Institute of Education

Developmental profiles of co-occurring internalizing and externalizing problems between ages 3 to 11 in a general UK population sample

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Research Gaps

- Increasing interest in typologies of symptom development
- Most previous research focused on either internalizing or externalizing problems
- Little attention to co-morbidity
- Little attention to developmental profiles in early childhood and associate risk factors
- Little attention to gender differences

Research Objectives

- This study examines the developmental profiles of co-occurring internalizing and externalizing symptoms between ages 3-5 years in a general population sample
- Assumption of similar antecedents and risk factors
  - Socio-demographic background
  - Family structure
  - Maternal characteristics
  - Parent-child interactions
  - Child characteristics

Definitions (Diagnostic and Statistical Manual of Mental Disorders – DSM)

- Internalizing problems
  - Tendency to experience distress inwardly
  - Comprise depression, anxiety, high levels of negative affect and distress
- Externalizing problems
  - Tendency to express distress outwardly
  - Comprises conduct problems, aggression, antisocial behaviour, hyperactivity, inattention, disinhibition and lack of behavioural control
- Assumption of a diagnostic threshold and independence of disorders
- Yet, frequent evidence of a 'mixed disorder' category (e.g. Rutter & Graham, 1966; Forbes et al., 2016; Krueger & Eaton, 2015)

Comorbidity

- Presence of at least two independent psychopathological syndromes
- Homotypic: disorders within one diagnostic grouping (i.e. conduct problems and hyperactivity or depression and anxiety
- Heterotypic: interlinkages between disorders from different diagnostic groupings (such as conduct problems and depression)

The IE model

- Rates of co-occurring internalizing and externalizing disorders are high (50% overlap) (Caspi et al., 2014; Kessler et al., 2005; Newman et al., 1998)
- Categorical diagnosis does not capture underlying dimensionality of mental disorders
- Important information is lost when using a present/absent dichotomy (Angold et al., 1999; Beauchaine & McNulty, 2013; Caron & Rutter, 1991; Willner et al., 2016))
- The IE model – a cross-cutting psychopathological construct that cuts across traditional diagnostic boundaries (Achenbach & Edelbrock, 1984; Eaton et al., 2015; Krueger, 1999)

Developmental patterns

- Factor structures of the IE model are largely invariant across development, although mean levels of IE may fluctuate throughout development (Hoertel et al., 2015; Mesman et al., 2001)
- Heterogeneity in developmental trajectories (Fanti & Henrich, 2010; Sterba et al., 2007):
  - Evidence of persisting, decreasing, increasing or low levels of IE problem trajectories

Possible Explanations

- Continuity models:
  - manifestation early in life and relative stability over time
- Accumulation of symptoms:
  - symptoms of one disorder increase the risk for the development of another
- Differentiation models:
  - initially undifferentiated symptoms differentiate into specific symptoms
- Maturation models:
  - most children will grow out of initial problem behaviours as they mature

Assumed vulnerability factors

- Shared risk factors:
  - diathesis-stress framework assumes that shared environmental stressors trigger pre-disposition towards IE
  - differentiation of level of severity in risk exposure
  - less understanding of whether risk factors are similar across the two domains
  - differentiation between distal and more proximal factors

Gender Differences

- Little understanding of gender differences in cross-domain symptom development
- Inconsistent evidence:
  - boys show more externalizing problems while girls have higher rates of internalizing problems (Costello et al., 2003; Muris et al., 2000)
  - no gender differences (Hay et al., 2000; Broidy et al, 2003)
  - similar development across early to middle childhood (Flouri et al., 2018; Gutman et al., 2018; Patalay et al, 2017), followed by marked gender differences during adolescence (Patalay & Fitzsimmons, 2018)

Objectives of Present Study

1. Describe developmental patterns of IE symptoms in general population sample – identify typology
2. Identify the role of psycho-social risk factors as predictors of developmental pathways
3. Examine gender differences in pathways and potential psychosocial risk factors

Assumptions - Typology

1. Large group with continuous low-symptom profile (normative group)
2. Comorbid developmental profile which shows high levels of severity and continuity over time (continuity model)
3. Pattern of initially high externalizing problems who develop co-occurring internalizing problems (cumulative model)
4. Initial co-occurring IE symptoms differentiate into specific symptoms (differentiation model)
5. Early high levels decrease (maturation model)
6. Emerging problems

