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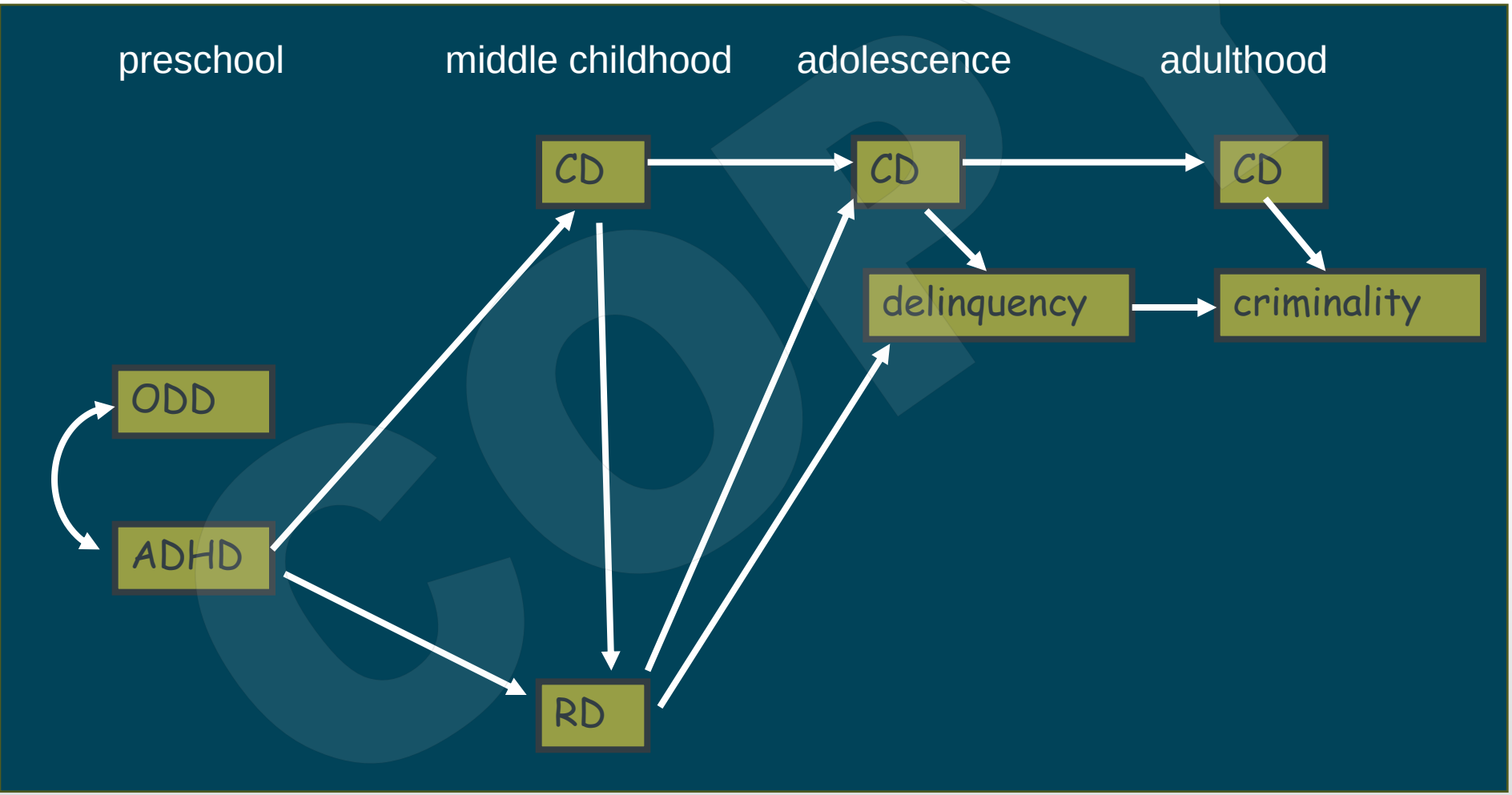
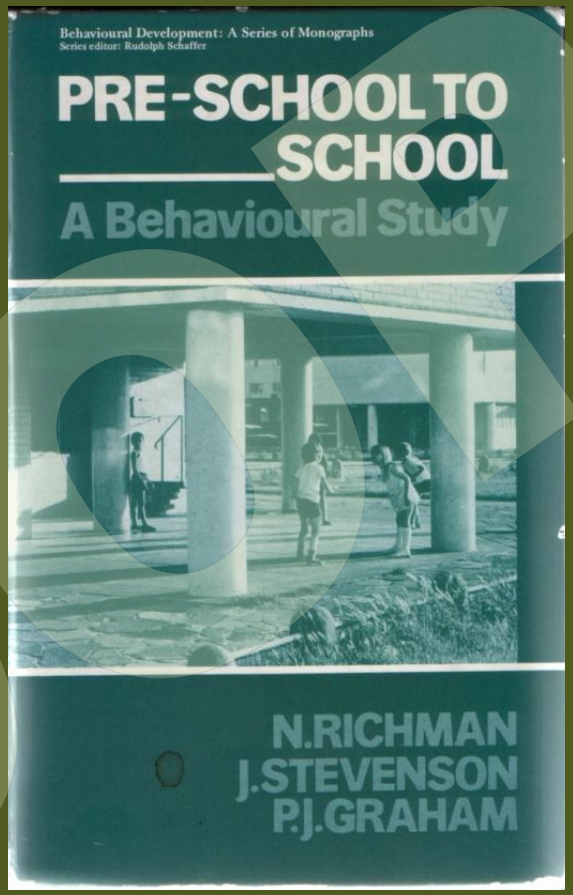
Factors in early development that impact social function .

