

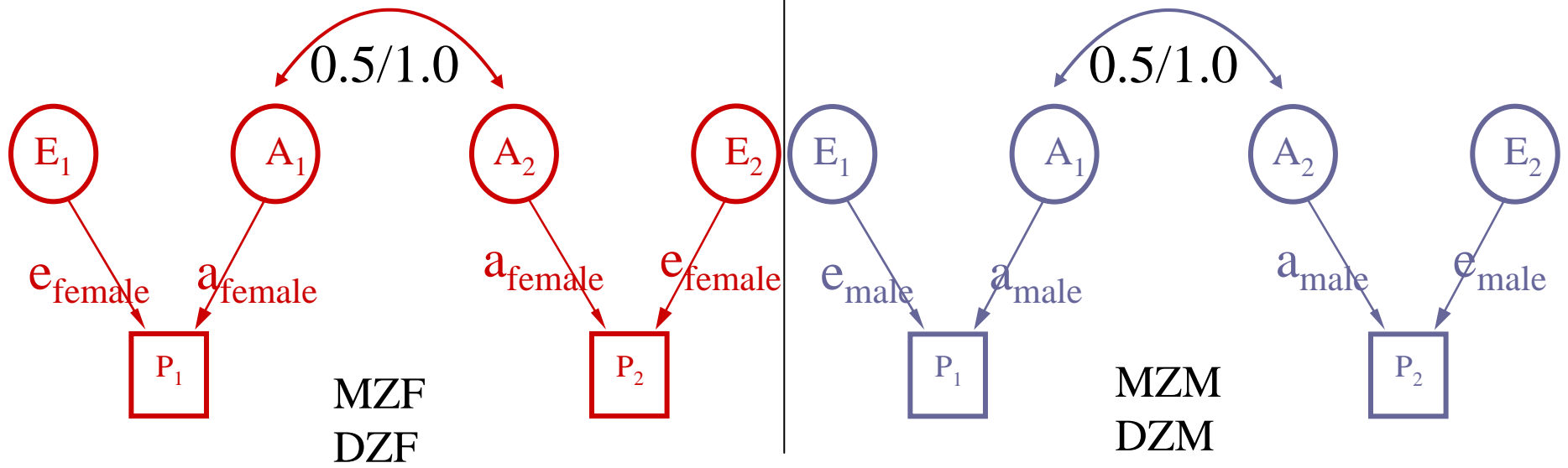
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# Heterogeneity across age cohorts