Data: UK Millennium Cohort Study (MCS)

	2001/2 9 months	2003/4 3	2005/6 5	2008/9 7	2012/13 11
main respondent	mother	mother	mother	mother	mother
secondary respondent	father	father child older siblings	father child older siblings teachers	father child teachers	father child
survey instruments		assessments	assessments	assessments child self-completion	assessments child self-completion
linked data	birth records	medical records	education records medical records	education records medical records	education records medical records
response rate	**18,552**	**15,590**	**15,246**	**13,857**	**13,287**

Assessment: SDQ (maternal report) Wave 2-5 (age 3 to 11)

- Conduct problems (fights, is disobedient, temper tantrums, lies, steals)
- Hyperactivity/Inattention (restless, fidgety, easily distracted, thinks before acting)
- Emotional problems (often unhappy, worries, fears, headaches)
- Peer problems (solitary, no friends, is picked on/bullied, not liked by others)

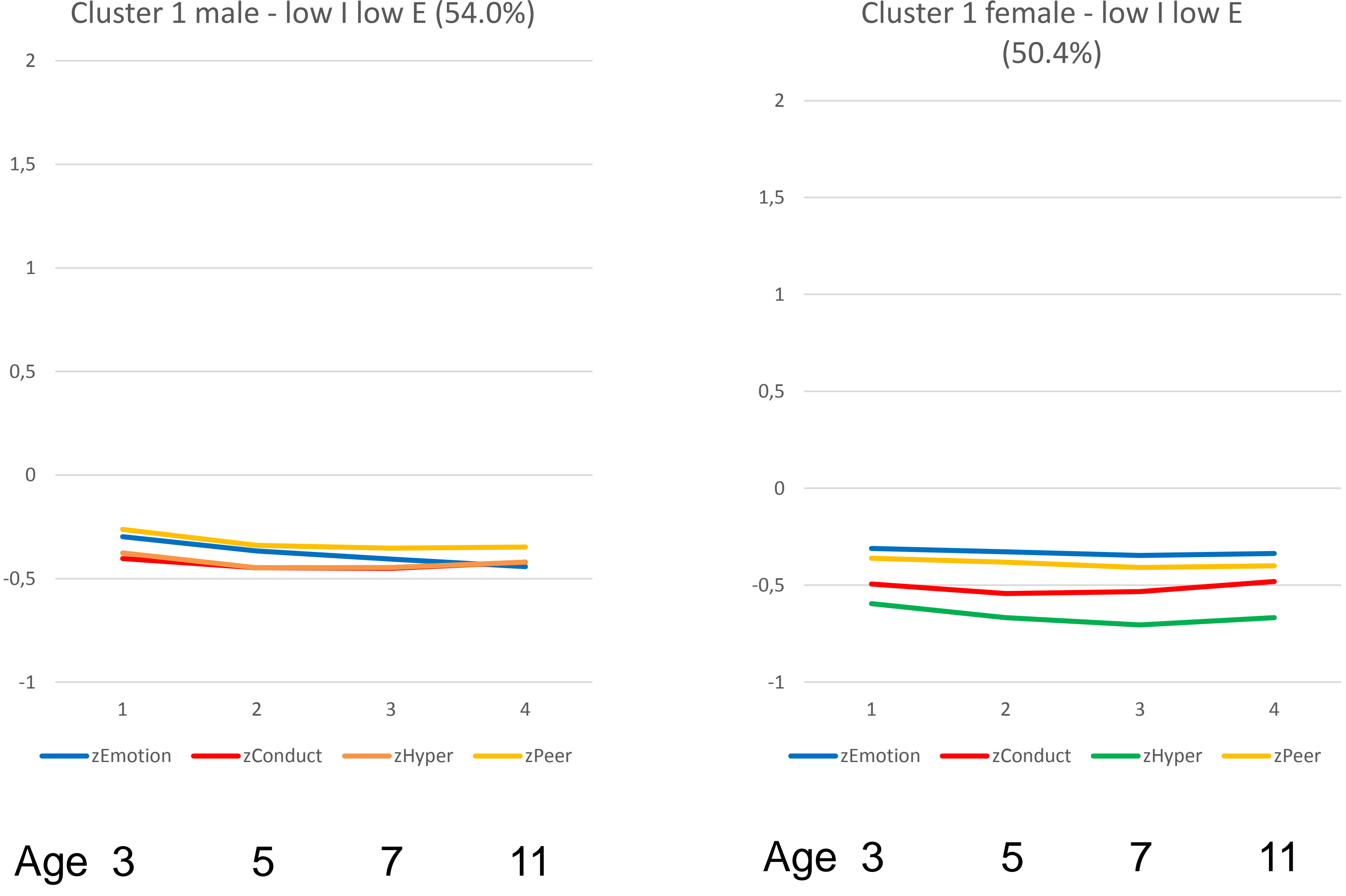
Early Risk Factors

- Socio-demographic factors
  - parental education, occupation, income, home ownership, crowding
- Family structure and environment
  - single parent, older siblings, quality of parent relationship (Grims)
- Maternal characteristics
  - teen mother, planned pregnancy, maternal depression
- Parenting
  - breast feeding, parent-child relationship (Pianta: warmth and conflict)
- Birth and infancy factors
  - child ethnicity, birth weight, developmental delay, early temperament (mood, adaptability, regularity), cognitive ability

