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ADHD HOS FØRSKOLEBARN

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OUTLINE

- ADHD in preschool: why is it important?
  - Assessment
    - Symptoms of ADHD vs normal diversity in preschool age?
  - Prevalence i preschool
    - Continuity – discontinuity of symptoms
    - Co-existing problems & disorders
  - Treatment
- The Norwegian Longitudinal ADHD Cohort Study

WHY EARLY ASSESSMENT?

- ADHD – a neurodevelopmental disorder
  - Can be identified early in development?
- Prevention of co-existing or secondary problems?
- Non-pharmacological treatment alternatives may be more effective during preschool age than later

OUTCOME & PREVENTION

OUTCOME OF ADHD

Although many children fare well with their ADHD, having untreated ADHD represents:

- Significantly increased risk for learning disorders and for psychiatric disorders, incl drug abuse
- Significantly increased risk for interrupted education, unemployment, and for crime
- Patients with ADHD (children and adults) score low on ”Quality of Life” (QoL) screening

LONG TERM PROGNOSIS

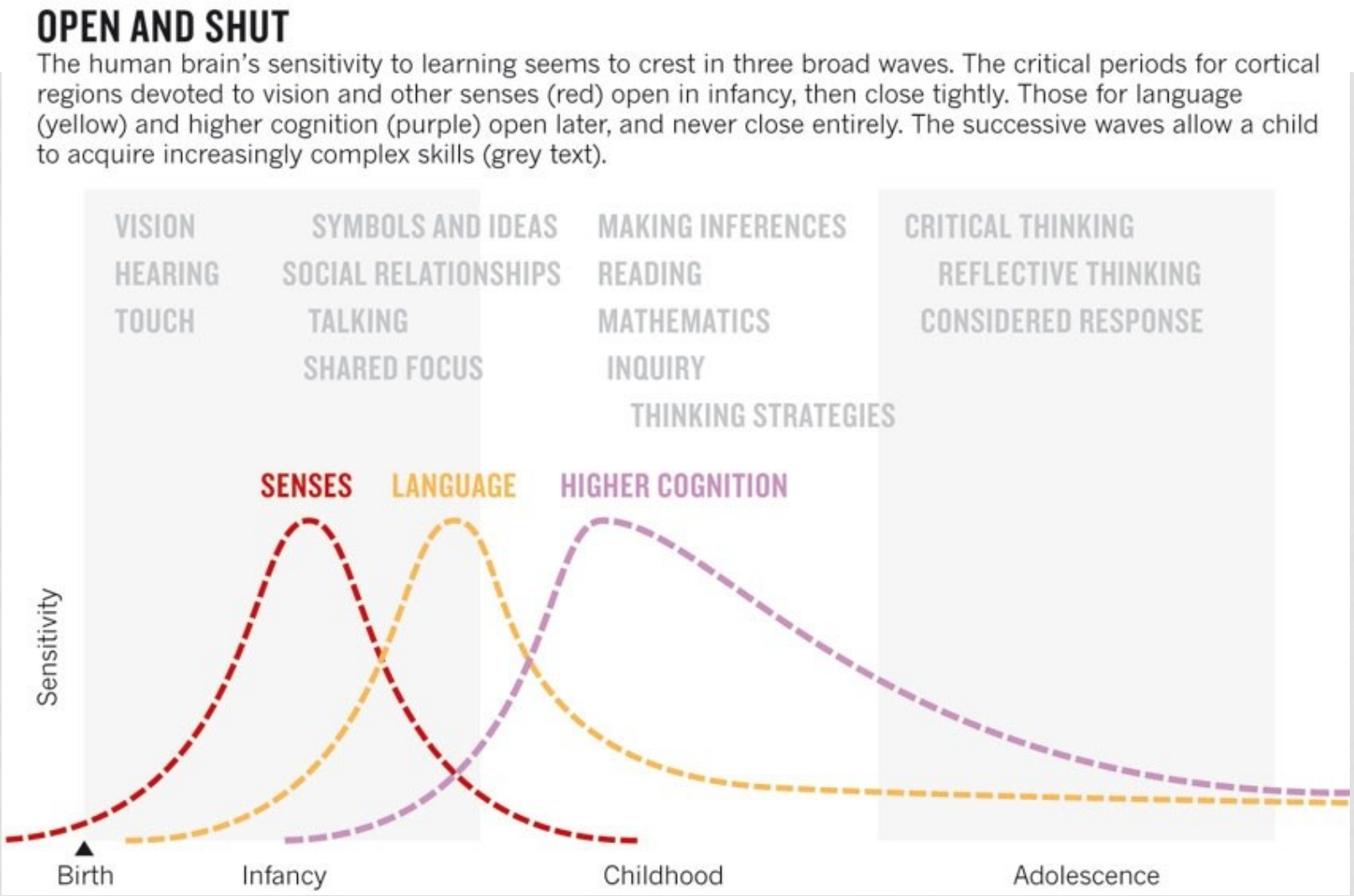
- From Norway:
  - Ca 30% of prison inmates have /have had ADHD
  - Less than 25% of patients with ADHD have their income from ordinary work, compared to 78% in the population
  - Early pharmacological treatment – the best predictor for work participation
  - Most common co-existing disorders:
    - Depression: 38%
    - Drug abuse: 28%
    - Alcohol abuse: 23%

