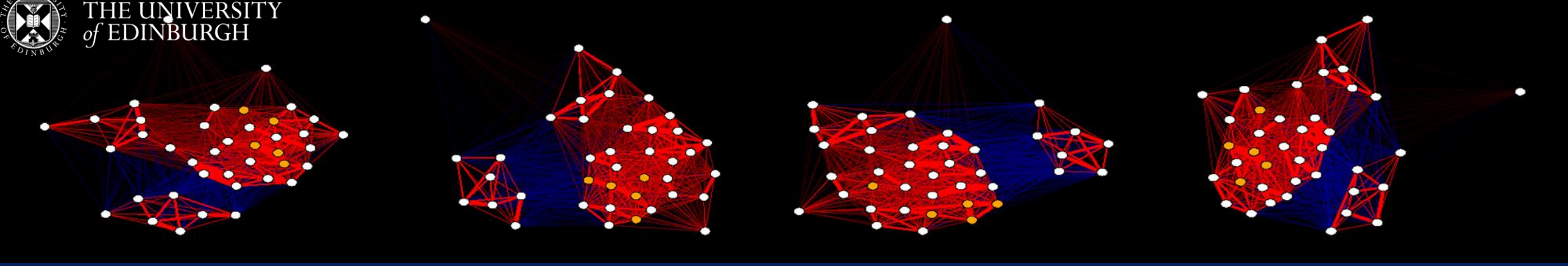


# *Z-proso Meeting 2018*

# *Developmental trajectories of ADHD symptoms*

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# Developmental subtypes of ADHD symptoms

- **ADHD**
  - Affects ~5% of global population but meaningful variation both above and below clinical thresholds
  - Traditionally conceptualised as early-onset childhood disorder
    - Age-of-onset <12 required for diagnosis
  - In reality substantial variation in age of onset/symptom developmental trajectories in general
  - *Question: Can we parse the heterogeneity in ADHD symptom trajectories into meaningful developmental subtypes?*

**Inattention**

- ***Difficulty organising tasks and activities***
- ***Easily distracted by extraneous stimuli***
- ***Forgetful in daily activities***

**Hyperactivity/impulsivity**

- ***Fidgets, squirms in seat***
- ***Often 'on the go'***
- ***Difficulty waiting turn***

Example diagnostic indicators from DSM-5

# Method

- **Overview**
  1. Can developmental trajectories of ADHD symptoms estimated from longitudinal data be summarised in terms of a small number of ‘developmental subtypes’?
  2. Do these subtypes include a ‘late onset’ category?
  3. Do those in this category differ from those with an early onset in clinically meaningful ways?

# Method

- **Participants and Measures**
  - Data from z-proso study
  - n=1572 youth from Zurich, normative sample
  - Teacher-reported ADHD symptoms at age 7,8,9,10,11,12,13,15

# Method: Identifying developmental subtypes

- **Analysis Method**
  - Inattention and hyperactivity/impulsivity analysed separately.
  - Growth mixture modelling (GMM)
    - Form of latent class analysis applied to longitudinal data
    - Identifies classes '**developmental subtypes**' defined by similar developmental trajectories in symptoms over time
    - Number of classes not known a priori but estimated from the data

