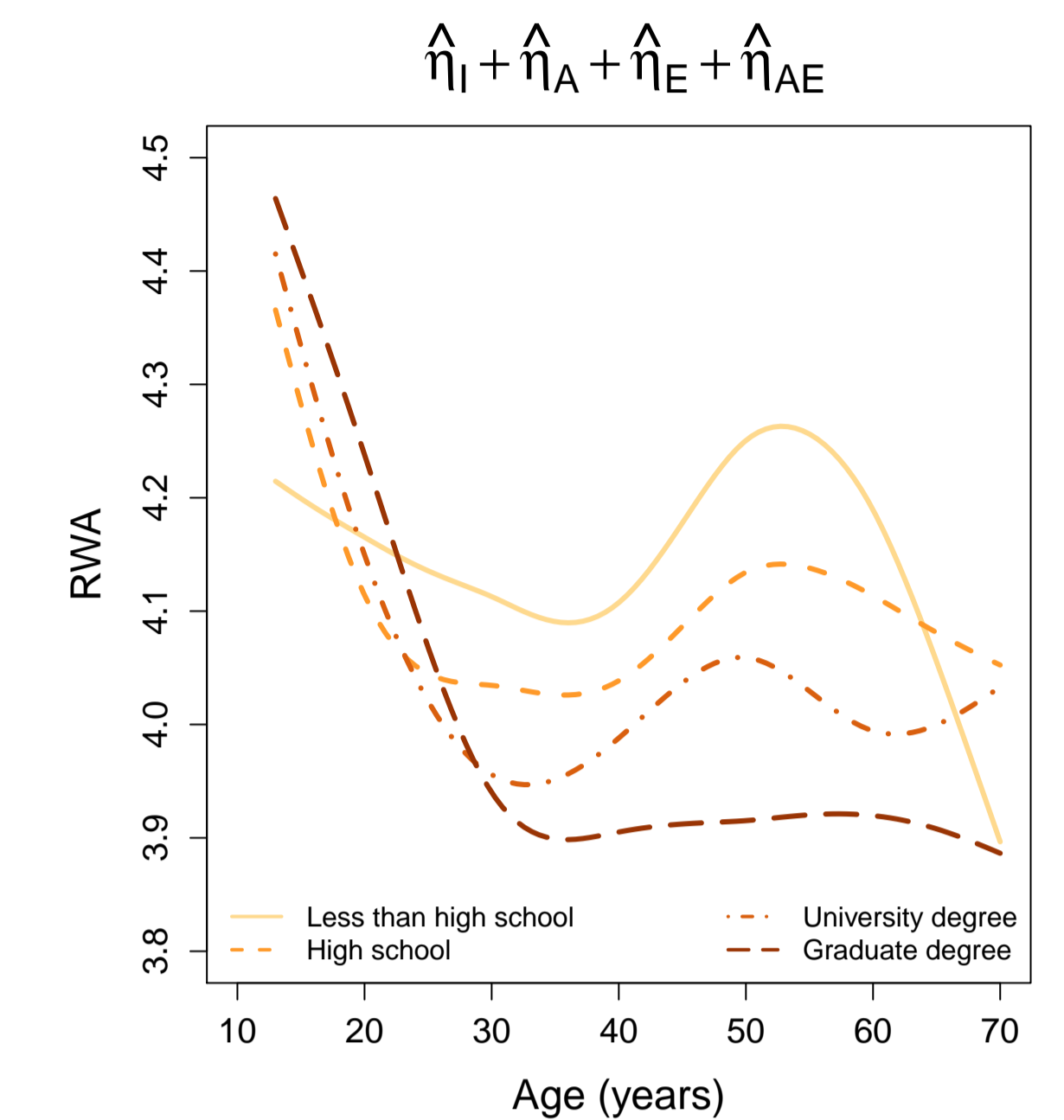


Figure 6: Model predicted right-wing authoritarianism across age and education.

## Conclusions

- There exists a significant interaction between age, gender, and education on levels of right-wing authoritarianism.
- Levels of right-wing authoritarianism decrease during adolescence up until early adulthood.
  - Greater differences observed with increasing education.
  - A gender gap exists for higher levels of educational attainment.
- Openness to experience explains a majority of the model explained variation in right-wing authoritarianism.
  - Moderate negative correlation between openness and right-wing authoritarianism  $r = -0.32$ .
- Generational differences may explain the observed increase in right-wing authoritarianism beginning around age 40.
  - The cross-sectional analysis cannot separate developmental and cohort effects.
  - Future studies would ideally follow one cohort across time, measuring levels of RWA periodically.

## References

Altemeyer, B. (1981). Right-wing authoritarianism. *University of Manitoba press*.  
 Gosling, S. D., P. J. Rentfrow, and W. B. J. Swann (2003). A very brief measure of the big five personality domains. *Journal of Research in Personality*, 37, 504–528.  
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