EARLY INTERVENTION

Prevent secondary disorders / problems

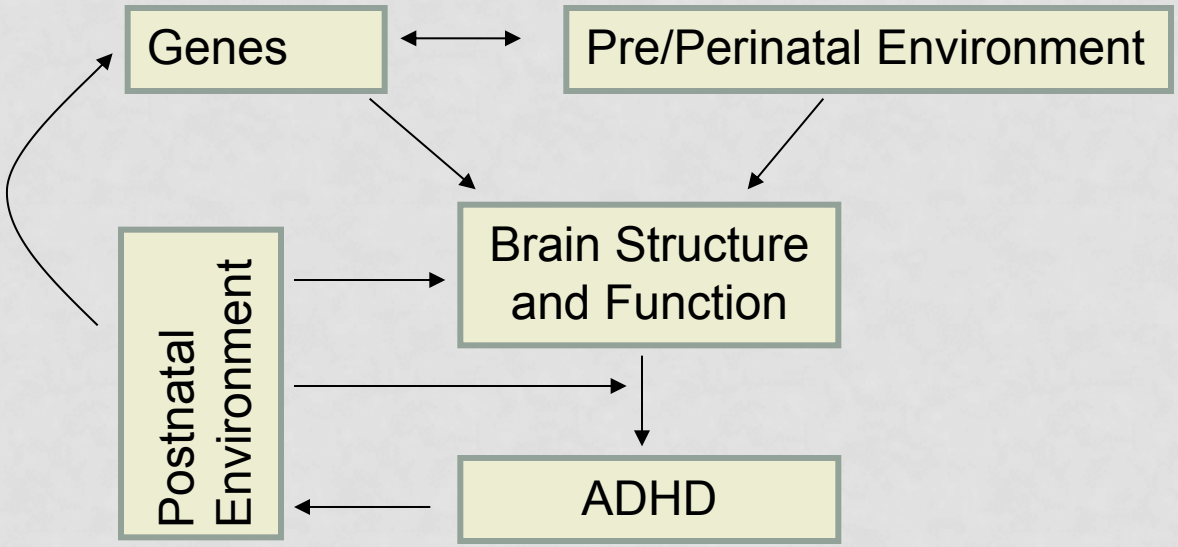
- Behaviour problems
- Learning difficulties
- Social exclusion
- Emotional problems

Brain plasticity during early development



Nature.com: Nature, vol. 487, pp. 24–26 (05 July 2012)

EARLY CHILDHOOD: WINDOW OF OPPORTUNITY



A dynamic/interactive model of the emergence and presistence of attention-deficit/hyperactive disorder (ADHD)

Halperin et al, 2012

CHALLENGES TO EARLY ASSESSMENT

ADHD / HYPERKINETIC DISORDER

Characterized by symptoms of

- Hyperactivity
- Impulsivity
- Attention problems

Symptoms must be of a magnitude that is ***exceeding what is considered typical for age***, and cause ***functional impairment***

SYMPTOMS OF HYPERACTIVITY MORE COMMON IN PRESCHOOL THAN SYMPTOMS OF INATTENTION

- Occurring in more than 40% of children 3-6 years (Smidts & Oosterlaan, 2007):
  - *Has difficulty playing quietly (H/I)*
  - *Talks excessively (H/I)*
  - *Has difficulty engaging in tasks that require sustained mental effort (I)*
  - *Is "on the go" or acts as if "driven by a motor"¨(H/I)*
  - *Responds to every extraneous stimulus (I)*
  - *Has difficulty awaiting turn (H/I)*
  - *Interrupts other people (H/I)*

OUR FOCUS IS ON CHILDREN THAT ARE STRUGGLING WITH

- activity levels that affect everyday functioning
- so impulsive behaviour that it affects everyday functioning, or
- so big difficulties keeping consentrated that it affects everyday functioning
- other problems often appearing in addition

- It takes a long time from parents report worry for their child's problems to assessment and diagnostics are being started
- Implies that very many that are diagnosed with ADHD during late childhood / early adolescence have had problems since preschool age

NORWAY: REFERRAL AND DIAGNOSIS

Region	Gjennomsnittsalder (SD)			
	Når meldt til PPT		Når diagnosen ble satt	
Øst	7,3 (3,1)	n=466	9,7 (2,4)	n=458
Sør	6,8 (2,9)	n=343	9,7 (3,0)	n=358
Vest	6,6 (2,6)	n=134	9,0 (2,6)	m=142
Midt-Norge	7,0 (2,8)	n=210	9,4 (2,8)	n=201
Nord	6,8 (2,9)	n=245	9,3 (2,8)	n=241
Ikke angitt	6,3 (3,0)	n=18	9,4 (2,0)	n=18
Hele landet	7,0 (2,9)	n=1416	9,5 (2,8)	n=1418