Jim Stevenson
15 July 2008

What are continuities are we considering here?



Waltham Forest Epidemiological Study



Adult convictions and behaviour at age 3

Table 2 Logistic regression analysis predicting any adult convictions and adult violent convictions from child and family characteristics at age 3 years (n=828)

	Any adult convictions Univariate logistic regression d.f.=1				Adult violent convictions Univariate logistic regression d.f.=1			
	χ^2	*P*	OR	95% CI	χ^2	*P*	OR	95% CI
Gender	63.53	<0.001	0.11	0.05–0.21	39.55	<0.001	0.00	0.00–0.00
Immigrant status	0.44	NS	0.80	0.40–1.60	1.25	NS	0.47	0.11–2.03
Social class	2.48	NS	1.55	0.88–2.73	1.53	NS	1.81	0.67–4.80
Family size	2.61	NS	1.17	0.97–1.41	3.36	NS	1.33	0.99–1.77
Family status	0.68	NS	1.44	0.63–3.30	0.34	NS	0.58	0.08–4.33
Family stress	0.35	NS	1.05	0.90–1.22	0.69	NS	1.12	0.85–1.49
Social disadvantage	1.32	NS	0.88	0.72–1.08	0.36	NS	1.14	0.72–1.82
Language development	2.80	NS	0.87	0.72–1.08	2.82	NS	0.74	0.53–1.03
Physical development	2.04	NS	0.87	0.72–1.05	2.75	NS	0.77	0.57–1.04
Social development	5.93	<0.02	0.88	0.80–0.97	6.58	<0.02	0.82	0.71–0.95
Total behaviour score	10.57	<0.001	0.94	0.90–0.98	4.63	<0.05	0.93	0.88–0.99