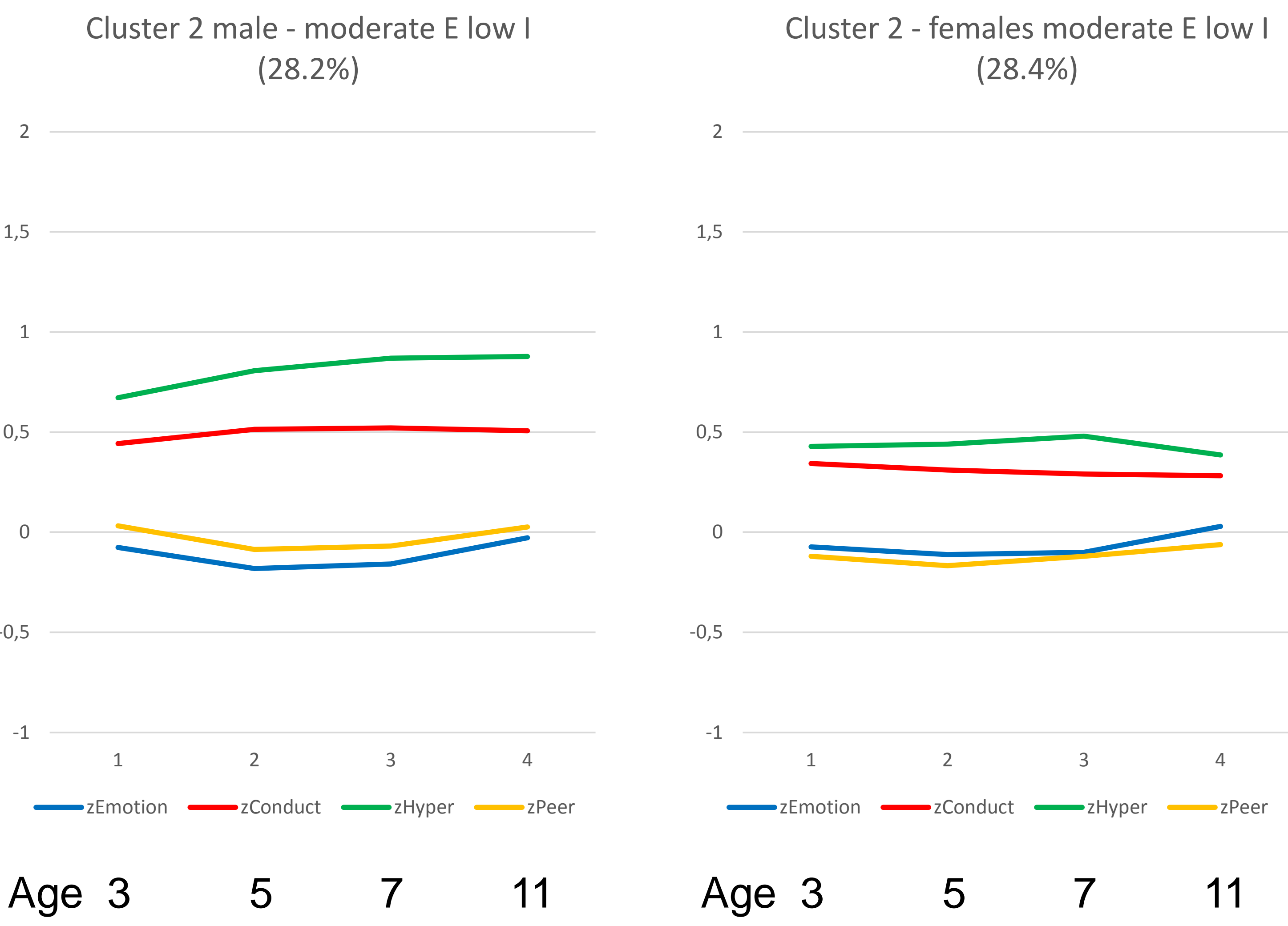
Methodology - Typology

- Latent profile transition analysis (LPTA)
- Person-centred approach
- Examines patterns in intra-individual change and development over time (Lubke & Muthen, 2005)