SINTEF, 2004

Brukerundersøkelse (N=1206): Ca 4 år fra foreldre registrerer problemet til diagnose er satt

ADORE: ATTENTION DEFICIT HYPERACTIVITY DISORDER OBSERVATIONAL RESEARCH IN EUROPE

Table 1 Sample descriptive data, employment status of parents, family history of ADHD and age of awareness of children's problems

Country	Patients analysed, N (% of sample)	Mean age, years (SD)	Male, %	Mother working, %	Father working, %	Family history of ADHD, %	Mean age at first awareness of problems, years (SD)	Mean age when first sought treatment, years (SD)
Austria	73 (5)	9.3 (2.7)	94	65	97	55	4.5 (2.3)	7.2 (3.1)
Denmark	32 (2)	9.2 (2.1)	91	87	86	62	4.3 (2.4)	5.5 (2.4)
France	241 (16)	8.8 (2.2)	88	NC	NC	50	5.2 (2.7)	7.5 (2.7)
Germany	434 (29)	8.7 (2.1)	79	64	94	69	5.0 (2.5)	7.0 (2.3)
Iceland	46 (3)	9.5 (2.4)	79	80	95	76	5.8 (2.4)	7.3 (2.4)
Italy	109 (7)	8.5 (2.4)	86	66	98	58	5.2 (2.5)	7.4 (2.5)
Netherlands	212 (14)	9.1 (2.9)	86	75	97	66	5.1 (3.3)	7.7 (3.2)
Norway	50 (3)	9.8 (2.4)	74	76	89	71	4.5 (2.5)	7.3 (2.5)
Switzerland	57 (4)	9.7 (3.0)	89	65	100	76	5.9 (3.2)	7.9 (2.9)
UK	223 (15)	9.3 (2.7)	86	52	80	64	5.3 (3.0)	7.6 (3.1)
All	1,478 (100)	9.0 (2.5)	84	66	93	64	5.1 (2.7)	7.3 (2.8)

Data are presented as % within country unless indicated otherwise. *SD* standard deviation, *NC* data not collected in France

Mean age at diagnosis: 9 years.

Preuss et al, 2006

PREVALENCE, COMORBIDITY, AND STABILITY IN SYMPTOMS

USING CRITERIA FOR ADHD FROM DSM-IV, WHAT DO YOU FIND IN PRESCHOOL AGE?

PREVALENCE OF ADHD IN PRESCHOOL AGE

TABLE 2. Prevalence of preschool ADHD (parent as informant)

Study	Measure	Impairment measured?	Child's age (yrs)	Ratio boys/girls with ADHD	ADHD-I (%)	ADHD-HI (%)	ADHD-combined (%)	ADHD total (%)
Lavigne et al (1996)[51]	Consensus evaluation (two psychologists); DSM-III-R	Yes	2–5	2:1	N/A	N/A	N/A	2.0
Gadow and Sprafkin (1997)[40]	DSM-IV checklist (ADHD subscales)[a]	No	3–5	1.5:1	0.0	3.1	2.5	5.7
Keenan et al (1997)[52]	Structured Diagnostic DSM-III-R Interview (K-SADS)[b]	Yes	4.6–5.8	N/A	N/A	N/A	N/A	5.7
Gimpel and Kuhn (2000)[53]	DSM-IV checklist for ADHD[c]	No	2–6	2:1	2.0	3.6	4.0	9.5
Gadow et al (2001)[54]	DSM-IV checklist (ADHD subscales)[a]	No	3–5	2:1	0.9	3.6	1.5	6.0
Egger et al (in press)[48]	Structured Diagnostic DSM-IV Interview (PAPA)[d]	Yes	2–5	2.5:1	0.0	1.8	1.5	3.3
Weighted average prevalence[e]					0.8	3.1	2.4	4.9[f]

Dreyer, 2006

PSYCHIATRIC COMORBIDITY IN PRESCHOOL

	Depression	Anxiety	ADHD	ODD
Depression	--	5.43* (1.47-20.10)	1.74 (.15-20.12)	4.94* (1.18-20.73)
Anxiety	6.47** (1.79-23.34)	--	.95 (.22-4.12)	1.81 (.92-3.58)
ADHD	5.79 (.67-50.13)	1.56 (.41-5.96)	--	18.44*** (5.05-67.33)
ODD	6.87** (1.87-25.19)	2.03* (1.08-3.83)	19.33*** (5.45-68.60)	--

Logistic Regression Comorbidity Analyses with PAPA/DSM-IV diagnoses: Odds Ratios (95; % Confidence Intervals)
*$p < .05$;
**$p < .01$;
***$p < .001$

Bufferd et al., 2011

WILL ADHD IN PRESCHOOL CONTINUE INTO SCHOOL AGE?