Stevenson and Goodman (2001) Br J Psychiat, 179, 197-202

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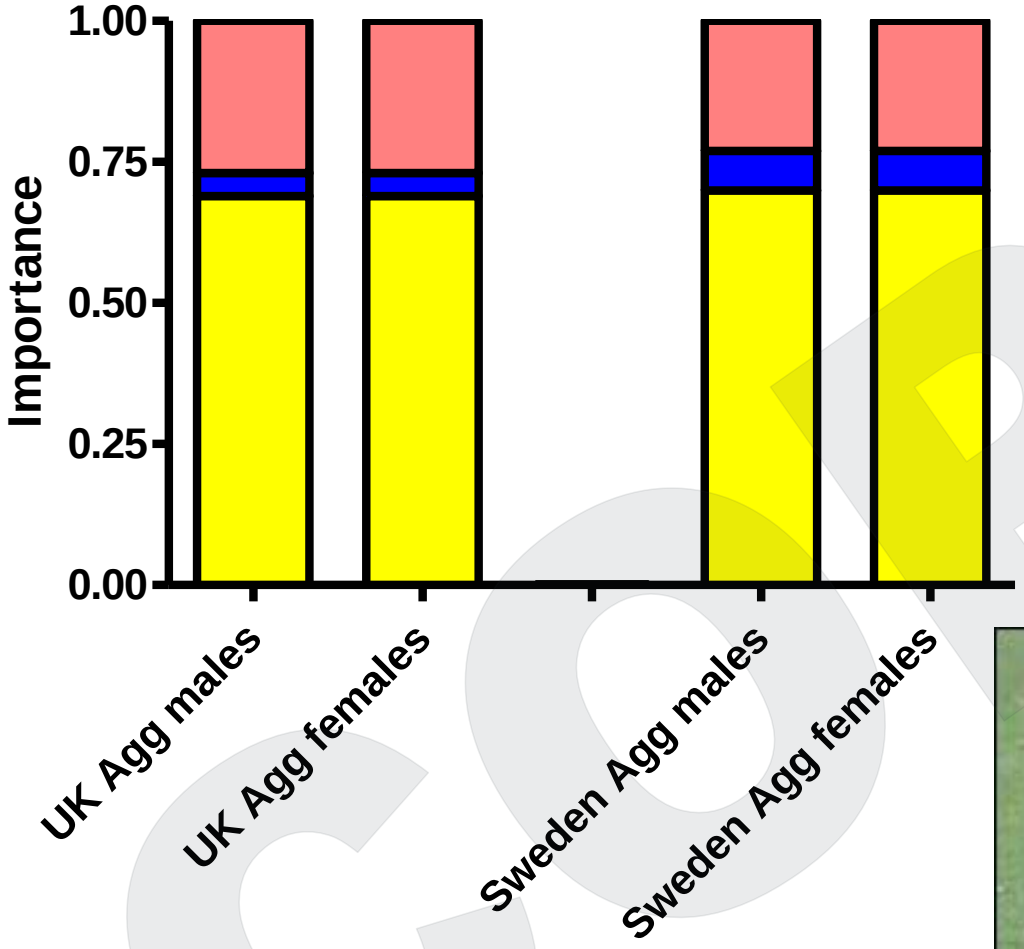
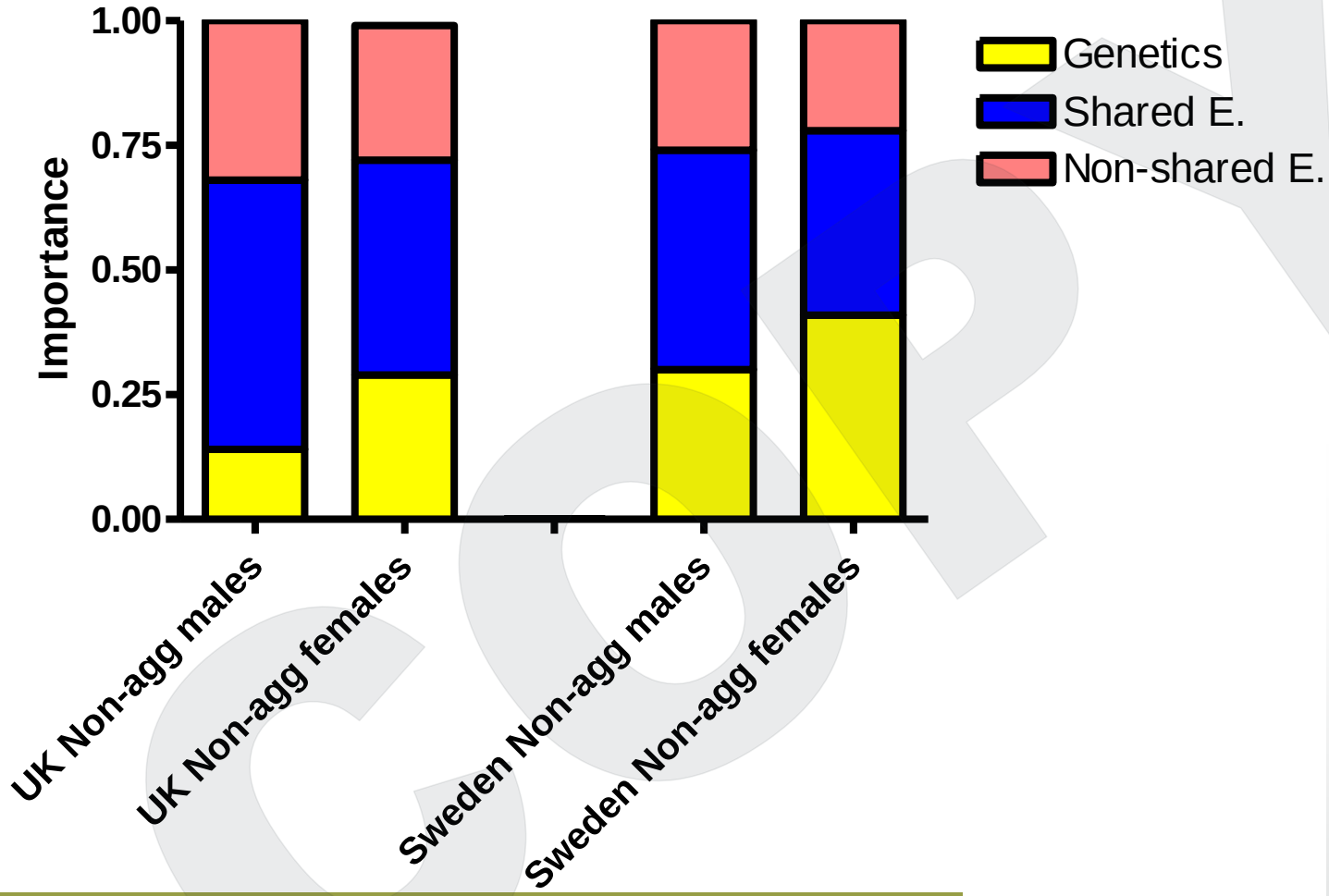
Genetics contributes to continuities.