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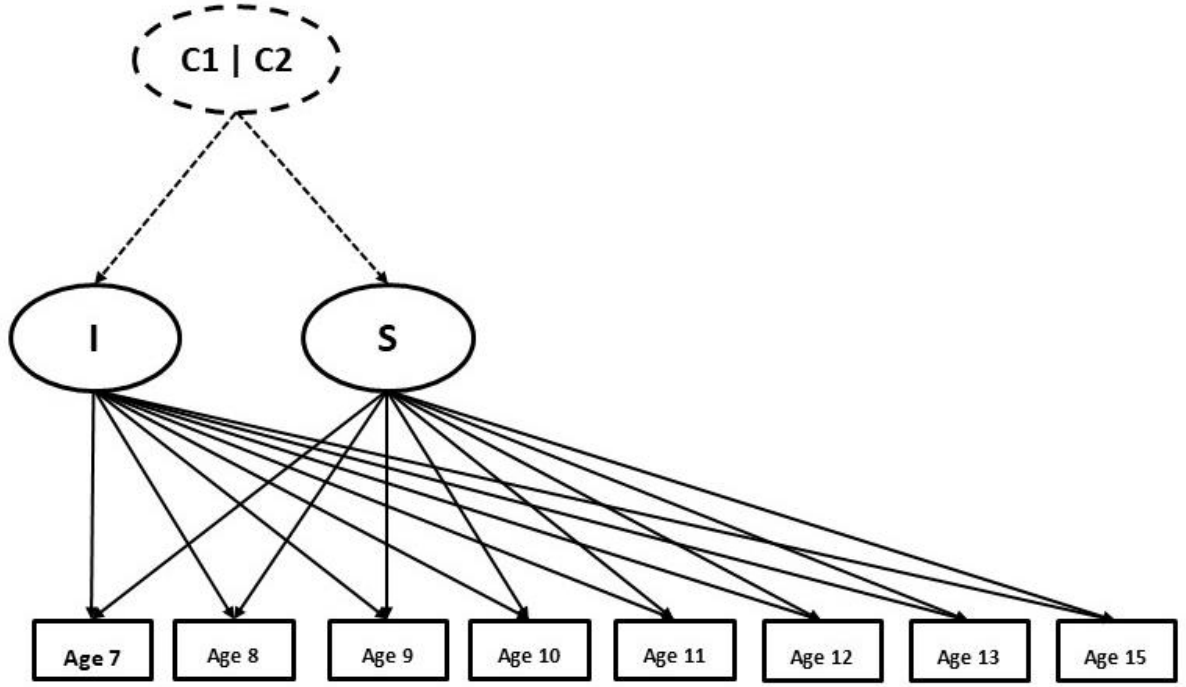
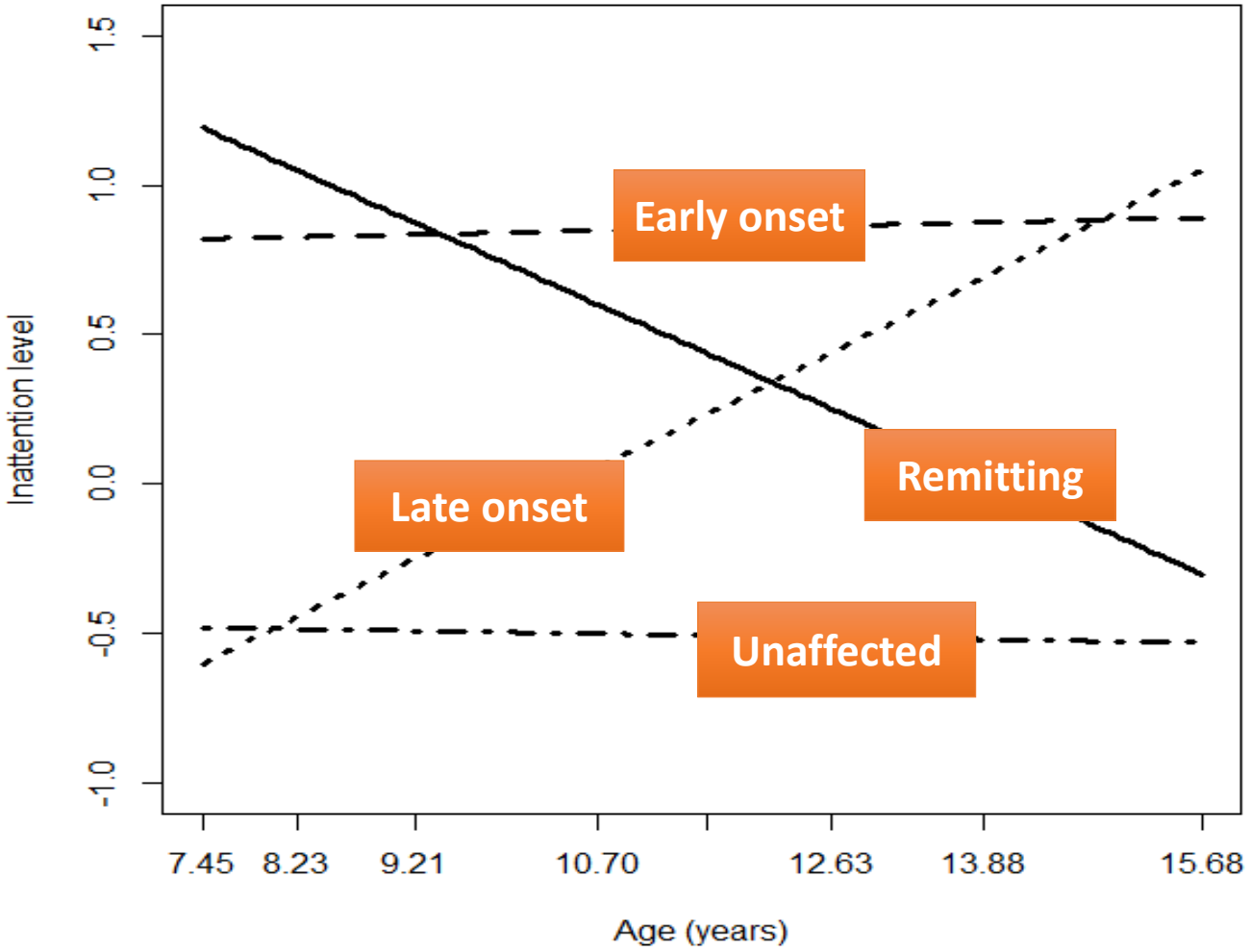



