





Gillberg Neuropsychiatry Centre
Sahlgrenska Academy



UNIVERSITY OF GOTHENBURG

Autism: prevalensförändringar, diagnosglidning och samexisterande tillstånd

Sebastian Lundström



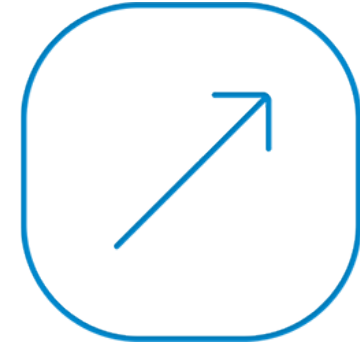
Background



- 20 fold increase (1966-2011)

Lotter 1966; Fombonne 2009; Gillberg 1993; Baird 2006; Brugha 2011; King & Bearman 2011

Background



- 20 fold increase (1966-2011)
- Recent studies report even higher estimates
 - South Korea 2.6%
 - United States 2.0%
 - Stockholm 3.1%

Tabell 1. Andel (%) samt absoluta och unga i Stockholms län år 2016 nostiserats med autismspektrumtil respektive ADHD någon gång mella

	AST	
	Antal fall (N)	Andel %
Pojkar 0-12 år	3 960	2,1
Flickor 0-12 år	1 164	0,6
Totalt 0-12 år	5 124	1,4
Pojkar 13-17 år	2 541	4,1
Flickor 13-17 år	1 265	2,2
Totalt 13-17 år	3 806	3,1
Män 18-24 år	2 596	2,8
Kvinnor 18-24	1 739	1,9
Totalt 18-24	4 335	2,4

Kim et al 2011; Blumberg et al 2013; Magnusson 2014; Kosidou 2017.



Background

Explanation 1: Environmental & Biological

- **Premature births**
- **Environmental toxins**
- **Valproate use during pregnancy**
- **Vitamin D deficiency**
- **Increasing paternal/maternal age**
- **IVF**
- **Genetics**

*Kočovská 2012, D'Onofrio 2013, Christensen 2013, McCanlies 2012;
Volk 2013; Jung, Lin & Hwang 2013; Deth 2008; Reichenberg 2006;
Lundström 2010; Sandin 2012 & 2013*



Gillberg Neuropsychiatry Centre
Sahlgrenska Academy



UNIVERSITY OF GOTHENBURG

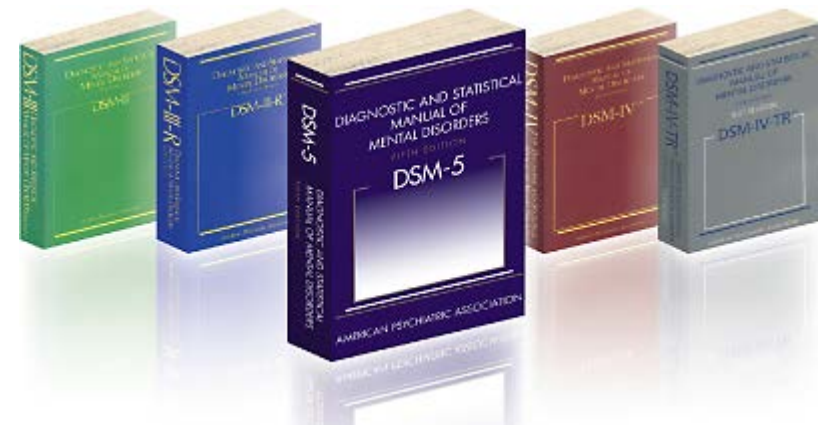
Background

Explanation 1: Environmental

Explanation 2: It is not real

Background

- Broadening of the diagnostic criteria



Wing & Potter 2002; Wasana et al 2007; Hansen et al 2014.



Background

- Broadening of the diagnostic criteria
- Increasing awareness → diagnostic substitution



. *Coo 2008; King 2009; Shattuck 2006; Bishop 2008*



Background

- Broadening of the diagnostic criteria
- Increasing awareness → diagnostic substitution
- **Referral patterns and availability of services**

Shattuck 2009; Blenner et al 2014; Lavelle et al 2014



Background

- Broadening of the diagnostic criteria
- Increasing awareness → diagnostic substitution
- Referral patterns and availability of services
- **Eligibility for support**

Fernell et al 2013; Taylor et al 2016



Child and Adolescent Twin Study in Sweden (CATSS)

Data from > 35 000 twins

70-80% answering frequency

Autism-Tics, ADHD and other Comorbidities inventory
(A-TAC)



www.AUSTRALIANACADEMICPRESS.com.au

ARTICLE AVAILABLE ONLINE
Twin Research and Human Genetics
Volume 14 ■ Number 6 ■ pp. 495–508

The Child and Adolescent Twin Study in Sweden (CATSS)

Henrik Anckarsäter,^{1,2} Sebastian Lundström,^{*2,3} Linnea Kollberg,⁴ Nora Kerekes,^{1,3} Camilla Palm,⁴ Eva Carlström,⁴ Niklas Långström,^{3,4} Patrik K. E. Magnusson,⁴ Linda Halldner,^{4,5} Sven Bölte,^{5,6} Christopher Gillberg,^{7,8} Clara Gumpert,⁹ Maria Råstam,^{7,10} and Paul Lichtenstein⁴

¹ Institute of Neuroscience and Physiology, Forensic Psychiatry, University of Gothenburg, Sweden

² Department of Clinical Sciences, Forensic Psychiatry, Lund University, Sweden

³ Swedish Prison and Probation Service, R&D Unit, Norrköping, Sweden

⁴ Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden

⁵ Karolinska Institutet Center of Neurodevelopmental Disorders (KIND), Stockholm, Sweden

⁶ Department of Women's and Children's Health, Karolinska Institutet, Stockholm, Sweden

⁷ Institute of Neuroscience and Physiology, Gillberg Neuropsychiatry Centre, University of Gothenburg, Sweden

⁸ Department of Child and Adolescent Psychiatry, University of Glasgow, United Kingdom

⁹ Section of Forensic Psychiatry, Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden

¹⁰ Department of Clinical Sciences, Child and Adolescent Psychiatry, Lund University, Sweden

Autism-Tics, AD/HD and other Comorbidities inventory (A-TAC)

- Parental telephone interview



I. Socialt samspel	För alla frågor gäller om problemet/egenheten varit framträdande någon gång under livet jämfört med jämnåriga.	Ja	Ja, i viss mån	Nej
40	Har han/hon svårt att uttrycka sig med ansiktsuttryck, gester, tonfall eller kroppshållning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41	Har han/hon påtagliga svårigheter med kamratkontakter?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42	Är han/hon ointresserad av att dela glädje, intressen och aktiviteter med andra?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43	Kan han/hon bara vara med andra på sina egna villkor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44	Har han/hon svårt att uppföra sig på det sätt som kamraterna förväntar sig?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45	Är han/hon lättpåverkad av andra?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



www.gnc.gu.se



- **Well Validated**

- **Sensitivity:**

- The tests ability to identify **positive** results

- **Specificity:**

- The tests ability to identify **negative** results

	Sensitivity	Specificity
ASD Low (4.5)	0.96	0.88
ASD High (8.5)	0.71	0.95



The Autism - Tics, AD/HD and other Comorbidities inventory (A-TAC): further validation of a telephone interview for epidemiological research

Tomas Larson^{1*}, Henrik Anckarsäter^{1,2}, Carina Gillberg³, Ola Ståhlberg², Eva Carlström³, Björn Kadesjö², Maria Råstam¹, Paul Lichtenstein¹, Christopher Gillberg¹

BRITISH JOURNAL OF PSYCHIATRY (2005), 187, 242-247

Psychiatric telephone interview with parents for screening of childhood autism – tics, attention-deficit hyperactivity disorder and other comorbidities (A-TAC)

Preliminary reliability and validity

SARA LINA HANSSON, ANNIKA SVANSTRÖM RÖJVALL, MARIA RASTAM, CARINA GILLBERG, CHRISTOPHER GILLBERG and HENRIK ANCKARSÄTER

Predictive properties of the A-TAC inventory when screening for childhood-onset neurodevelopmental problems in a population-based sample