Aggressive behaviour – e.g. destroying property, fighting, attacking others, threatening

Eley, Lichtenstein & Stevenson (1999) Child Development, 70, 155-168



Non-aggressive antisocial behaviour – e.g. stealing, lying, cheating, truanting,

Eley, Lichtenstein & Stevenson (1999) Child Development, 70, 155-168

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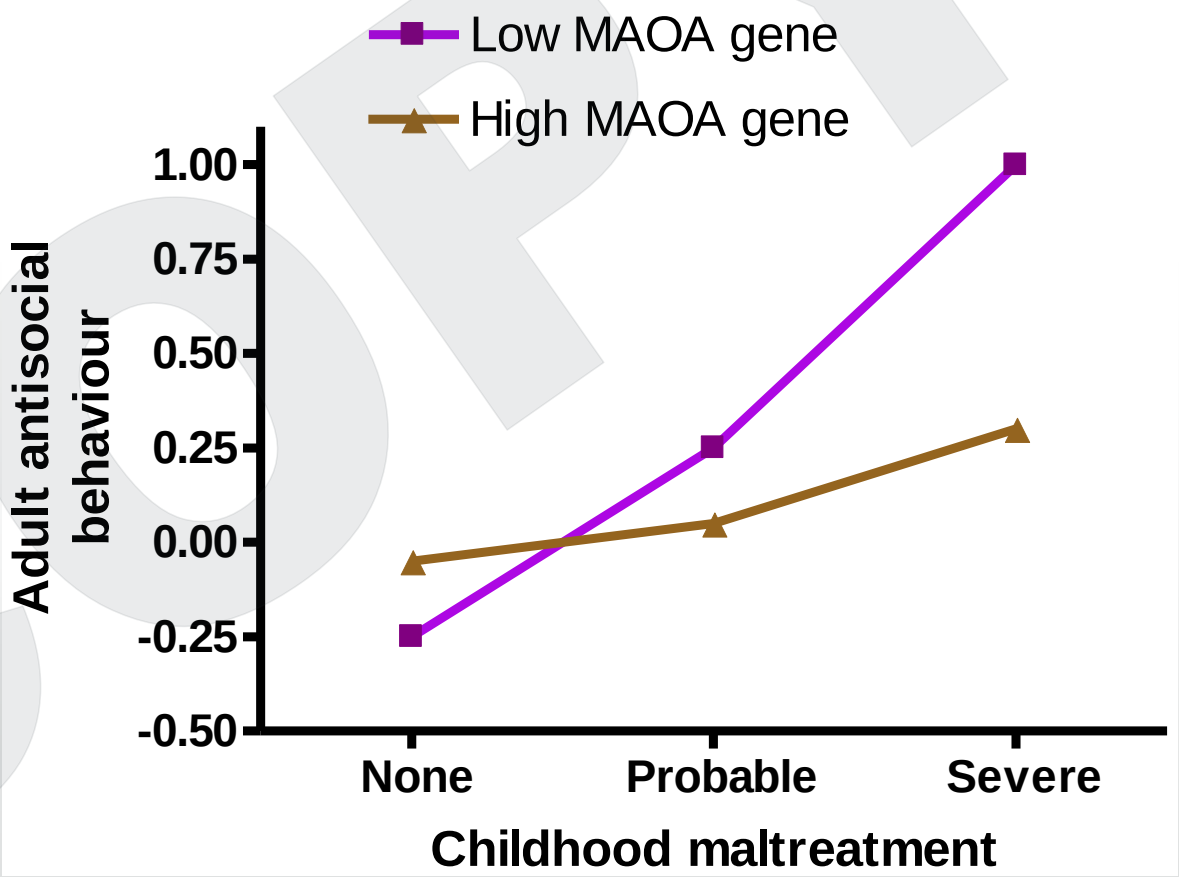
GxE effects are important.