FROM PRESCHOOL TO SCHOOL

- Richmond et al 1982
  - 62 % of children with behaviour disorders at age 3 had problems at age 8
  - Children with behaviour disorders had generally lower scores on tests of intellectual functioning, academic achievement, and other developmental measures
  - Children with disorders experienced more frequent problems in their parents and in their local environment

ADHD SUBTYPES

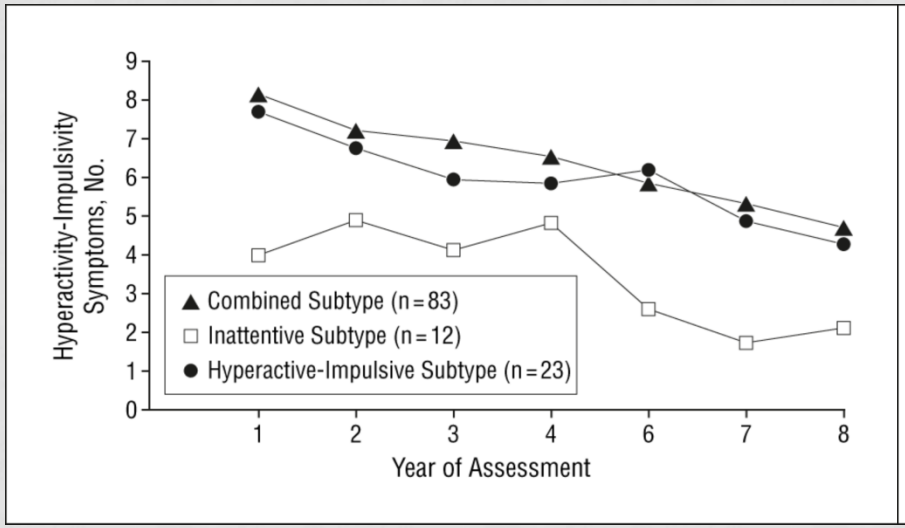
TABLE 3. Comparison of ADHD subtypes in preschool and school-aged children

ADHD subtype	Preschool (% total prevalence)[a]	School-aged (% of total prevalence)[b]
Inattentive	13	48
Hyperactive-impulsive	49	9
Combined	38	43

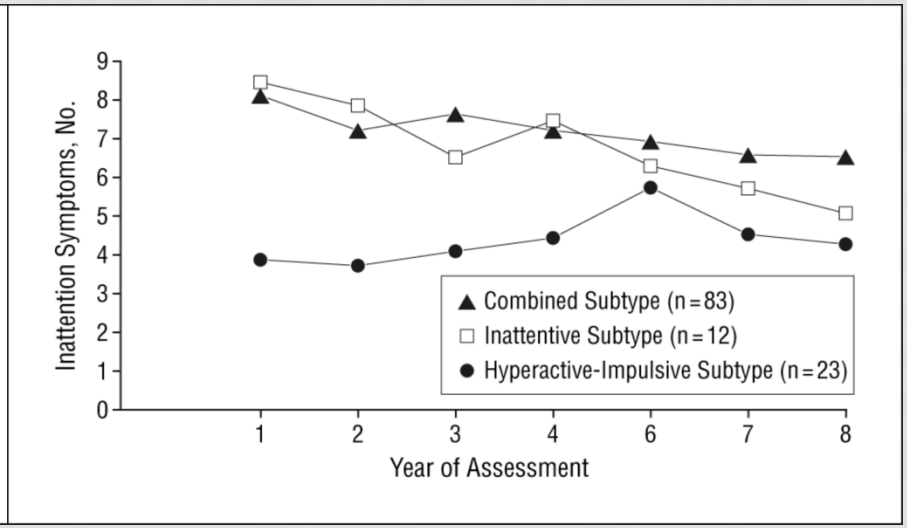
[a]Based on weighted average prevalence in studies of ADHD in preschool children (see Table 1).
[b]Wolraich et al 1998.[42]

Dreyer, 2006

HYPERACTIVITY IS REDUCED BY AGE, ATTENTION PROBLEMS ARE NOT



Average number of **hyperactivity-impulsivity symptoms** during years 1 through 8 of children who met criteria for each subtype of attention-deficit/hyperactivity disorder in year 1.



Average number of **inattention symptoms** during years 1 through 8 of children who met criteria for each subtype of attention-deficit/hyperactivity disorder in year 1.