The basic growth mixture model. I=intercept, S= slope; C1 and C2 are the categories of a latent categorical variable

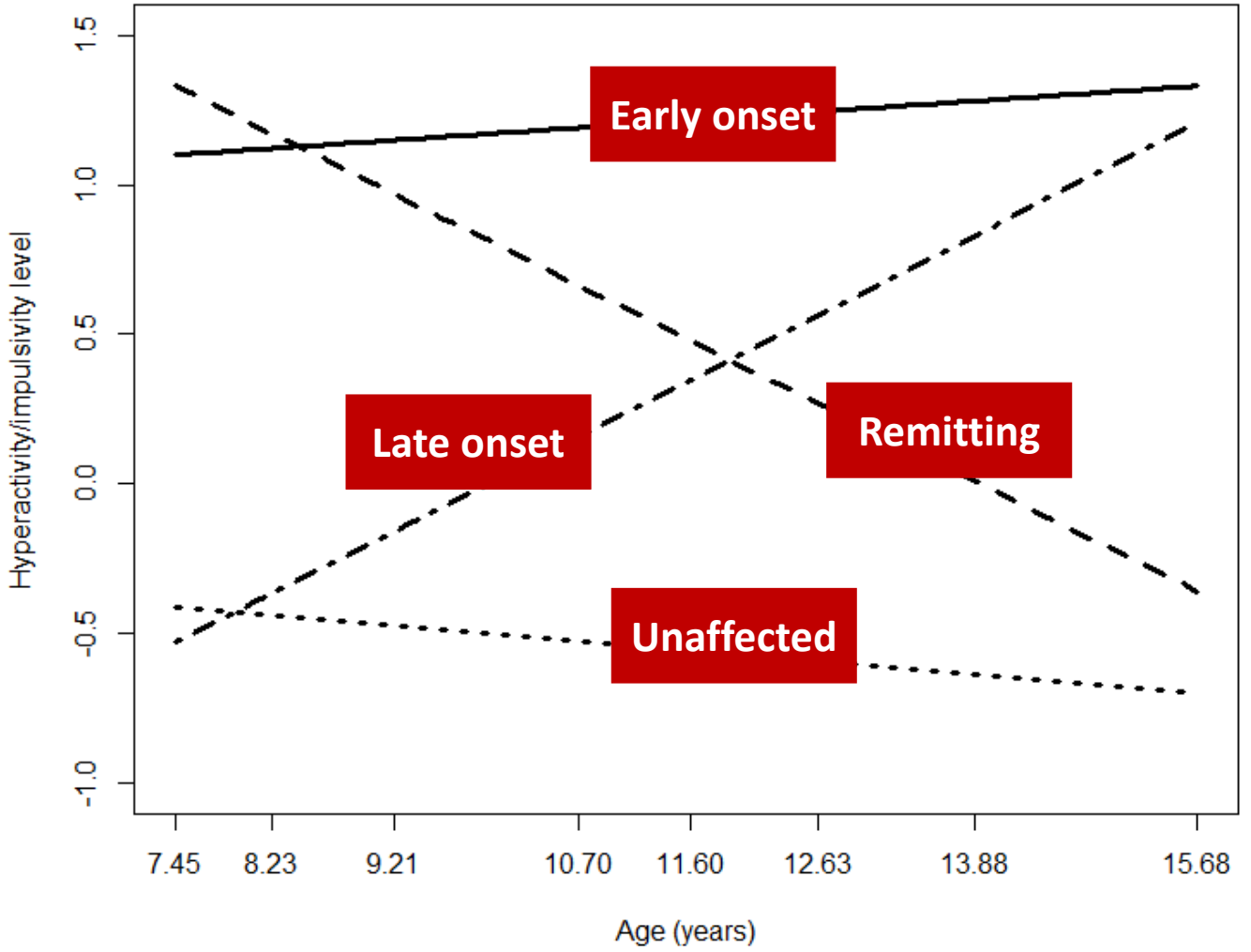
# Results: Developmental subtypes of inattention