Maltreatment and High MAOA allele



Caspi et al. (2002) Science ,297, 851-845

MAOA gene replication and meta-analysis

"These findings provide the strongest evidence to date suggesting that the MAOA gene influences vulnerability to environmental stress, and that this biological process can be initiated early in life."

Kim-Cohen et al. (2006) Molecular Psychiatry ,11, 903-913

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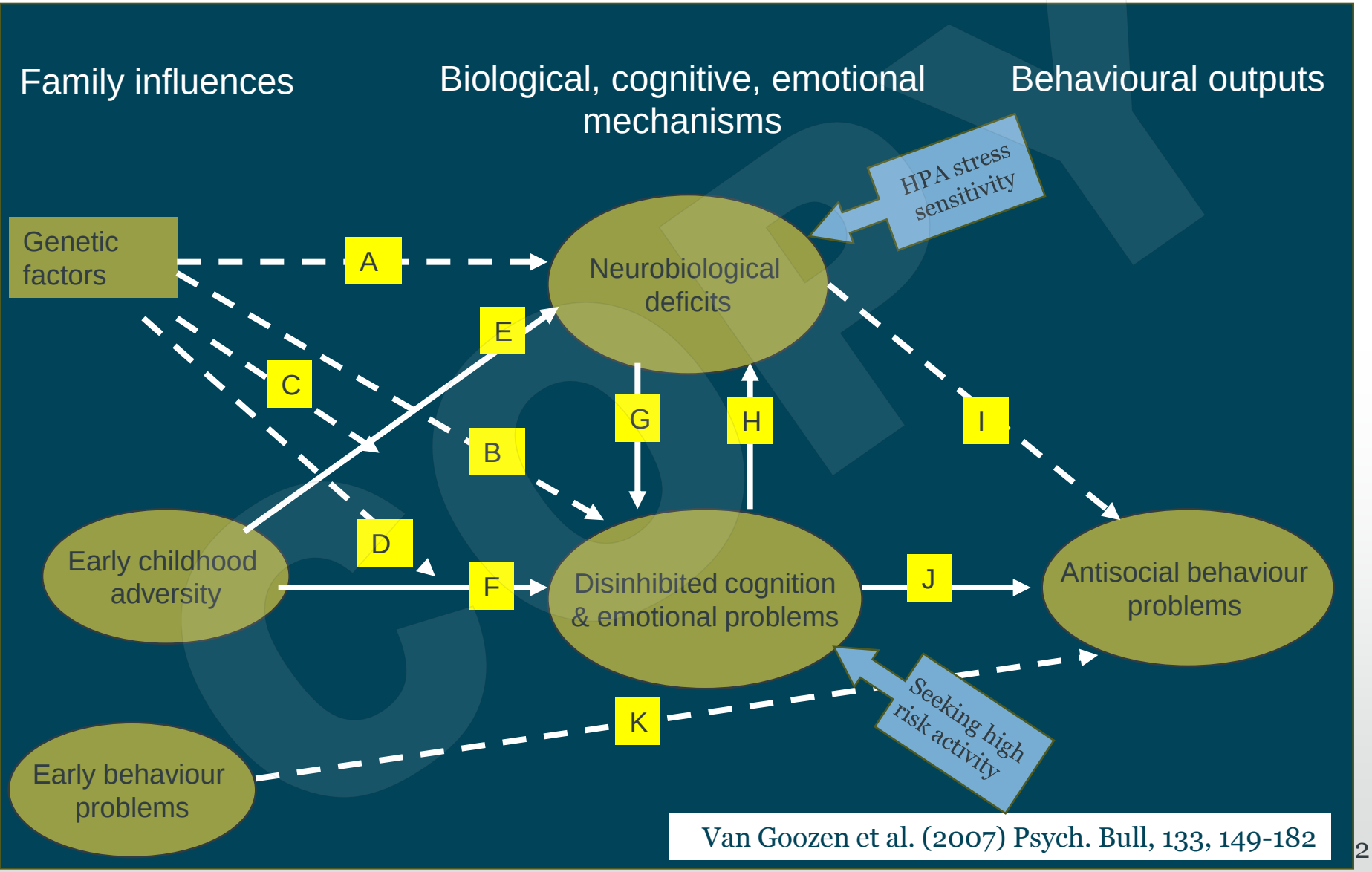
But what are the mechanisms underlying GxE effects?