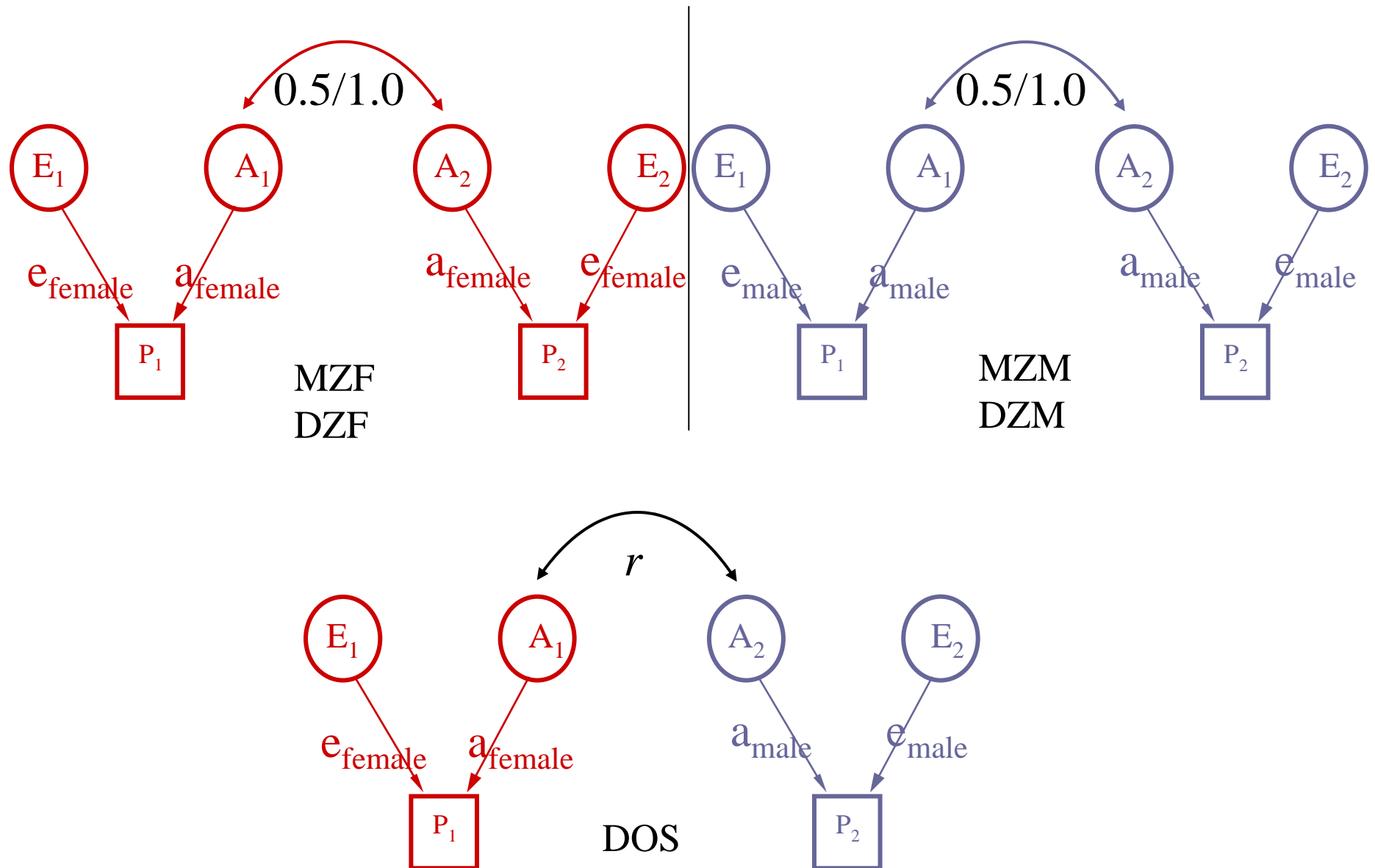
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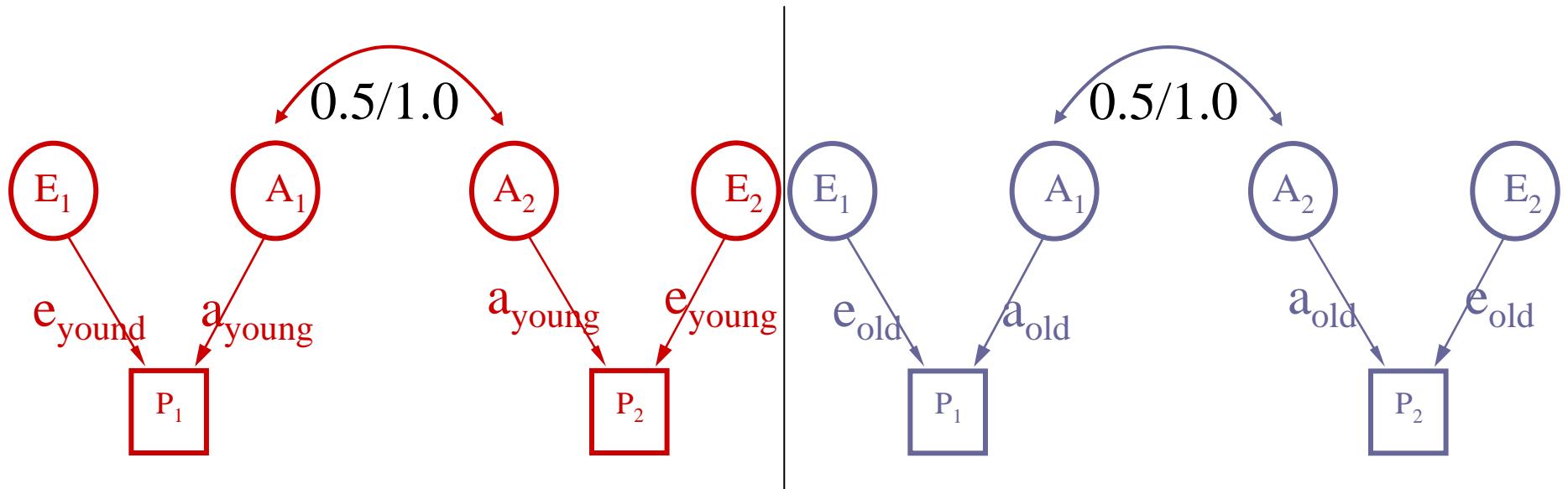
# Sex differences – same heritability?