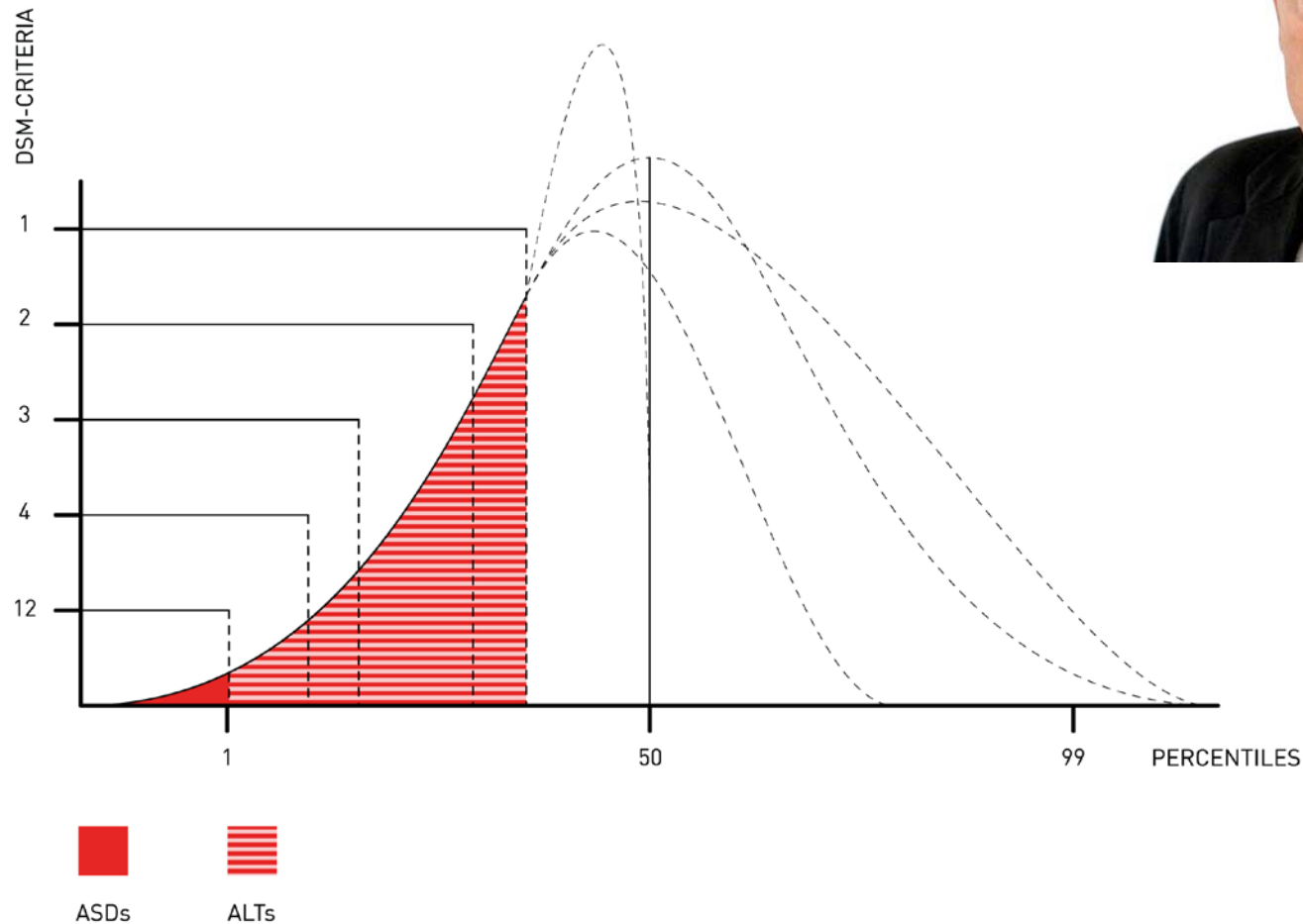
Tomas Larson^{1*}, Sebastian Lundström^{2,3,4}, Thomas Nilsson², Eva Norén Selinus², Maria Råstam¹, Paul Lichtenstein¹, Clara Hellner Gumpert², Henrik Anckarsäter^{1,2} and Nora Kerekes^{1,2}



Autism-Tics, AD/HD and other Comorbidities inventory (A-TAC)

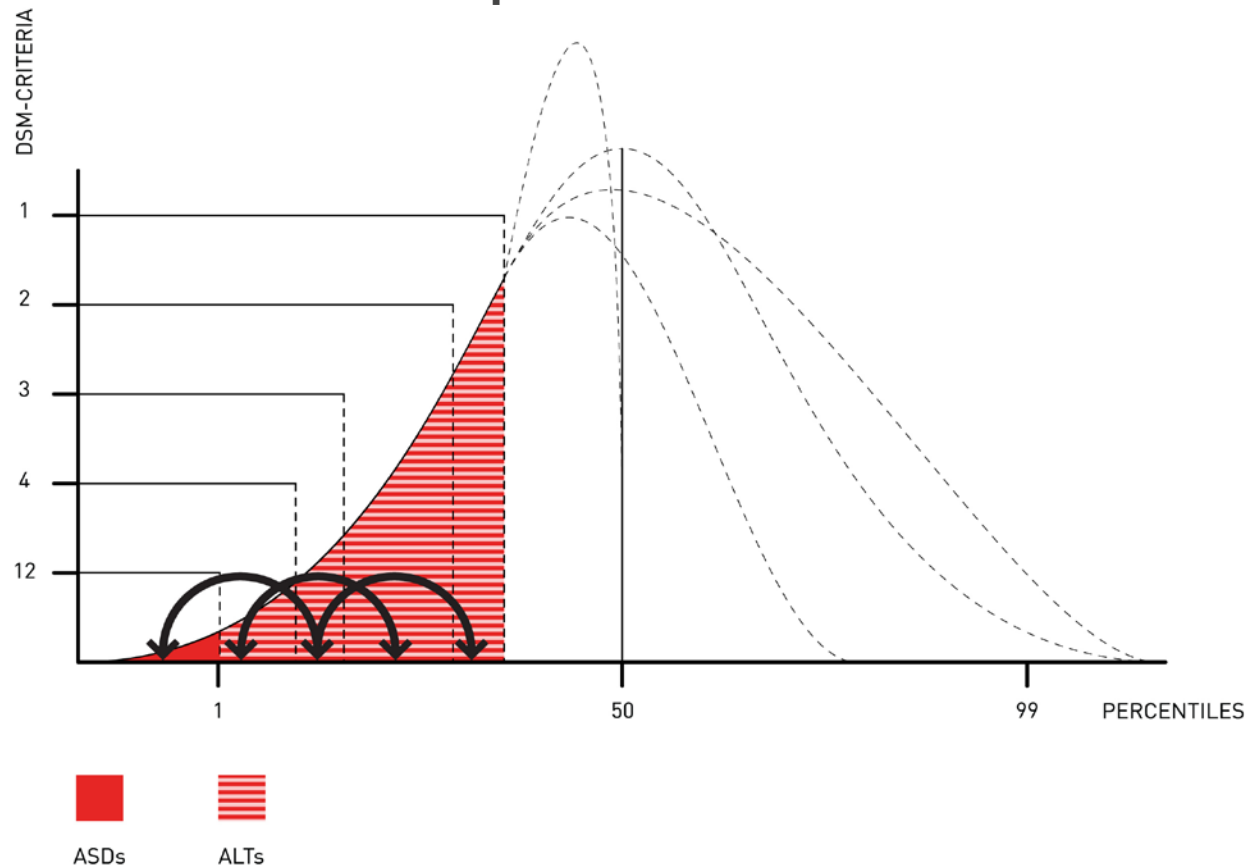
- **Construction of A-TAC remove biases**
 - Does not disclose which questions pertain to which disorder
 - Administered by laymen over the phone
 - Avoid adherence to mutually exclusive DSM criteria
 - Evaluate life-time presence of symptoms and behaviors
 - Same questions for 15 years
- **Suitable for identification of real changes**

Results



Gillberg 1991; Constantino & Todd 2001 Anckarsäter et al 2011; Posserud et al 2009

Comparabile etiology across the distribution = *quantitative* not a qualitative difference



Lundström et al 2009;2010;2011; Robinson et al 2011; Taylor et al 2019



[ladda fler kommentarer](#) (5 svar)



[\[-\] theunderhillaccount](#) 14 poäng 4 månader sen



This has been known--and there have been peer-reviewed publications addressing this issue--for years.