Van Goozen et al. (2007) Psych. Bull, 133, 149-182

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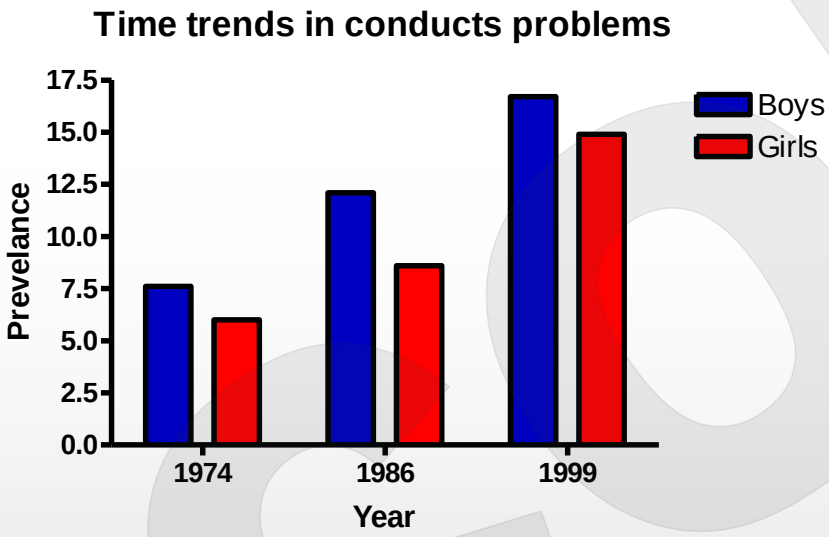
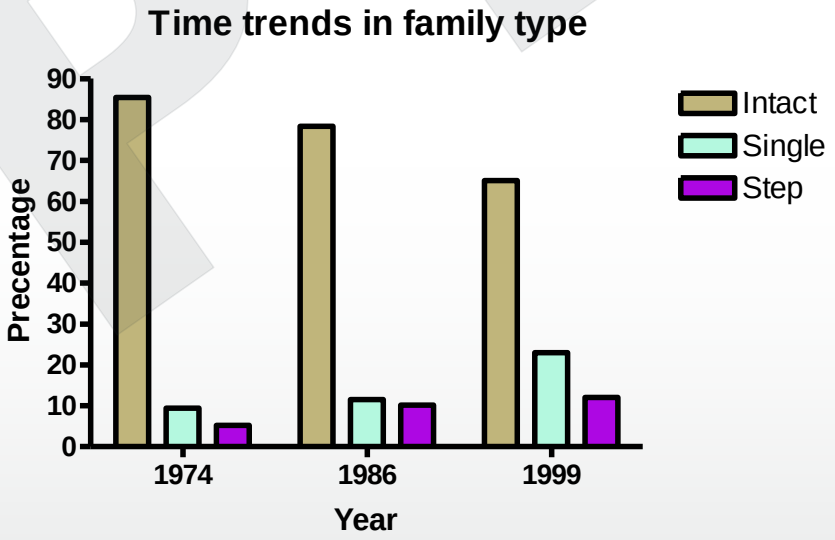
Are the effects of early antisocial behaviour likely to become more common?