| Inattention subtype | % (n) of Sample |
|---|---|
| Unaffected | 63% (996) |
| Early onset | 20% (311) |
| Remitting | 10% (151) |
| Late onset | 8% (112) |



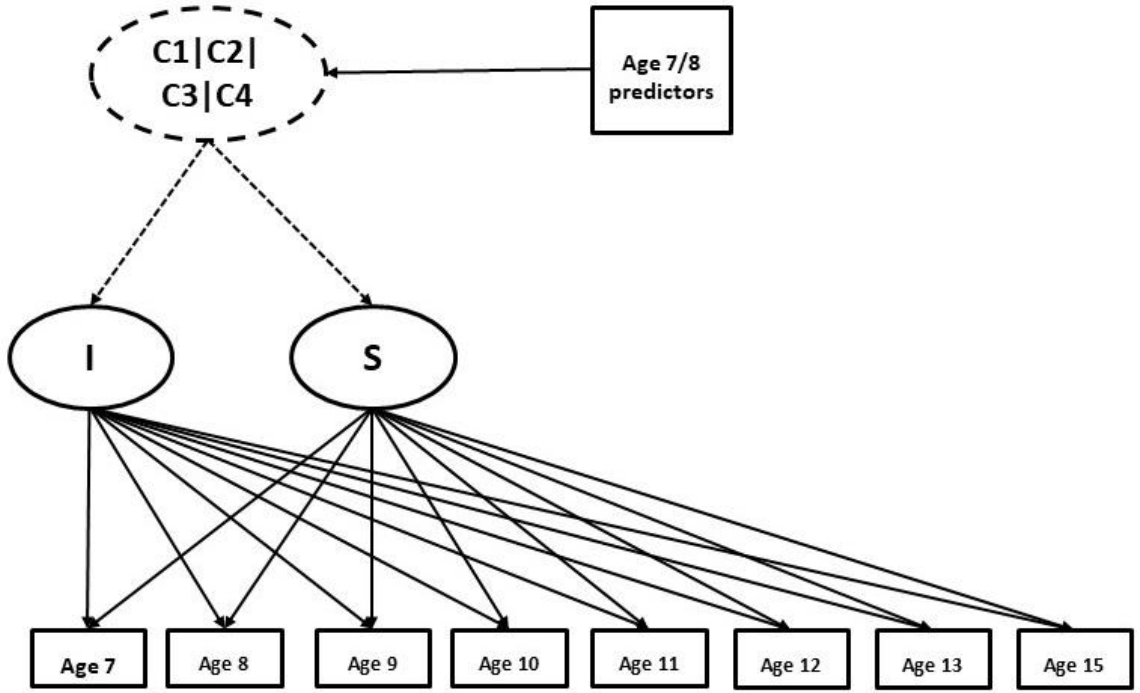
# Results: Developmental subtypes of hyperactivity/impulsivity (H/I)

| H/I subtype | % (n) of Sample |
|---|---|
| Unaffected | 73% (1144) |
| Early onset | 8% (125) |
| Remitting | 13% (215) |
| Late onset | 5% (86) |