[permalänk](#)

[ladda fler kommentarer](#) (1 svar)



[\[-\] StarkRG](#) 8 poäng 4 månader sen



I'm assuming this new study was published in the Journal of Obvious Conclusions published by Noshit Sherlock.

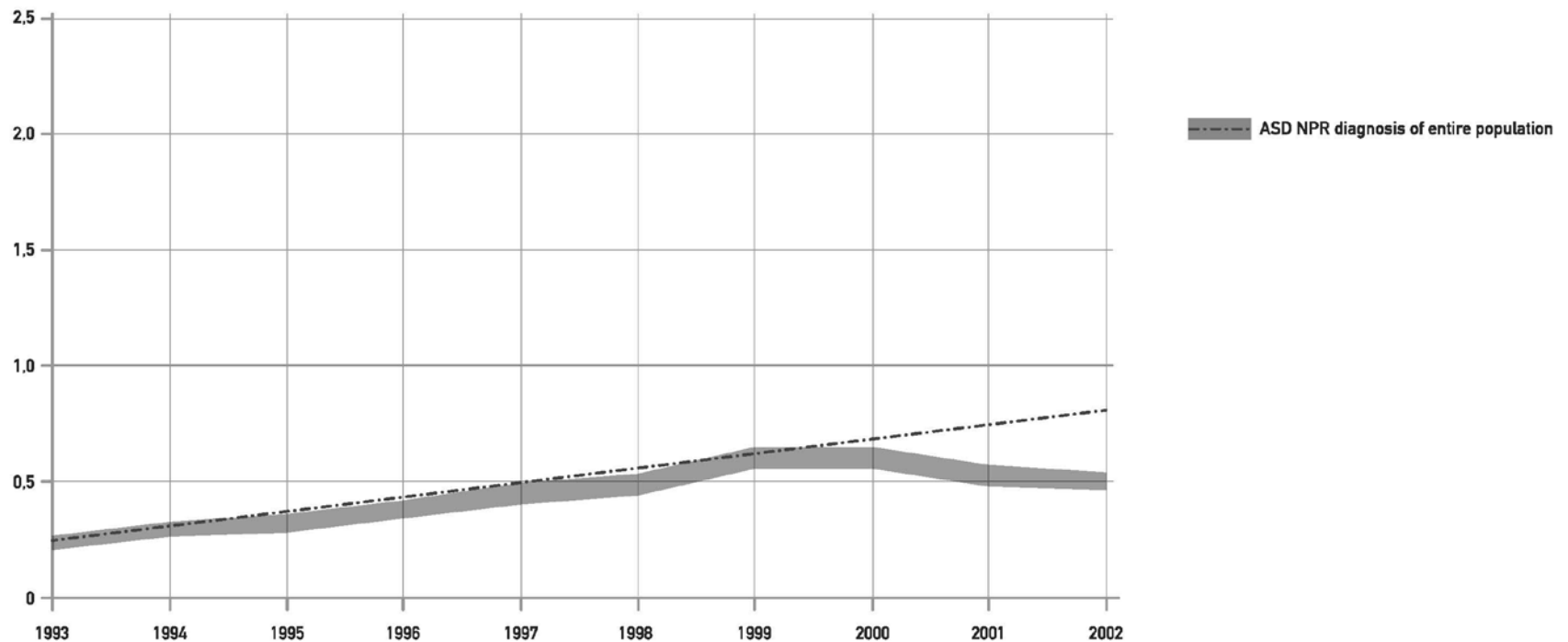
[permalänk](#)



Results

Prevalence per year of birth

(95% confidence intervals, regression lines depicted within confidence intervals)

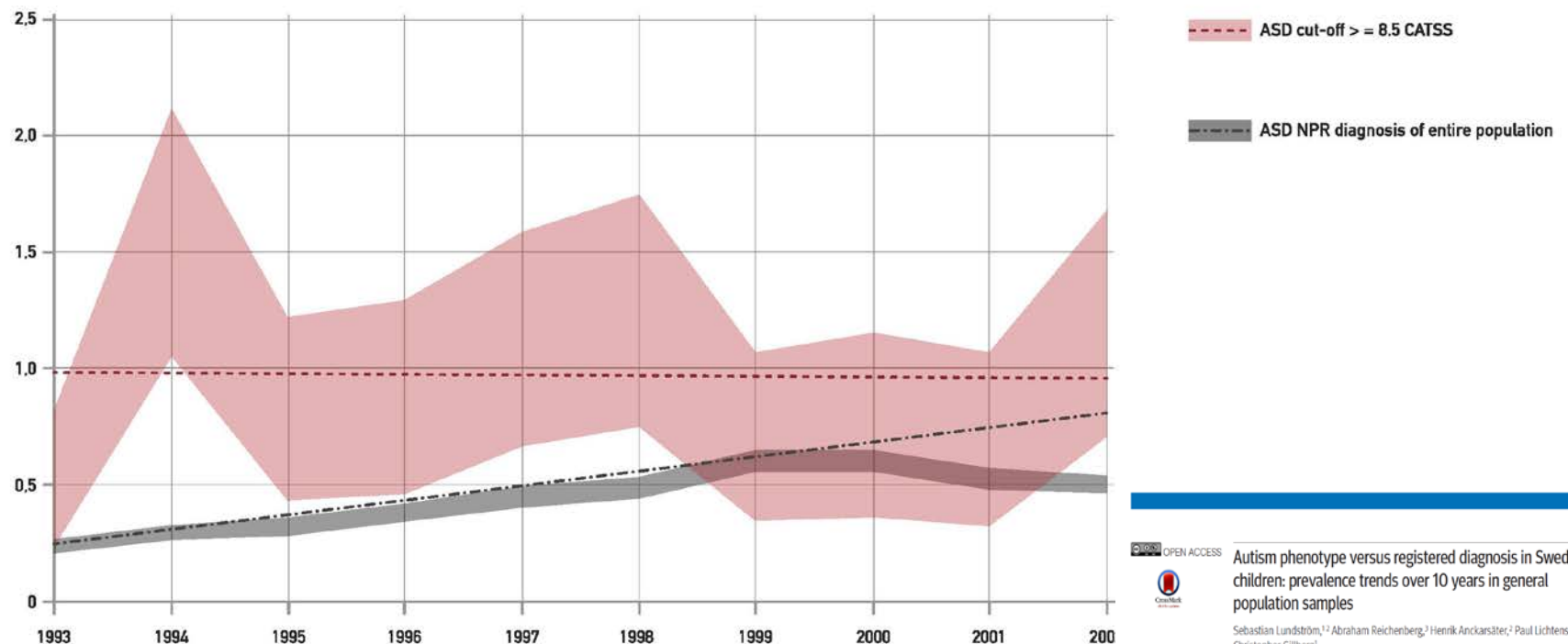


Lundström et al., BMJ 2015

Results

Prevalence per year of birth

(95% confidence intervals, regression lines depicted within confidence intervals)



RESEARCH

OPEN ACCESS



Autism phenotype versus registered diagnosis in Swedish children: prevalence trends over 10 years in general population samples

Sebastian Lundström,^{1,2} Abraham Reichenberg,³ Henrik Anckarsäter,² Paul Lichtenstein,⁴ Christopher Gillberg¹