Lahey et al, 2005

CONTINUITY VS DISCONTINUITY

- Presence of ADHD at both age 3 and 4 significantly increased the risk for ADHD at age 5 and later

- Other risk factors associated with increased continuity:
  - Coexisting behaviour disorders (ODD, CD or both)
  - Coexisting depression
  - Coexisting serious life events

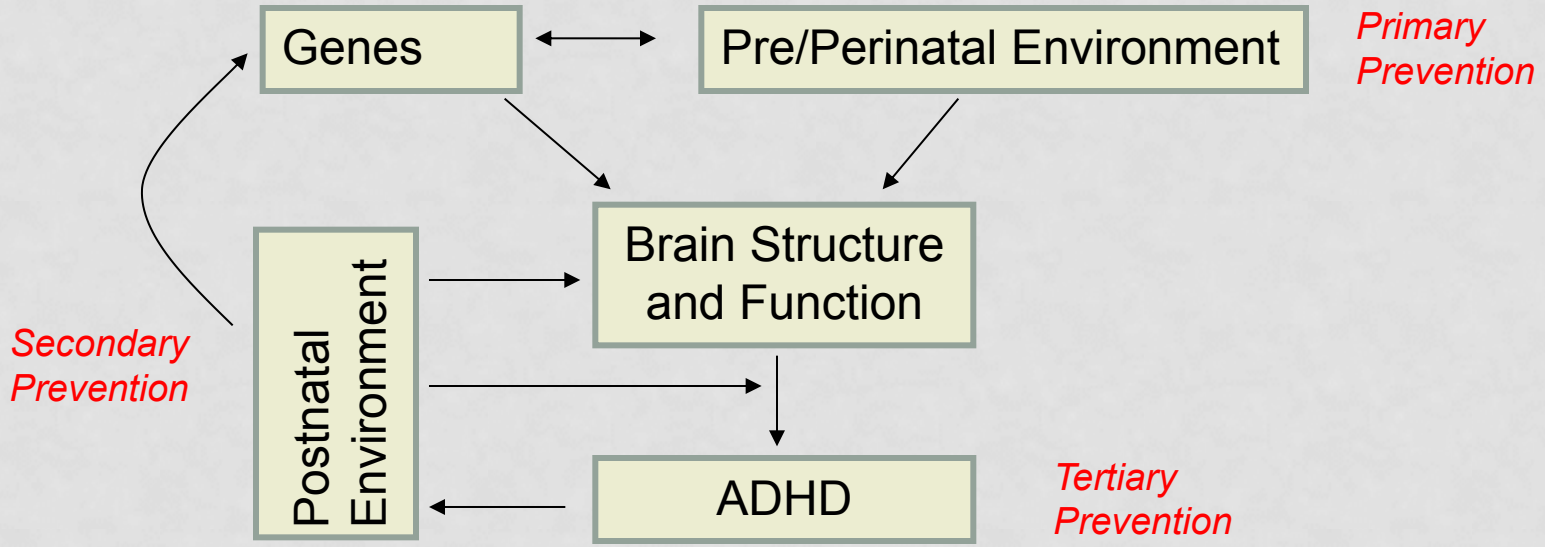
Tandon et al., 2011

IMPLICATIONS FOR TREATMENT

- Few studies of pharmacological treatment of preschoolers with ADHD
  - Main effect on hyperactivity
  - Overall lower effect sizes than with older children
  - More side effects
  - Unknown longterm effects

- Psychosocial interventions
  - Parent training programs
  - Effects mainly on behaviour problems
  - A few programs with effects on ADHD symptoms
  - Important: individualized, intensive, motivated parents
  - Unknown longterm effects

EARLY CHILDHOOD: WINDOW OF OPPORTUNITY



A dynamic/interactive model of the emergence and presistence of attention-deficit/hyperactive disorder (ADHD), along with loci for preventative interventions.

Halperin et al, 2012

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The Norwegian Longitudinal ADHD Cohort Study

Norwegian Institute of Public Health (FHI)
&
Oslo University Hospital HF (OUS)

PIs: Heidi Aase (FHI) & Pål Zeiner (OUS)