Time trends

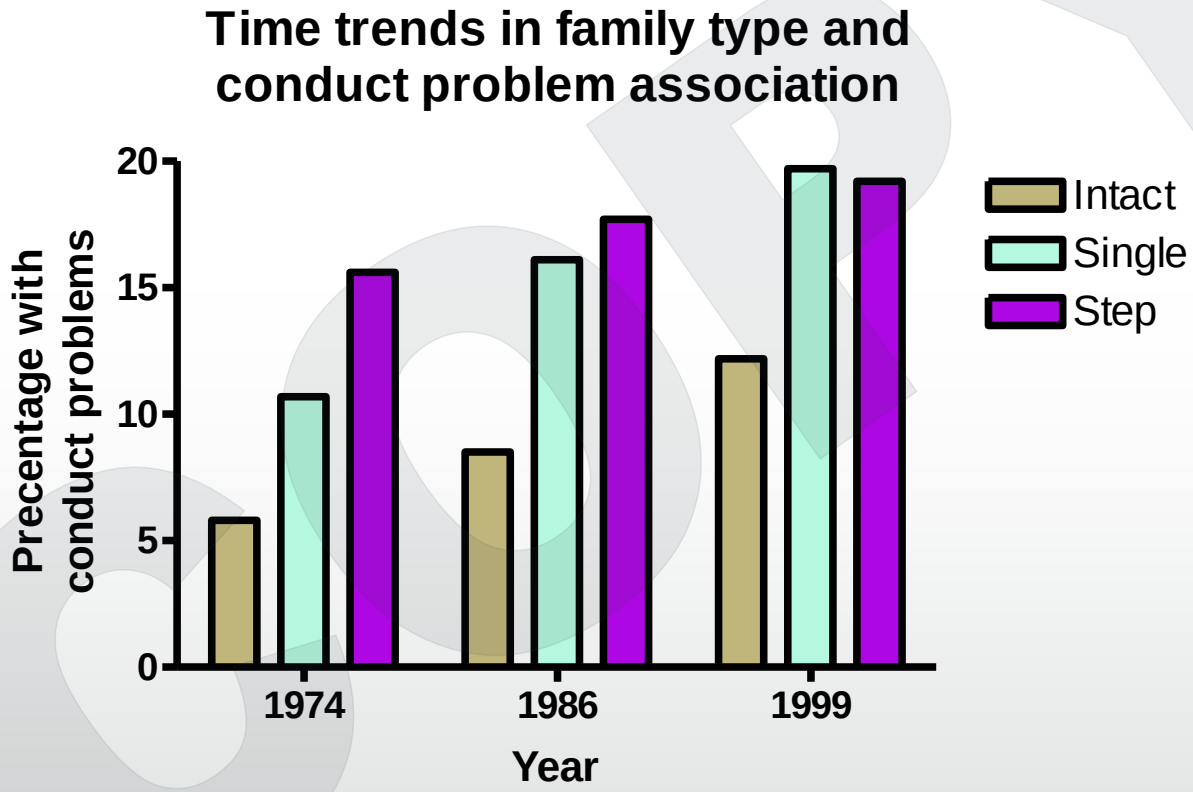


Collishaw et al. (2002) JCPP,45,1350--62



Collishaw et al. (2007) Social Science and Medicine,65,2576--87

Conduct problems and family type



Collishaw et al. (2007) Social Science and Medicine,65,2576--87

Adult outcome on conduct problems by cohort

Table 4 Adult outcomes for adolescents with conduct problems

	NCDS – age 33, year 1991			BCS70 – age 29/30, year 1999			
	Conduct problems			Conduct problems			
	No $N^2 = 6979$ %	Yes $N = 425$ %	OR [95% CI]	No $N = 5142$ %	Yes $N = 478$ %	OR [95% CI]	*Interaction*[1] *(p)*
Occupation							
Unemployed	3.7	10.7	3.12 [2.2–4.4]	2.5	5.8	2.40 [1.5–3.9]	.39
Sacked	2.8	5.2	1.86 [1.2–3.0]	3.3	6.8	2.13 [1.4–3.3]	.68
Other SES							
Benefits	12.7	28.0	2.67 [2.1–3.4]	12.8	28.1	2.67 [2.1–3.4]	.99
Homelessness	3.8	6.3	1.72 [1.1–2.6]	4.8	14.5	3.40 [2.5–4.7]	.01
Relationships and children							
3+ cohabitations	3.4	6.7	2.06 [1.3–3.2]	2.2	5.0	2.38 [1.5–3.8]	.66
Teenage parent	6.9	16.4	2.64 [2.0–3.5]	4.6	11.8	2.74 [2.0–3.8]	.86
Health							
Poor health	13.0	19.8	1.64 [1.3–2.1]	14.2	20.7	1.58 [1.2–2.0]	.84
Alcohol problems	11.9	19.5	1.79 [1.4–2.3]	14.2	18.3	1.35 [1.0–1.8]	.14
Smoking	31.2	59.7	3.27 [2.7–4.0]	32.2	59.3	3.07 [2.5–3.8]	.66
Help-seeking	21.4	33.7	1.87 [1.5–2.3]	23.6	31.0	1.46 [1.2–1.8]	.11
Total problems							
4 or more	5.4	17.2	3.61 [2.7–4.8]	5.7	18.2	3.69 [2.8–4.9]	.92

[1]Test of interaction between conduct problems and cohort in prediction of adult outcomes.
[2]Unweighted *N*s.