Lundström et al., BMJ 2015



Another approach

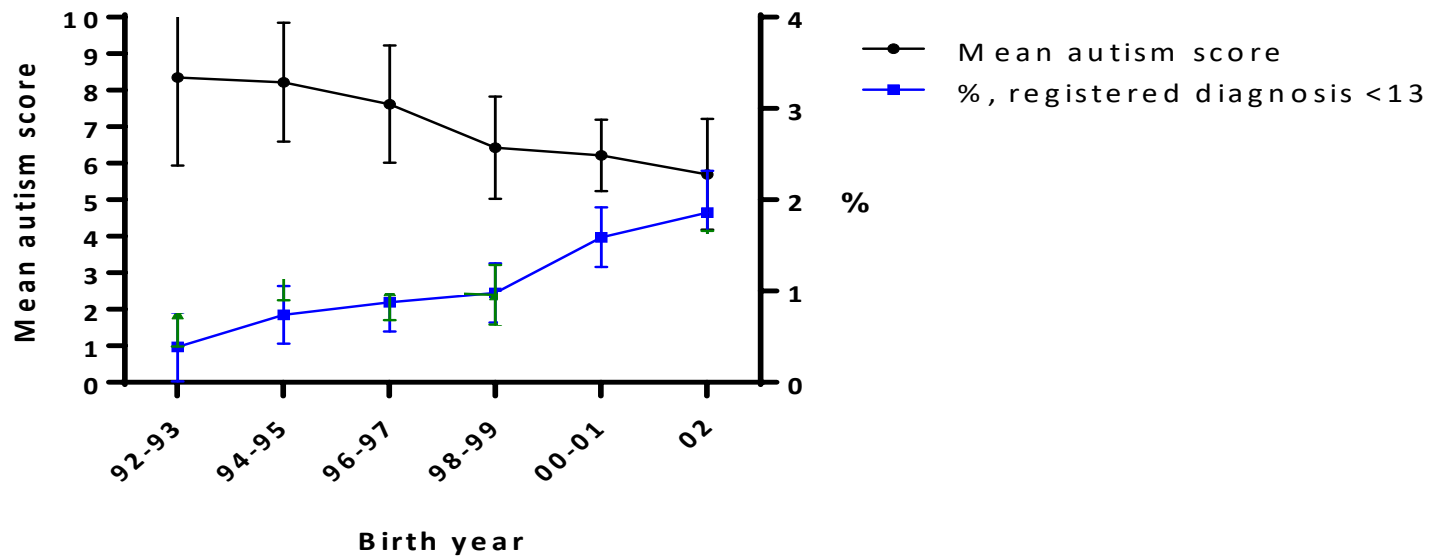
- 271 individuals with an autism diagnosis registered in the National patient register
- Annual mean A-TAC score



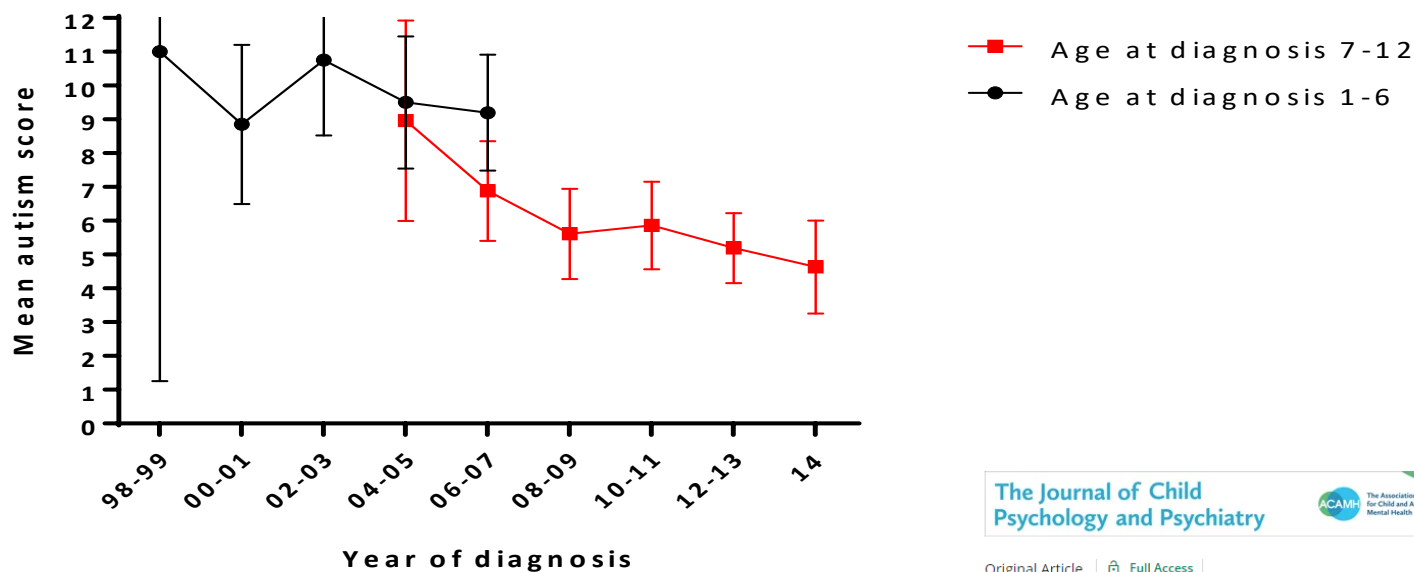
Secular changes in the symptom level of clinically diagnosed autism

Olof Arvidsson,¹ Christopher Gillberg,¹ Paul Lichtenstein,² and Sebastian Lundström^{1,3}

¹Gillberg Neuropsychiatry Centre, University of Gothenburg, Gothenburg; ²Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm; ³Centre for Ethics, Law and Mental Health, University of Gothenburg, Gothenburg, Sweden



Arvidsson et al., JCPP 2018



The Journal of Child
Psychology and Psychiatry

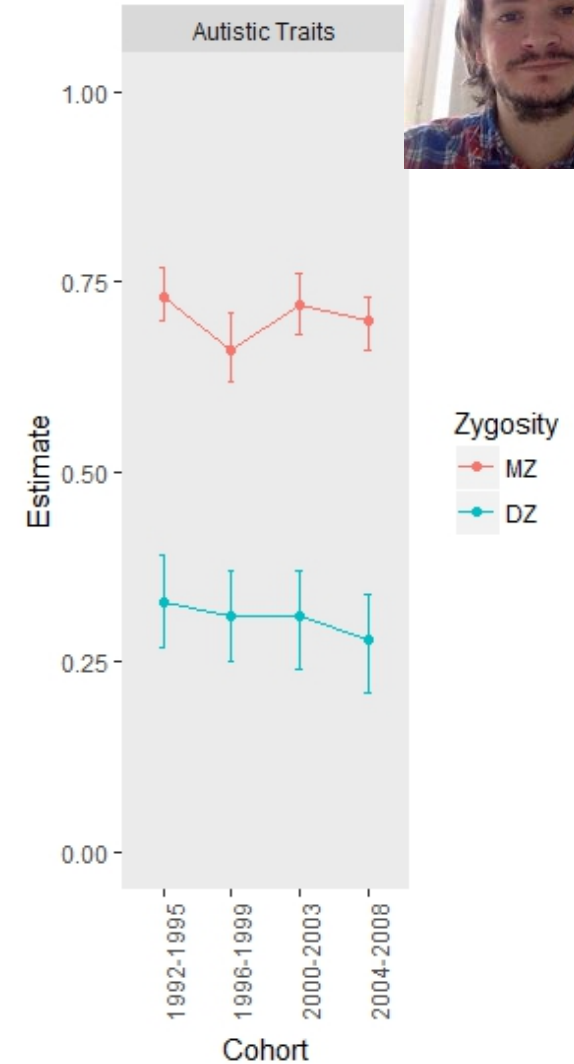
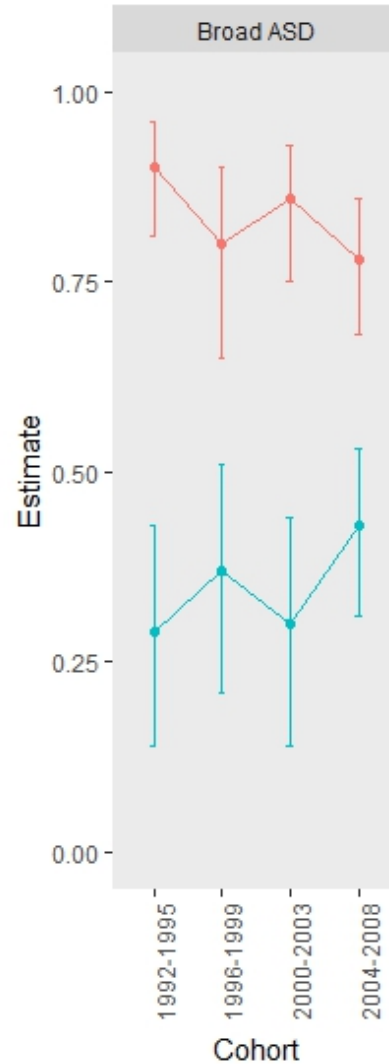
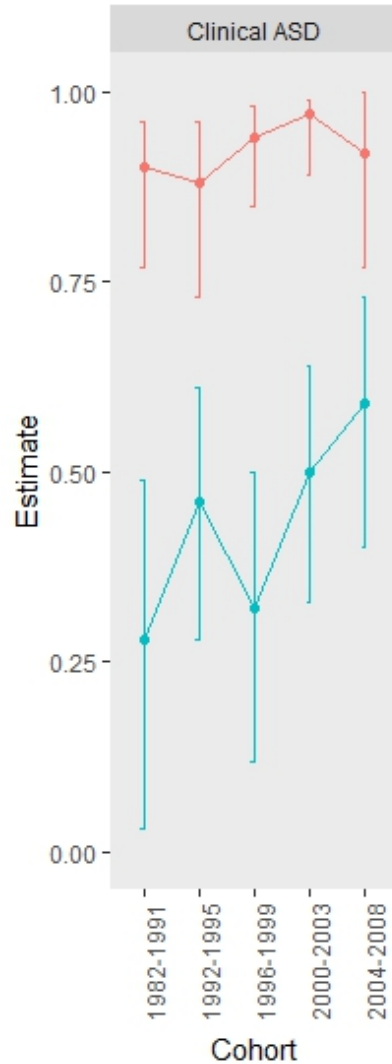