- Decomposes co-variances to highlight relationships among individuals
- Sorts individual into groups of individuals who are similar to each other and different from those in other groups

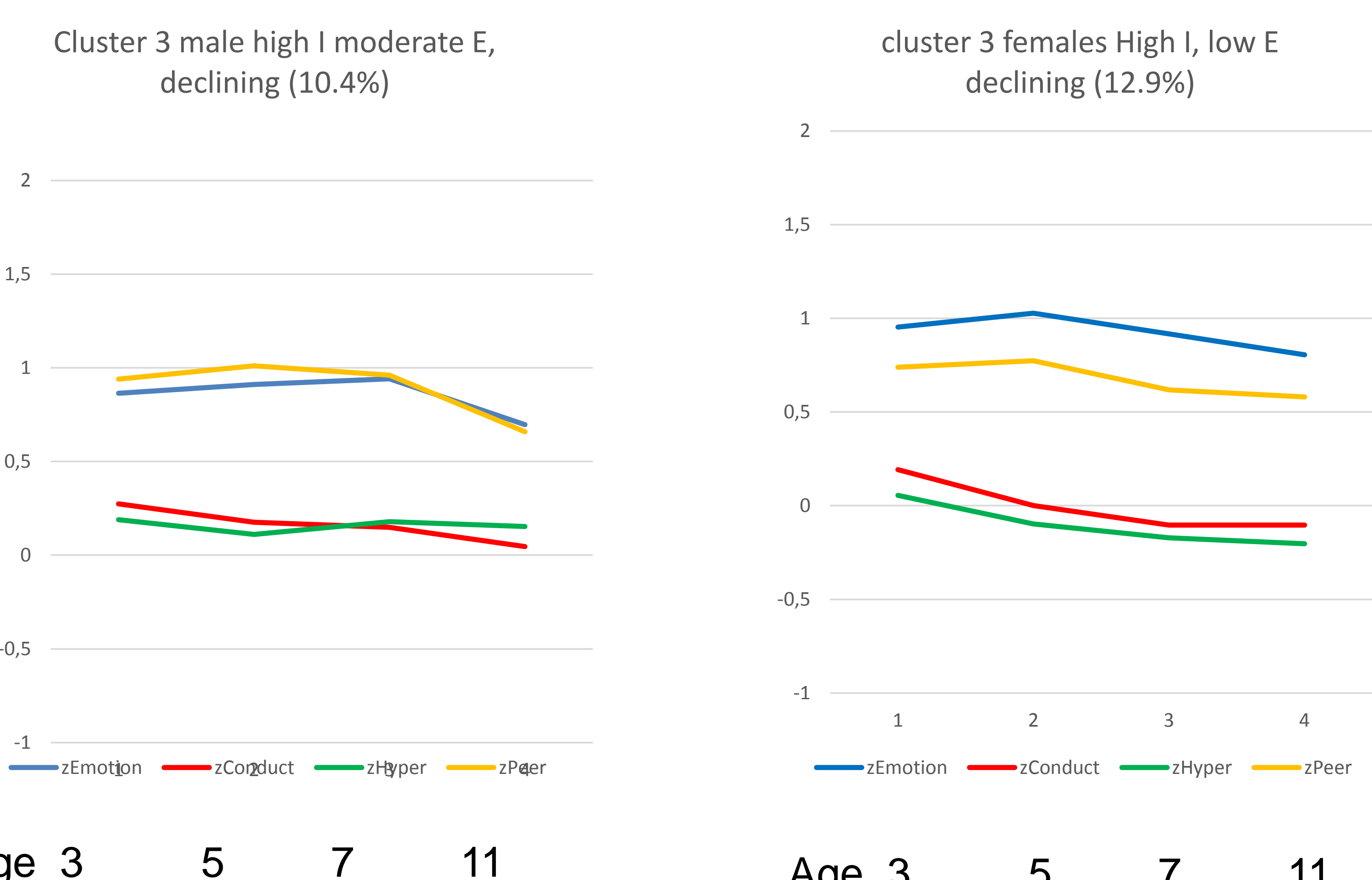
4 Cluster Solution
Low IE (Typical Development)