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Research aims

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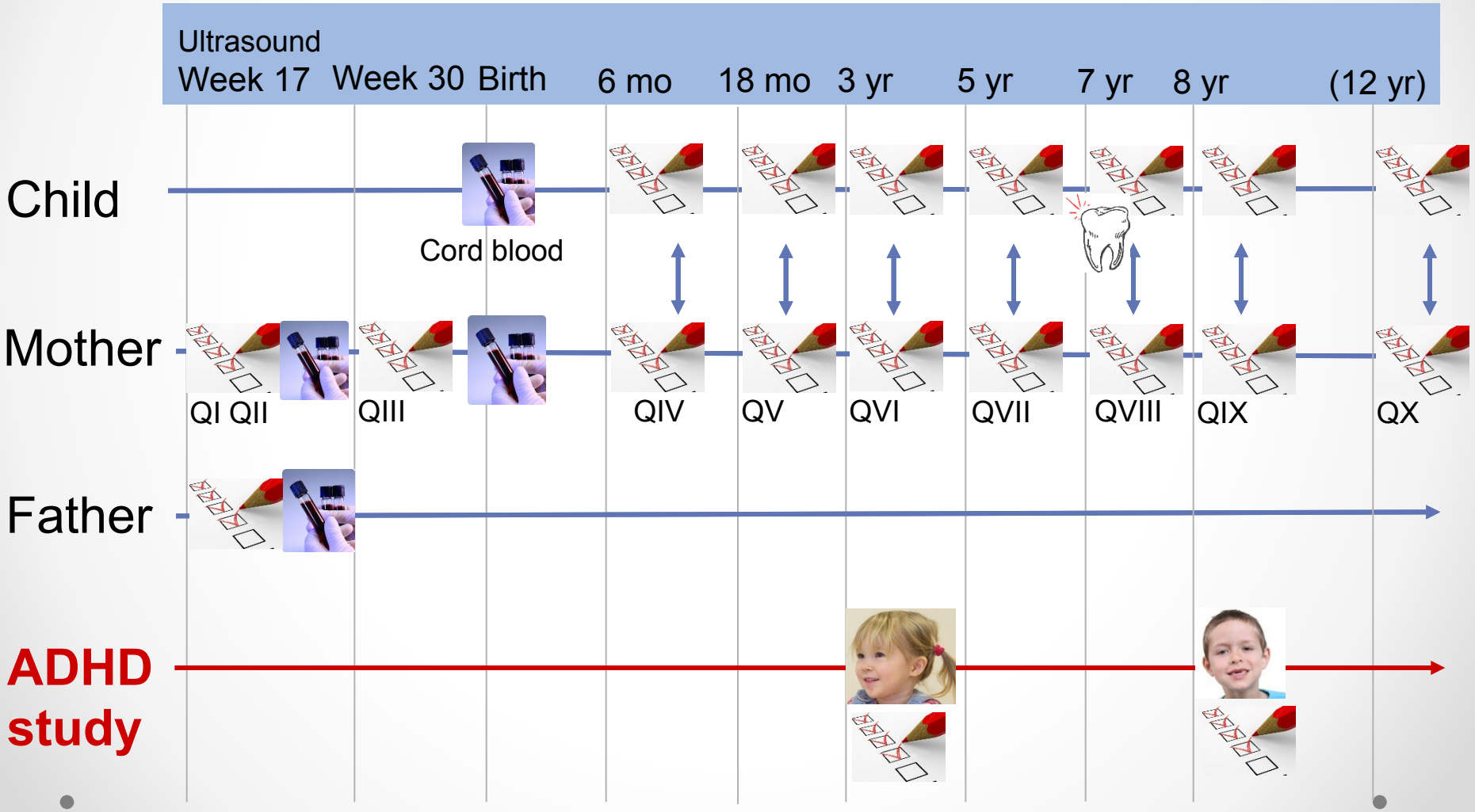
Gain new knowledge about early characteristics, developmental trajectories, risk- and protective factors

- This knowledge is needed to:
  - Provide targeted help as early as possible for children that needs it
  - Develop effective preventive and disease restricting interventions for children and their environment

The Norwegian Mother and Child Cohort Study (MoBa)

- Approx. 107 000 pregnancies enrolled during the period 1999 – 2008
  - About 80% of fathers participate
  - Recruitment at routine ultrasound assessment (week 17)
- Questionnaires
  - Health, lifestyle, diet, socio-economic factors, psychosocial factors, etc.
- Biological samples
  - Blood from mother and father during the pregnancy, and from mother and child at birth, urine from mother during pregnancy, children's milk teeth

Data collection



Screening: 11 q in MoBa 36mo questionnaire

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		Not true	Somewhat or sometimes true	Very true or often true	
	1. Afraid to try new things	☐	☐	☐	CBCL
→	2. Can't concentrate, can't pay attention for long	☐	☐	☐	
→	3. Can't sit still, restless or hyperactive	☐	☐	☐	
→	4. Can't stand waiting, wants everything now	☐	☐	☐	
	5. Clings to adults or too dependent	☐	☐	☐	
	6. Constipated, doesn't move bowels	☐	☐	☐	
	7. Defiant	☐	☐	☐	
→	8. Demands must be met immediately	☐	☐	☐	
→	15. Gets into everything	☐	☐	☐	
	16. Gets too upset when separated from parents	☐	☐	☐	
	17. Hits others	☐	☐	☐	
	18. Poorly coordinated or clumsy	☐	☐	☐	
	19. Punishment doesn't change his/her behaviour	☐	☐	☐	
→	20. Quickly shifts from one activity to another	☐	☐	☐	

		Not true	Somewhat or sometimes true	Very true or often true	
→	1. Becomes distracted or diverted by outside stimuli (sounds or events)	☐	☐	☐	DSM-IV
→	2. Finds it difficult waiting his/her turn	☐	☐	☐	
→	3. Has problems keeping focused on tasks or activities	☐	☐	☐	
→	4. Is excessively talkative	☐	☐	☐	
	5. Doesn't differentiate between adults; behaves the same way to all of them	☐	☐	☐	
	6. Will wander after other adults, even if they are strangers	☐	☐	☐	
→	7. Doesn't seem to listen when he/she is being spoken to	☐	☐	☐	

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Invited to the ADHD-study: Scores ≥ 90th% and random controls