# Sex differences – same genes?



# Differences across age cohorts – same heritability?



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## Exercise I: modifying the script to test for age heterogeneity

- Open **bmi\_young.mx** (in \\danielle\AGE\_heterogeneity\)
- This script: young males, 4 groups:
  - 1 = calculation group – matrix declarations
  - 2 = MZ data
  - 3 = DZ data
  - 4 = calculation group – standardized solution
- ADE model, 1 grand mean, so 4 estimated parameters

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## Exercise I: modifying the script to test for age heterogeneity

- Change this script so it will allow you to estimate ADE in the young and the older cohort by adding four groups for the older cohort
- Then run it
- If done correctly you should get **-2|| = 3756.552** and **df = 1759**

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# Required modifications for Exercise I

- Copy and paste all 4 groups
- Change **Select if agecat=2** in the two new data groups
- Change **matrices = group 5** in the two new data groups
- Change **#ngroups = 8**

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## Exercise II: Testing AE vs ADE for both cohorts

- Test whether D is significant using option multiple
- Check the unstandardized and standardized estimates of A and E in the young and old cohort under the AE model



	A	E
Young - unstandardized		
Young standardized		
Old – unstandardized		
Old - standardized		

	A	E
Young - unstandardized	<b>0.5413</b>	<b>0.1414</b>
Young standardized	<b>0.7924</b>	<b>0.2076</b>
Old – unstandardized	<b>0.4330</b>	<b>0.1815</b>
Old - standardized	<b>0.7046</b>	<b>0.2954</b>

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- Since D is not significant, we will use the AE model to compare submodels:

**Drop W 1 1 1 W 5 1 1**

**Option issat**

**End**

**Save AE\_cohort.mxs**

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## Exercise III: Equality of variance components across age cohorts

Add the option multiples with EQUATE command, use a **get** in between and test whether

- $a_{\text{young}} = a_{\text{old}} ?$
- $e_{\text{young}} = e_{\text{old}} ?$

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## Exercise III: Fit results