Original Article | [Full Access](#)

Secular changes in the symptom level of clinically diagnosed autism

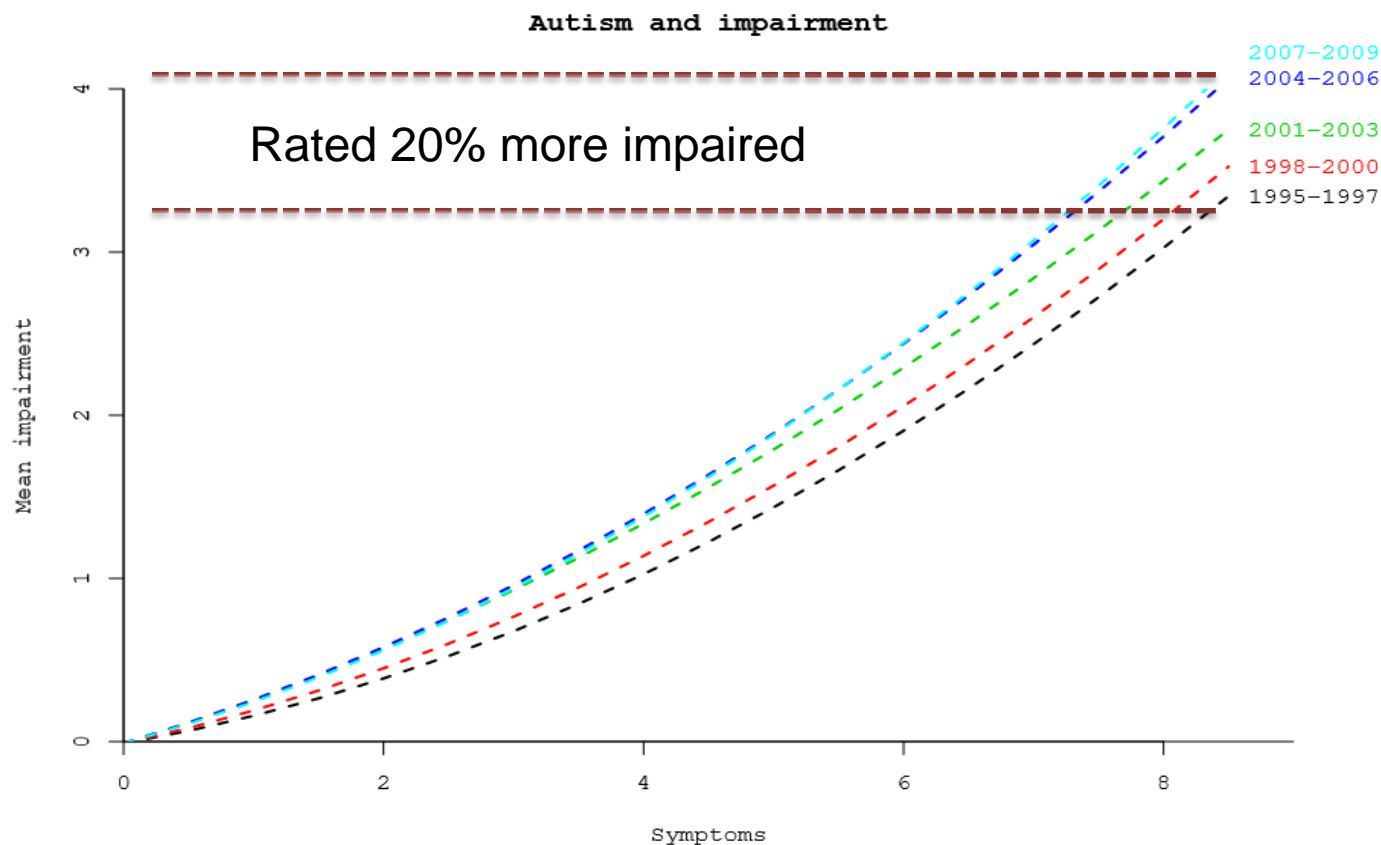
Olof Arvidsson, Christopher Gillberg, Paul Lichtenstein, Sebastian Lundström

Arvidsson et al., JCPP 2018



Taylor et al, JAMA Psychiatry, accepted

Results



Lundström et al, in preparation



Autism spectrum disorders

- Substantial 'co-morbidity'



Contents lists available at [ScienceDirect](#)

Research in Developmental Disabilities



The ESSENCE in child psychiatry: Early Symptomatic Syndromes
Eliciting Neurodevelopmental Clinical Examinations[☆]

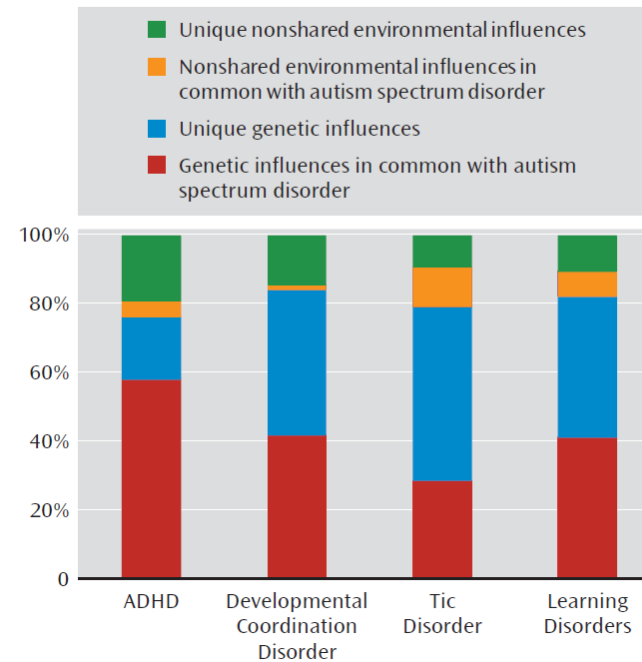
Christopher Gillberg

Institute of Neuroscience and Physiology, Child and Adolescent Psychiatry, University of Göteborg, Sweden