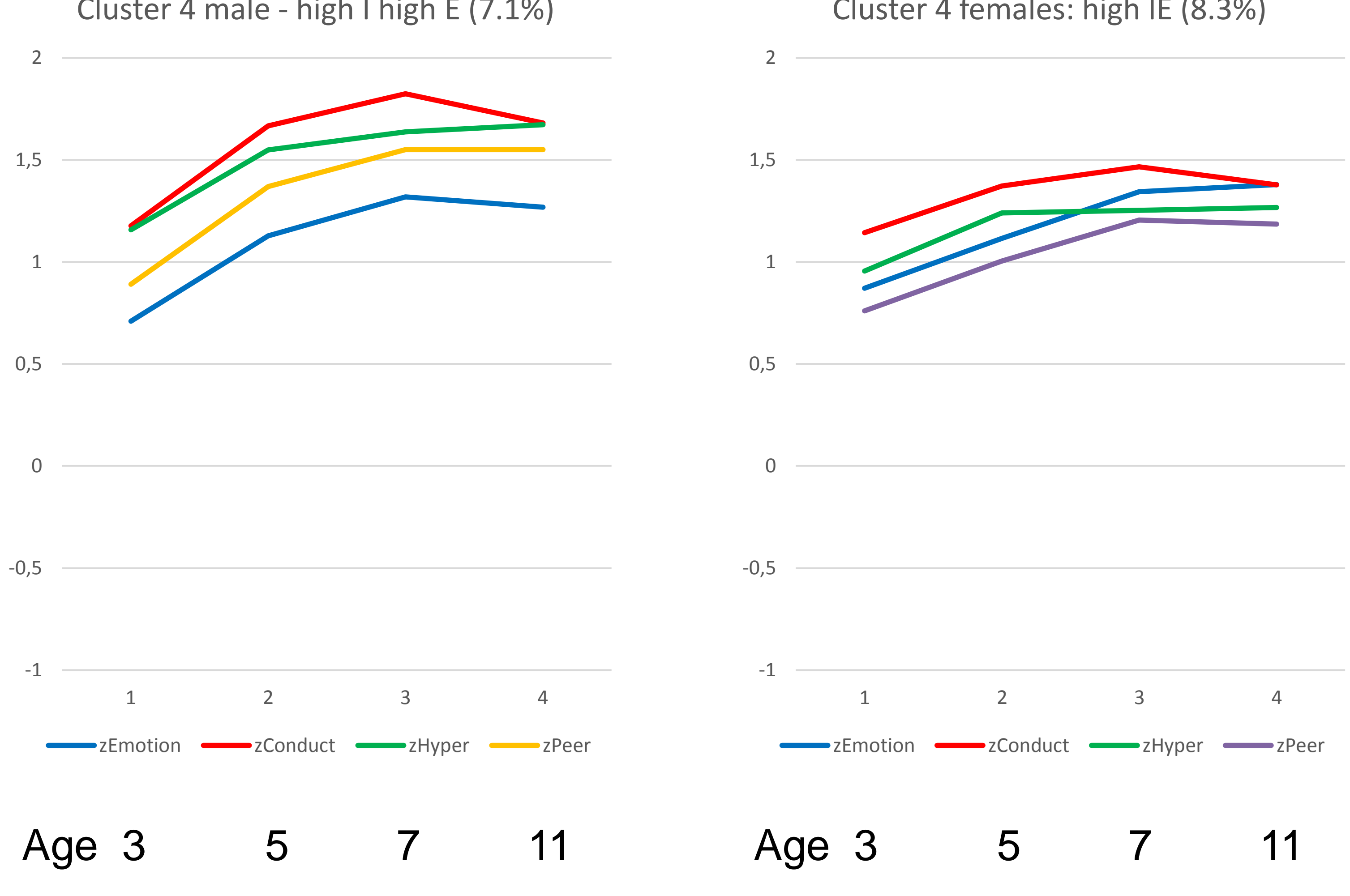
4 Cluster Solution
Moderate E Low I



4 Cluster Solution
High I (declining) moderate/low E



4 Cluster Solution
High IE (Troubled)



Predicting patterns (Ref: low symptoms) - 1

	Moderate E, Low I		High I, moderate E		High IE (troubled)	
	Male	Female	Male	Female	Male	Female
Socio-demographics						
Low parental education	.26#	.53*	.19	.29$	.55*	.56#
Unskilled occupation	.34#	.37*	.50*	.39#	.24$	.61*
Low Income	-.21	-.04	-.20	-.08	.46$	.45
No home ownership	.19	.52*	.04	.60*	.44#	.91*
Crowding	-.22$	-.21$	-.17	-.12	-.81*	-.56*
Family structure						
Single parent	.03	.03	.02	.03	-.03	-.04
Older siblings	-.18	-.19	-.47*	-.63*	-.80*	-.43#
Parental relationship	-.04*	-.03#	-.05*	-.01	-.09*	-.04#
Maternal Characteristics						
Teen mother	.22	-.59	-.36	-.60	-.04	-.09
Unplanned pregnancy	-.03	.08	-.09	.24$	-.10	.20
Maternal depression	.14*	.07$	.18*	.24*	.25*	.30*

Predicting patterns (Ref: low symptoms) - 2

	Moderate E, Low I		Moderate I, low E		High IE	
	Male	Female	Male	Female	Male	Female
Parenting						
Breast feeding	.23#	.10	.23#	.20	.20	.31#
Pianta: warmth	-.07#	-.15*	-.07#	-.13*	-.12*	-.21*
Pianta: conflict	.18*	.16*	.18*	.13*	.26*	.28*
Birth and Infancy Factors						
White	.47$	.46$	.38	.00	.21	.46
Birth weight	-.00	-.34*	-.18	-.12	-.10	-.38#
Developmental delay	.02	.03	.17*	.21*	.17#	.19#
Mood	.00	-.02	.01	-.06*	.01	-.02
Adaptability	.02	.02	-.08*	-.05*	.01	-.04
Regularity	-.04#	-.04#	-.05*	-.08*	-.06#	-.08#
Cognitive Ability	-.34*	-.39*	-.21*	-.35*	-.55*	-.62*

Note: * p <.000; # p <.05; $ p <.10

Summary - Typology

- Could identify 4 distinct developmental patterns for both males and females:
  - Large group with continuous low symptom profile (normative group)