■  $a_{\text{young}} = a_{\text{old}} ?$

**EQ X 1 1 1 X 5 1 1**

**end**

Chi-squared 4.093

d.f. 1

Probability 0.043

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**get AE\_cohort.mxs**

■  $e_{\text{young}} = e_{\text{old}} ?$

**EQ Z 1 1 1 Z 5 1 1**

**End**

Chi-squared 3.954

d.f. 1

Probability 0.047

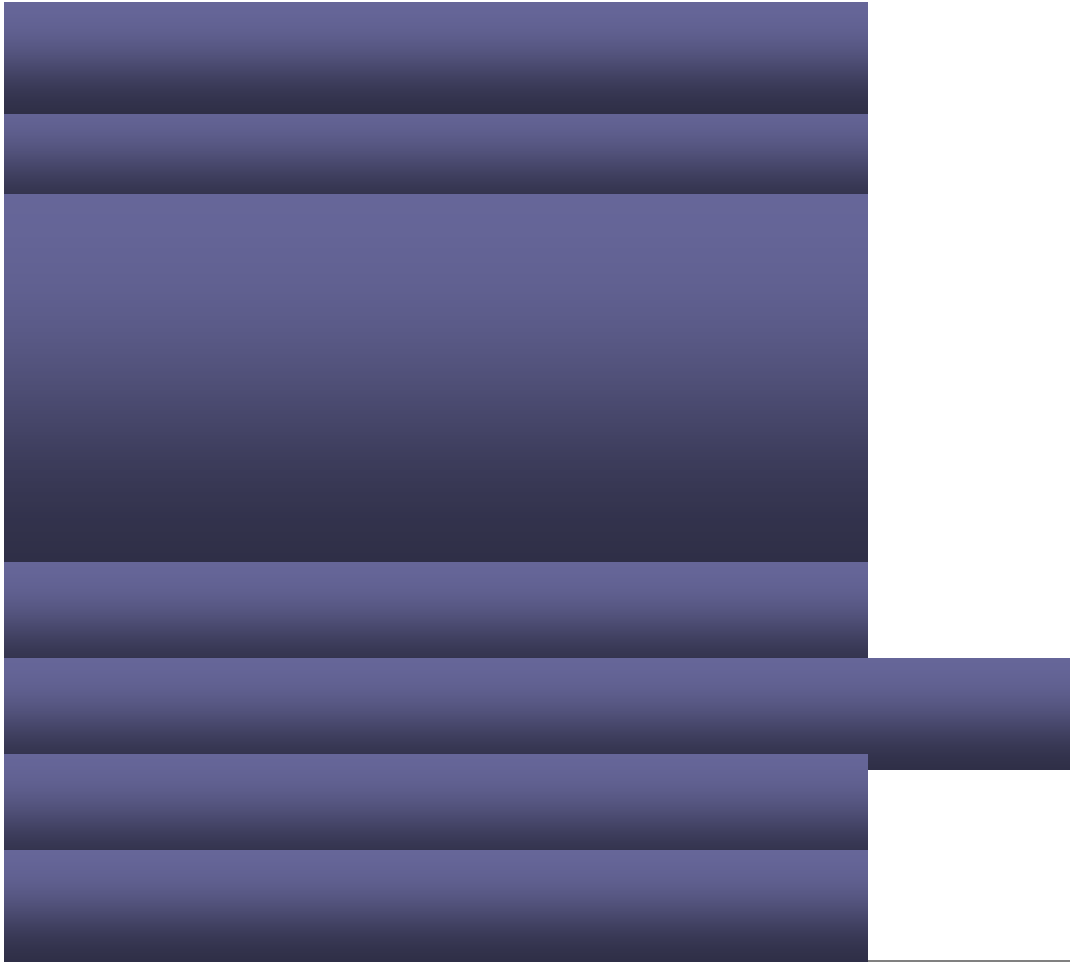
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# Standardized estimates

- Testing whether the standardized estimates of heritability and environment are equal across age.
- As the standardized parameters are calculated we cannot change them in an option multiple, and cannot use the EQ statement. Instead we need to use a constraint group

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# Constraint group



# Adjusting df : Option df = -3

■ MATRIX S [=P@V~] YOUNG

0.7924   0.0000   0.2076   0.0000

■ MATRIX S [=P@V~] OLD

0.7046   0.0000   0.2954   0.0000

Add up to 1

Fixed to 0



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## Exercise IV: Testing homogeneity of standardized estimates

- We want to test whether this constraint provides a worse fit than the unconstrained AE model, so fix D for both cohorts to zero

- #ngroups #9

- Add constraint group

- Fit results if done correctly:

Chi-squared 6.030

d.f 1

Probability 0.014

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- Testing whether the standardized estimates are equal is more significant, but now we cannot really distinguish anymore between A and E, as  $A+E = 1$
  - Danielle Dick will talk about interpretation of heterogeneity in unstandardized vs standardized parameters