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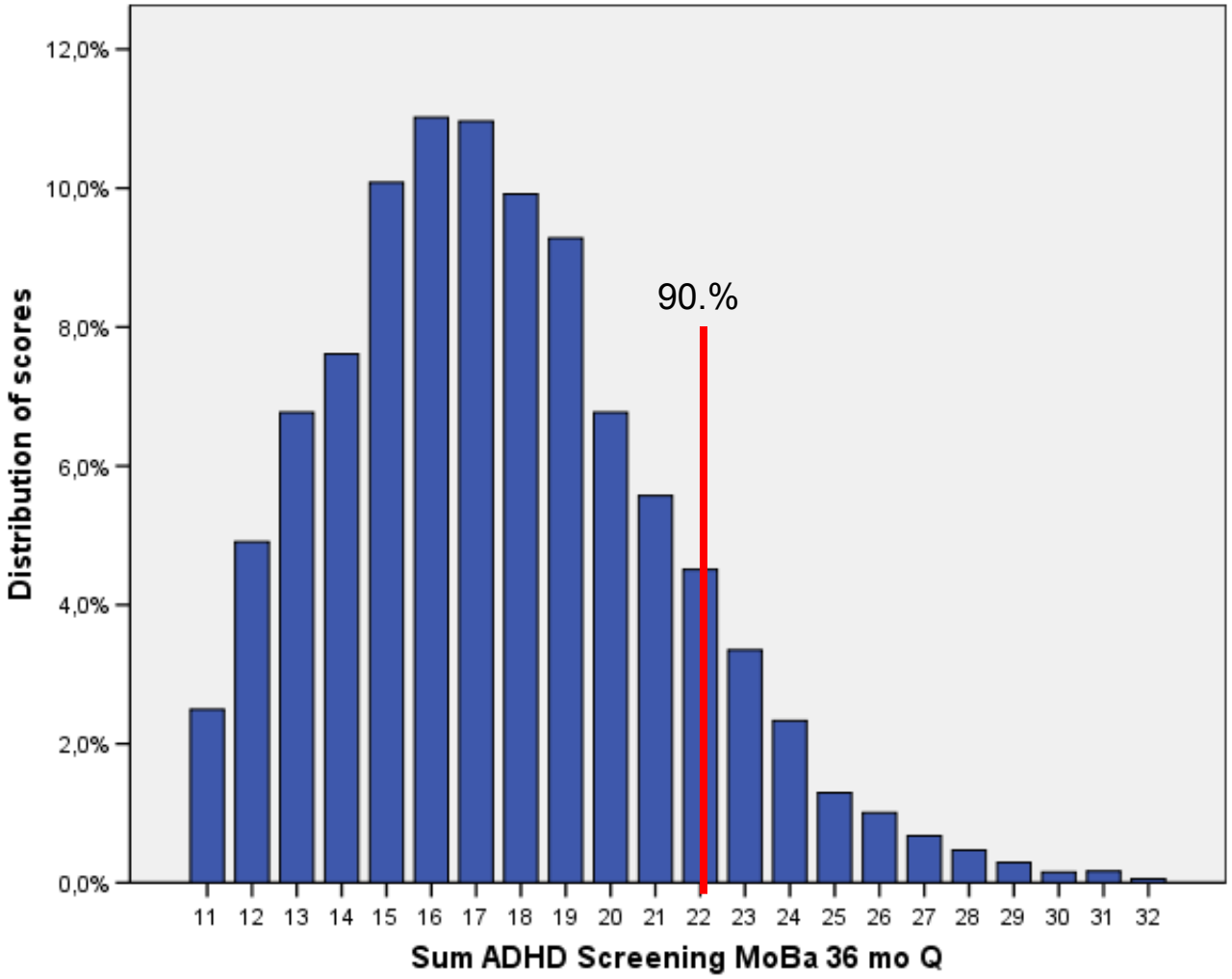

Thorough clinical assessment

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- Questionnaire data: parents and kindergarten
- Developmental history, etc.
- Short medical and neurological examination
- Neuropsychological assessment
- Structured diagnostic interview (PAPA) with one parent
- Structured parent-child interaction observation

Additional measures

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- Questionnaires in the MoBa study from pregnancy onwards
- Information from Medical Birth Registry
- Biological samples from child and parents
- Linkage with other health registries

Phase II: ADHD in Early Schoolage (2012 – 2016)

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- All children from Phase I are invited for reassessment at age 8
- Screening of new participants from MoBa 8 year Q
  - Later onset ADHD
- Similar clinical assessment

Some research questions

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- Early indicators in preschool age
  - Symptoms vs normal behaviour
  - Co-existing disorders
- Causal factors
  - Relevant genetic factors?
  - Environmental factors contributing to ADHD?
  - Gene x environment interactions?
- Developmental trajectories
  - Different characteristics at different time points
  - Early vs late debut of symptoms – same disorder?
  - Children growing out of disorder – what are the predictors?
- And a host of additional questions

Anxiety and ADHD in preschool

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Journal of Attention Disorders
XX(X) 1–8