# Method: Predictors and outcomes of category membership

- **Analysis method**
  - Extend GMM to include predictors of class membership (measured at age 7/8)
  - Extend the GMM to include outcomes of class membership (measured at age 17)
  - Control for gender



# Method: the predictors and outcomes

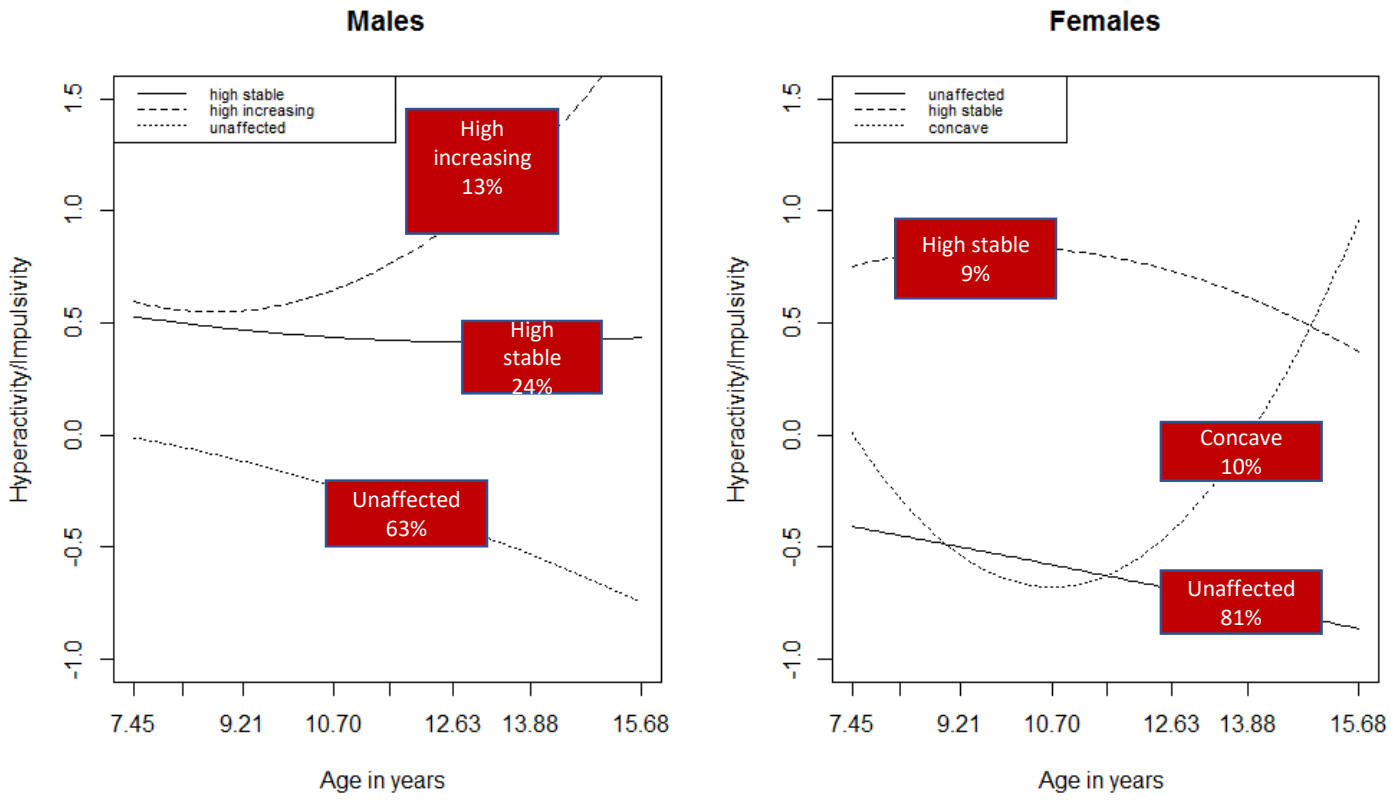
- **Predictors**
  - Known childhood ADHD correlates
    - Sensation-seeking (age 7)
    - Risk-taking (age 8)
    - Reactive Aggression (age7)
    - Anxiety (age 7)
- **Outcomes (age 17)**
  - Substance use
  - Delinquency
  - Aggression
  - Internalising problems
  - Violent ideations