Autism spectrum disorders

- **Substantial 'co-morbidity'**
- **Shared etiology**

FIGURE 1. Amount of Variance in Liability to Autism Spectrum Disorder in Common With Other Neuropsychiatric Disorders





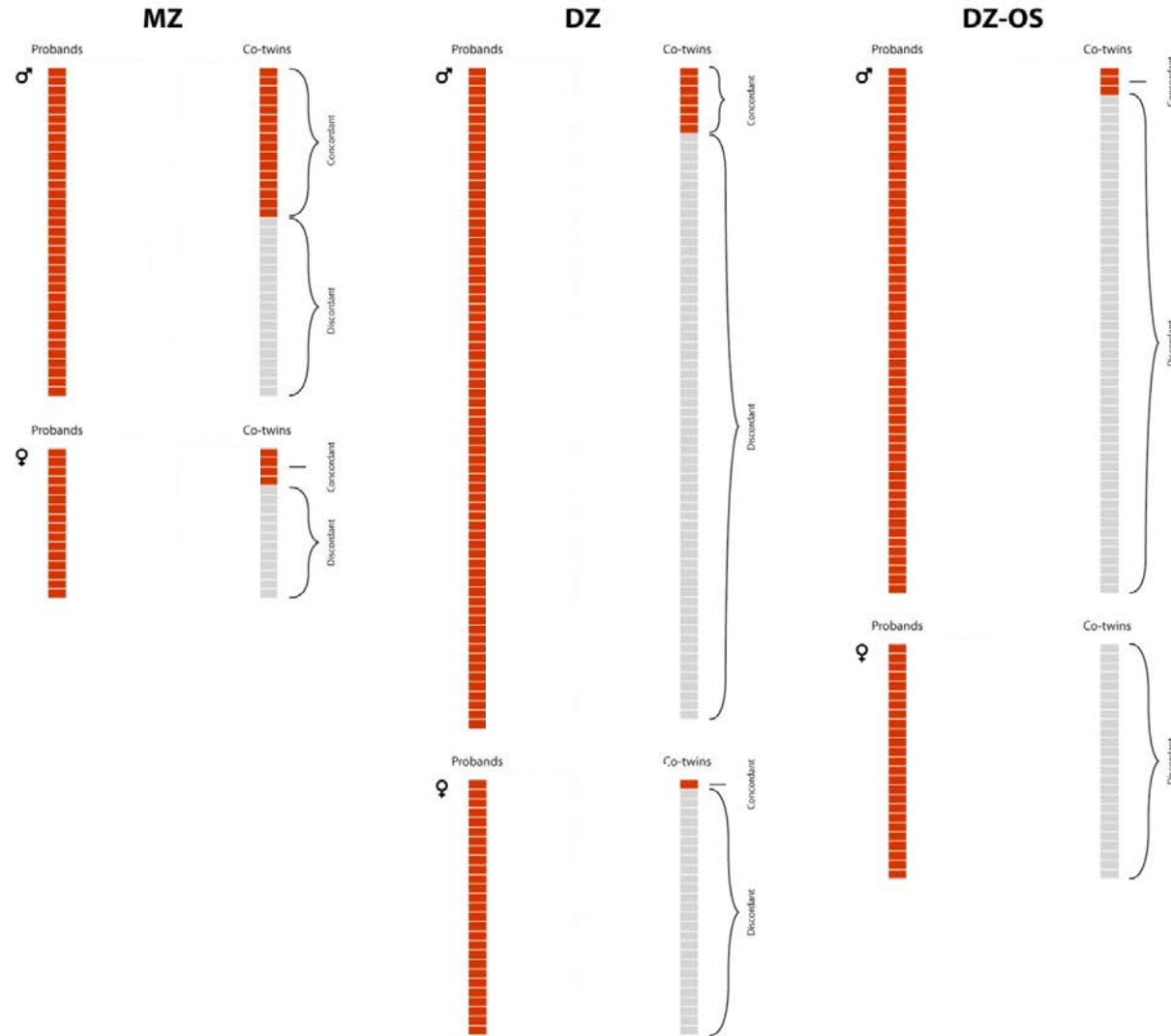
Autism spectrum disorders

- **Substantial 'co-morbidity'**
- **Shared etiology**
- **Pencil and paper approach**