  - Small group with continuous and increasing high IE symptoms (continuity model)
  - About a third show moderate externalizing problems which are increasing for males, possible spill-over effects (symptom accumulation)
  - About 1 in 10 shows initially high internalizing problems which decrease over time (maturation)
  - No evidence for differentiation models
  - ➢ Homotypic comorbidity more prevalent than heterotypic

Summary – Antecedents

- Parental socio-economic resources are significant risk factors (in particular parental education, occupational status, and home ownership), in particular regarding IE symptoms
- Other key risk factors are maternal depression and perceived conflict in parent-child relationship
- Potential beneficial effects of having a older siblings, warm parent-child relationship, regularity and cognitive ability
- Differential effects regarding homotypic comorbidity: females potentially more affected by socio-economic risks than males; adaptation predicts internalizing symptoms
- Developmental delay significant risk factor for moderate I and high IE trajectory
- Girls less likely in high IE than boys, but gender does not predict higher levels of internalizing symptoms

Conclusion

- Person-centered approaches useful to identify meaningful patterns in developmental trajectories
- General risk factors include socio-economic background, maternal depression, parent-child conflict, regularity
- Other risk factors were specific to certain groups, suggesting that symptoms are sensitive to specific constellations of risk (in particular adaptability)
- Generally: proximal factors show independent effect to distal background factors

Thank you

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