# Results

- General pattern:
  - Late onset scored higher on ADHD risk factors and outcomes than unaffected
  - Late onset scored lower on ADHD risk factors and outcomes than early onset
- Interpretation:
  - Late onset trajectory seems to show expected hallmarks and sequalae of ADHD but may be considered a milder developmental subtype

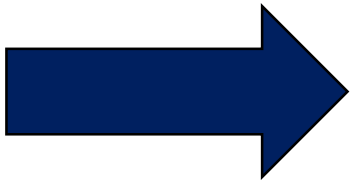
# And in follow-up work…

- Females more likely to show a later onset
- Late onset category shows a particular increase in symptoms around puberty onset→ *critical period for ADHD*



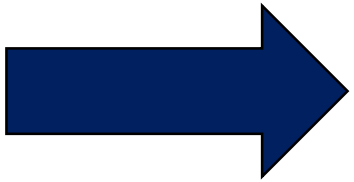
# Summary and clinical implications

- Around **5-8%** of individuals show later onsets of ADHD symptoms



- Scrap onset-before-12 criterion in diagnosis.
- **Why?** People with later onset who could benefit from intervention may be excluded, especially females

- Those with a later onset show overall less impaired profile

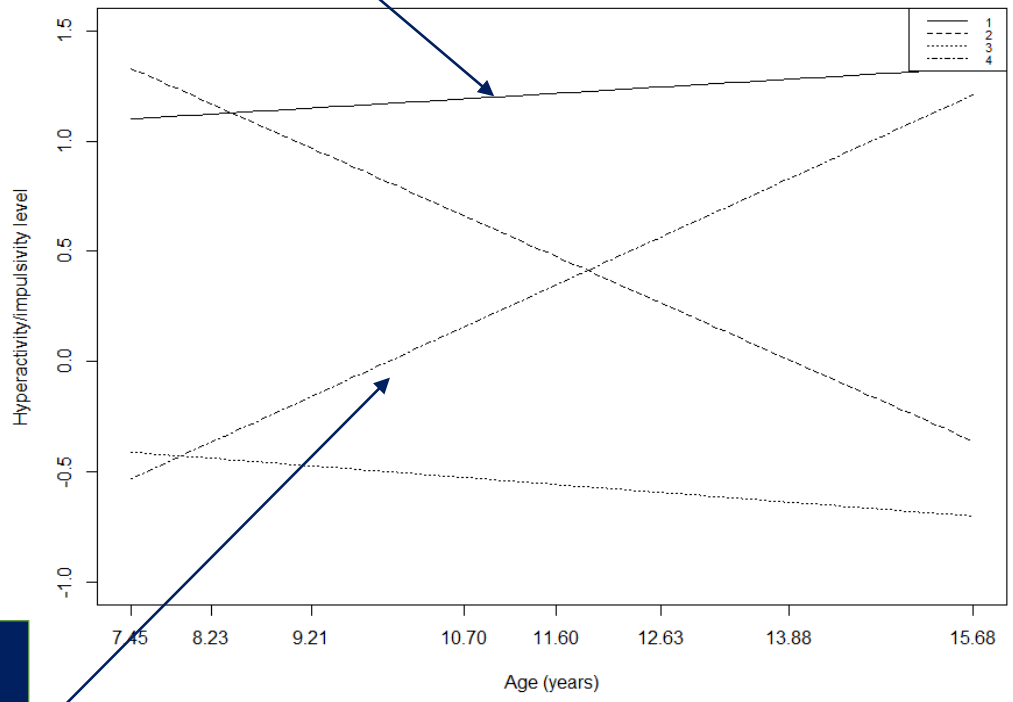


- Replace age-of-onset restriction with developmental subtypes
- **Why?** Developmental trajectories may be informative about risks of adverse outcomes and support needs

# Future directions in Z-proso

- 1. Follow-up at age 20:
  - Do we see more ‘late onsets’?
  - Do late versus early onset show different experience sampling profiles at age 20?
- 2. Do those in the late onset category show a more ‘enriched’ early environment that delays symptom manifestation relative to early onset?

High risk with challenging early environment (e.g. erratic parenting)?




High risk with early protective environment, compensatory high IQ etc.?

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# Thank You