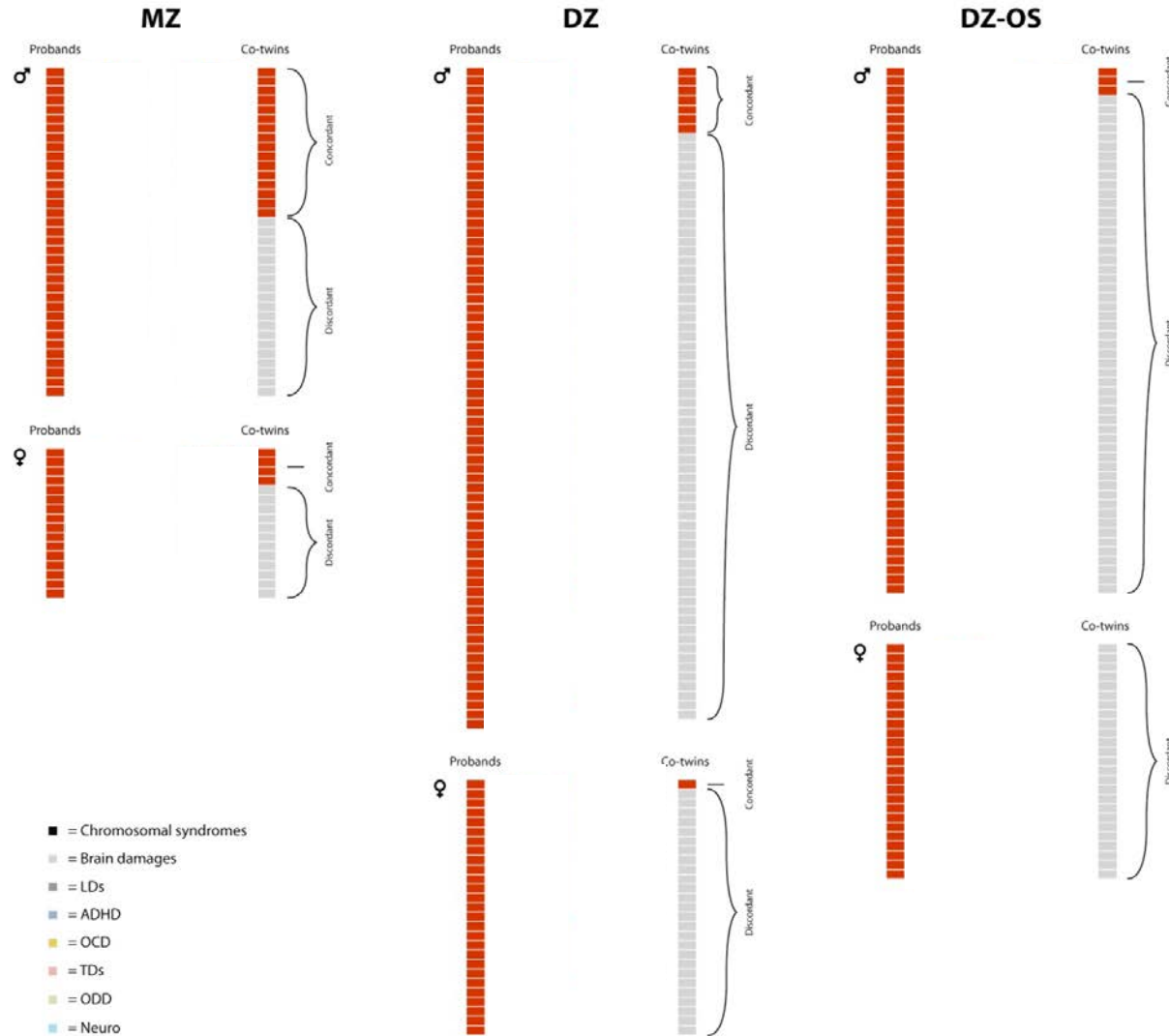


Autism spectrum disorders

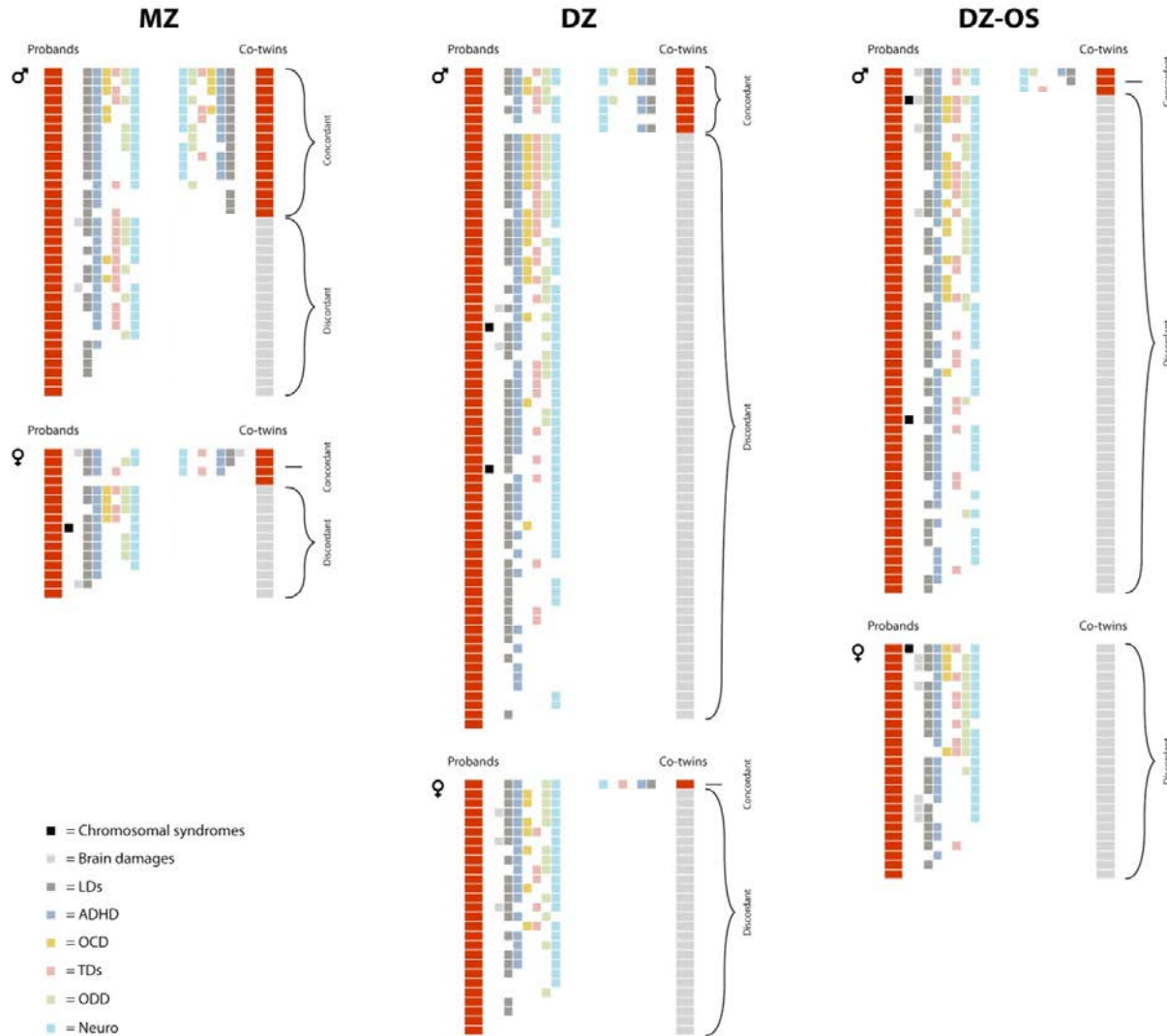
- **Substantial 'co-morbidity'**
- **Shared etiology**
- **Pencil and paper approach**
- **Characterize the autism phenotype and eight co-existing disorders in MZ and DZ-twins**