DOI: 10.1177/1087054712463063
http://jad.sagepub.com
SAGE

Co-Occurrence of ADHD and Anxiety in Preschool Children

Kristin Romvig Overgaard[1], Heidi Aase[2], Svenn Torgersen[3,4], and Pål Zeiner[1]

Abstract

Objective: The objective of this study was to examine co-occurrence of ADHD and anxiety in preschool children. **Method:** The data collection was part of the Norwegian Mother and Child Cohort Study (MoBa) at the Norwegian Institute of Public Health. After a screening for ADHD symptoms at 36 months, participants were clinically assessed at age 36 to 44 months. Psychiatric symptoms of ADHD and anxiety were derived from the Preschool Age Psychiatric Assessment (PAPA) interview. **Results:** In preschoolers with ADHD symptoms, 33% were reported to have symptoms of anxiety. Children with symptoms of ADHD *and* anxiety had more severe ADHD symptomatology, and particularly more inattentive symptoms compared with children with ADHD symptoms and no anxiety. **Conclusion:** Clinicians should be aware of the frequent overlap between symptoms of anxiety and ADHD in preschoolers as different intervention strategies may be required. *(J. of Att. Dis. 2012; XX(X) 1-XX)*

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Co-Occurrence of ADHD and Anxiety in Preschool Children

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Table 1. Anxiety Symptoms in the Preschool Group With ADHD Symptoms (ADHD Group) Compared With Controls Without ADHD Symptoms (Comparison Group) From the Population

	ADHD group	Comparison group			
	n = 371	*n* = 127	χ^2	*df*	*p* (two-sided)
Anxiety, symptom(s) present (%)	123 (33)	21 (16)	12.721	1	<.0001
Anxiety, *DSM*-diagnosis present (%)	34 (9.2)	6 (4.7)	2.525	1	.112
≥2 symptoms of different anxiety subtype (%)	54 (14.6)	8 (6.3)	5.917	1	.015
Phobia symptoms present (%)	89 (24)	16 (13)	7.378	1	.007
Social anxiety symptoms present (%)	6 (1.6)	4 (3.1)	1.129	1	.288
Separation anxiety symptoms present (%)	51 (13.7)	3 (2.4)	12.684	1	<.000
GAD symptoms present (%)	8 (2.2)	3 (2.7)	0.019	1	.892

Note: *DSM* = *Diagnostic and Statistical Manual of Mental Disorders*; GAD = generalized anxiety disorder. Pearson chi-square statistics.

Table 2. Child Characteristics and Symptoms of Anxiety

	Anxiety	Anxiety + ADHD			
	n = 175	*n* = 123	*df*	*t*	*p*
Age, months, mean (SD)	41.9 (1.4)	41.6 (1.2)	296	–2.123	.035
ABIQ, mean (SD)	101.2 (9.6)	100.8 (8.6)	291	–0.431	.673
Anxiety symptoms, mean (SD)	2.4 (1.8)	2.5 (1.8)	296	0.546	.586
Phobia symptoms, mean (SD)	1.0 (.8)	1.1 (.9)	296	0.804	.422
Separation anxiety symptoms, mean (*SD*)	0.9 (1.1)	1.1 (1.2)	296	1.153	.250
Anxiety symptoms with impairment , mean (*SD*)	1.3 (2.0)	1.5 (2.0)	296	0.932	.352

Note: ABIQ = abbreviated IQ; SD =Standard deviation. Independent sample *t* test, comparisons of anxiety in two groups: (a) anxiety symptoms without ADHD (anxiety), and (b) anxiety and ADHD symptoms (anxiety + ADHD).

Anxiety and ADHD

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	ADHD with Anx	ADHD without Anx			
	n = 123	*n* = 248	*df*	*t*	*p*
Hyperactivity symptoms, mean (SD)	4.4 (1.5)	4.2 (1.4)	369	−1.251	.212
Inattentive symptoms, mean (SD)	3.3 (2.3)	2.7 (2.1)	369	−2.457	.014
Impulsivity symptoms, mean (SD)	1.3 (.9)	1.2 (1.0)	369	−0.562	.575
ADHD severity sum score mean (SD)	21.6 (9.0)	19.6 (8.7)	369	−2.089	.037
Impairment present, *n* (%)	107 (87)	212 (86)	1	0.155	.694

Note: Anx = anxiety symptoms. Independent sample *t* test; SD = Standard deviation.

Preschool findings – so far

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- Our results are in accordance with other studies
- These data can thus be used for investigating:
  - Early characteristics
  - Associated problems
  - Risk factors / causal factors
  - etc
- Re-assessment at age 8 will be used for investigating
  - Continuity-discontinuity of symptoms
  - Early vs late debut of disorder
  - Developmental trajectories
  - Early predictors for later disorder
  - Predictors for co-existing disorders
  - etc

"Take-home-message"

- ADHD *should* be identified as early as possible
  - Early ADHD symptoms may indicate serious risk for deviant development
  - Coexisting problems are present early
- ADHD *can* be identified in preschool age
  - Repeated assessments
- There are alternatives to pharmacological treatment

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