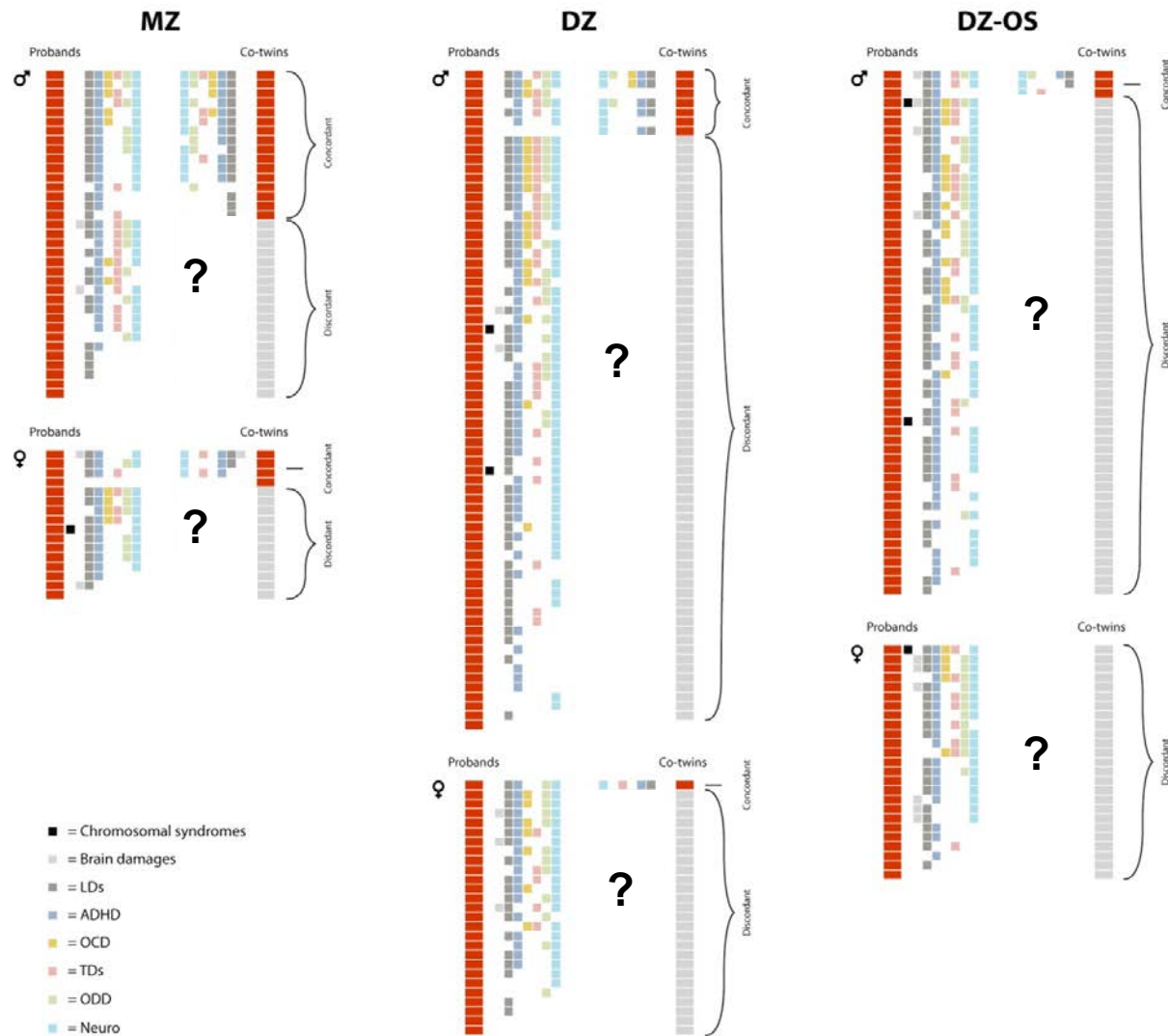
Lundström et al., JCPP 2015



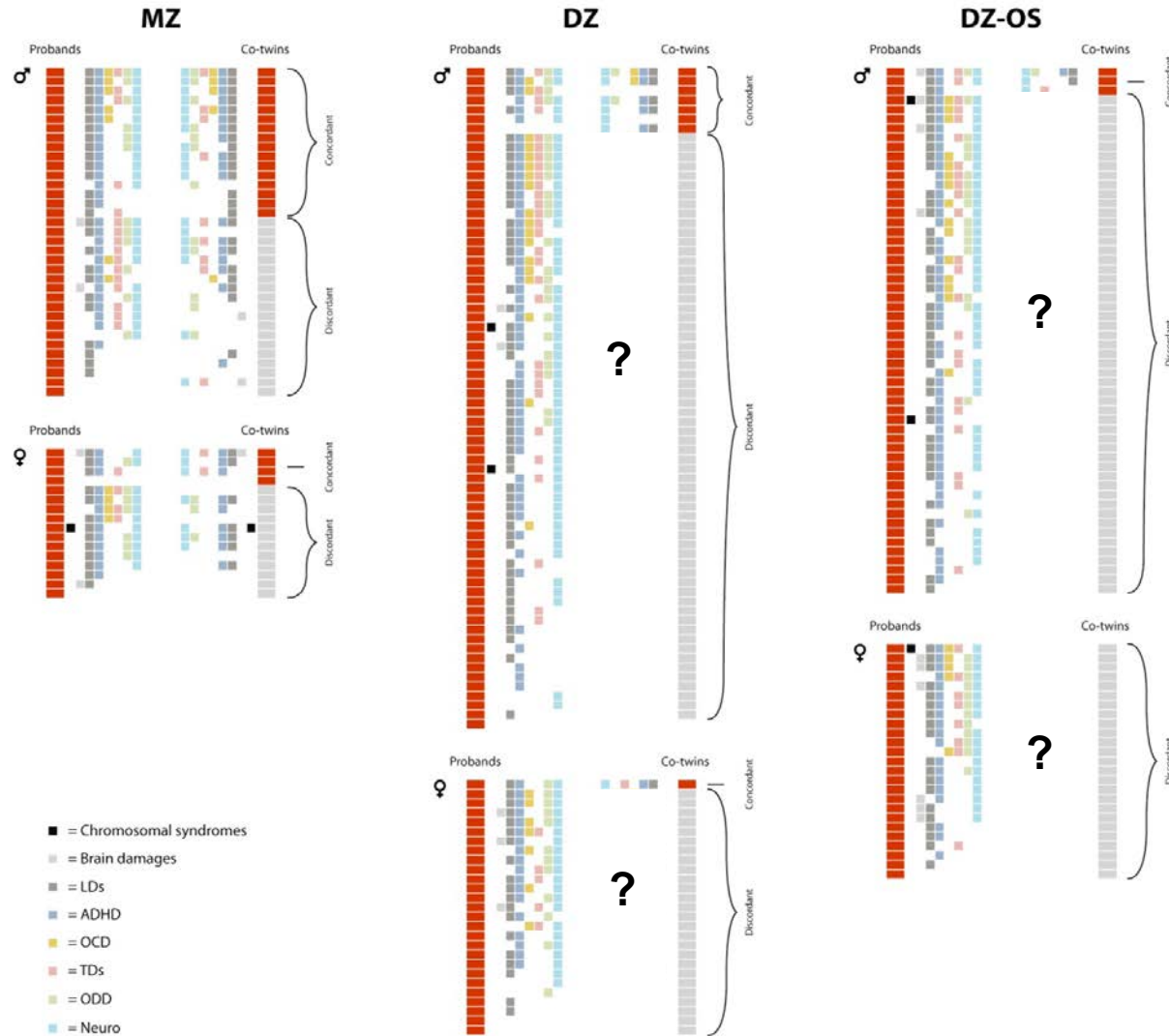
Lundström et al., JCPP 2015



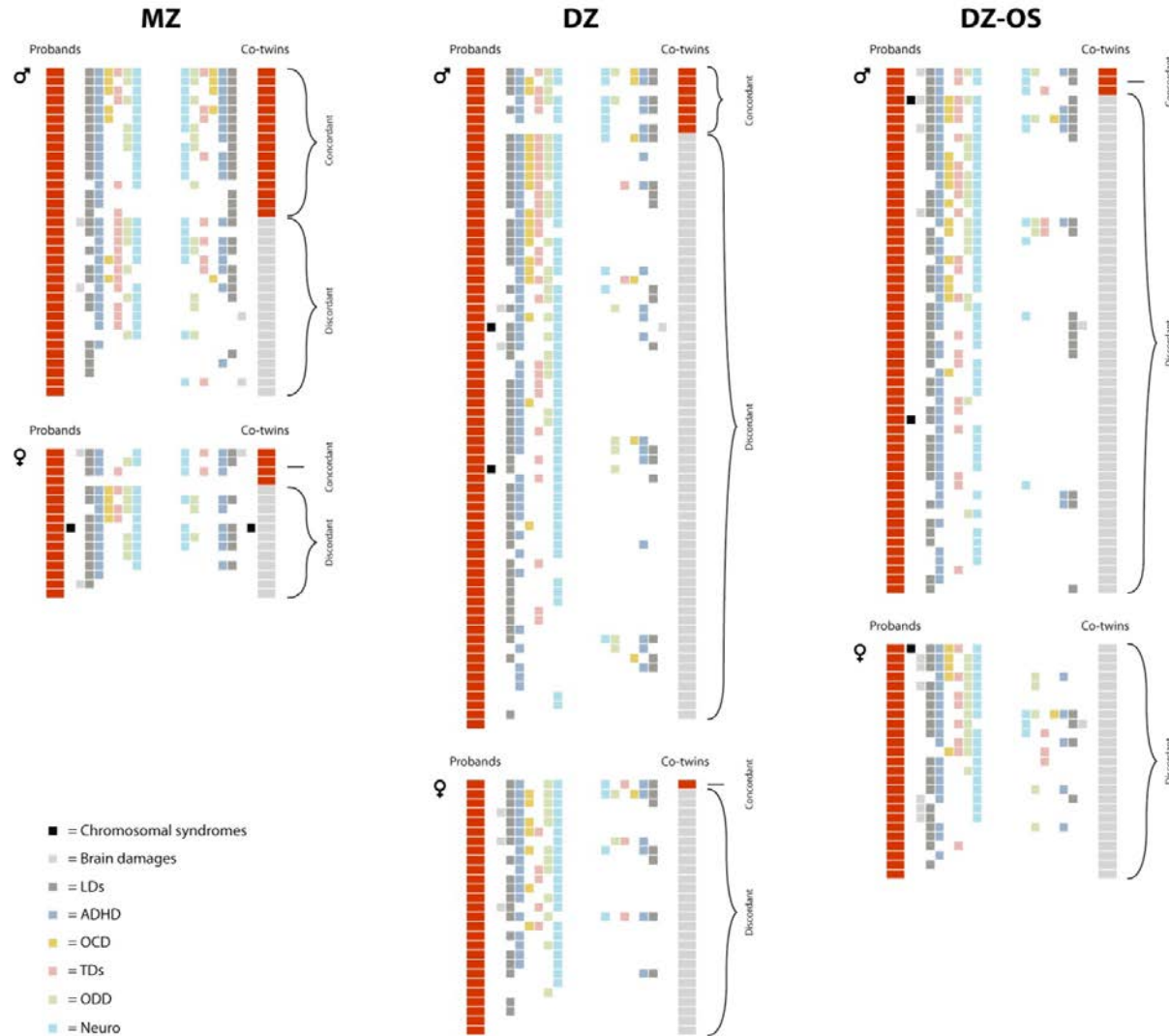
Lundström et al., JCPP 2015



Lundström et al., JCPP 2015



Lundström et al., JCPP 2015



Lundström et al., JCPP 2015



Conclusion

- No increase in symptoms over time
- Diagnoses assigned on less symptoms
- No change in underlying etiology
- Same level of symptoms rated as more impairing
- Autism almost never comes 'alone'



Gillberg Neuropsychiatry Centre
Sahlgrenska Academy



UNIVERSITY OF GOTHENBURG

Thank you for listening!

sebastian.lundstrom@gnc.gu.se