Collishaw et al. (2002) JCPP,45,1350--62

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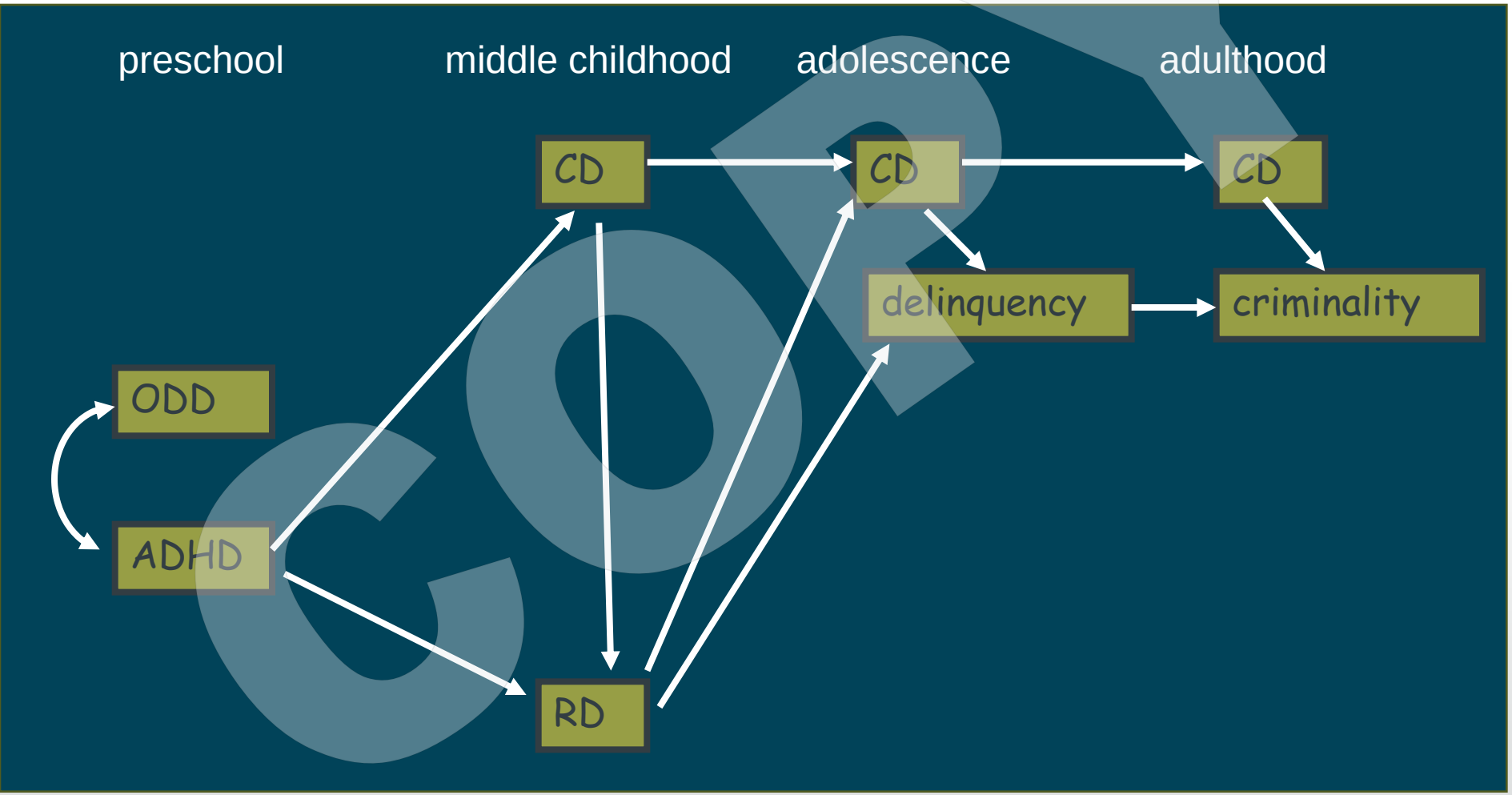
So early antisocial behaviour is increasing and its long term effects on adult functioning are being sustained. The increase cannot be attributed to secular changes in family type, income or size.

What is the significance of Reading Disability?



Reading disability and social function

- Goldston DB, Walsh A, Arnold EM, et al. (2007). Reading problems, psychiatric disorders, and functional impairment from mid- to late adolescence. *Journal Of The American Academy Of Child And Adolescent Psychiatry*, **46**, 25-32
- "The increased psychiatric morbidity and functional impairment of adolescents with reading problems highlight the importance of developing interventions that help these youths address reading deficits and associated vulnerabilities during the last years of secondary school."
- These functional impairments continue into adulthood – see Maughan, B. (1995). Annotation - long-term outcomes of developmental reading problems. *Journal Of Child Psychology And Psychiatry*, **36** : 357 1995

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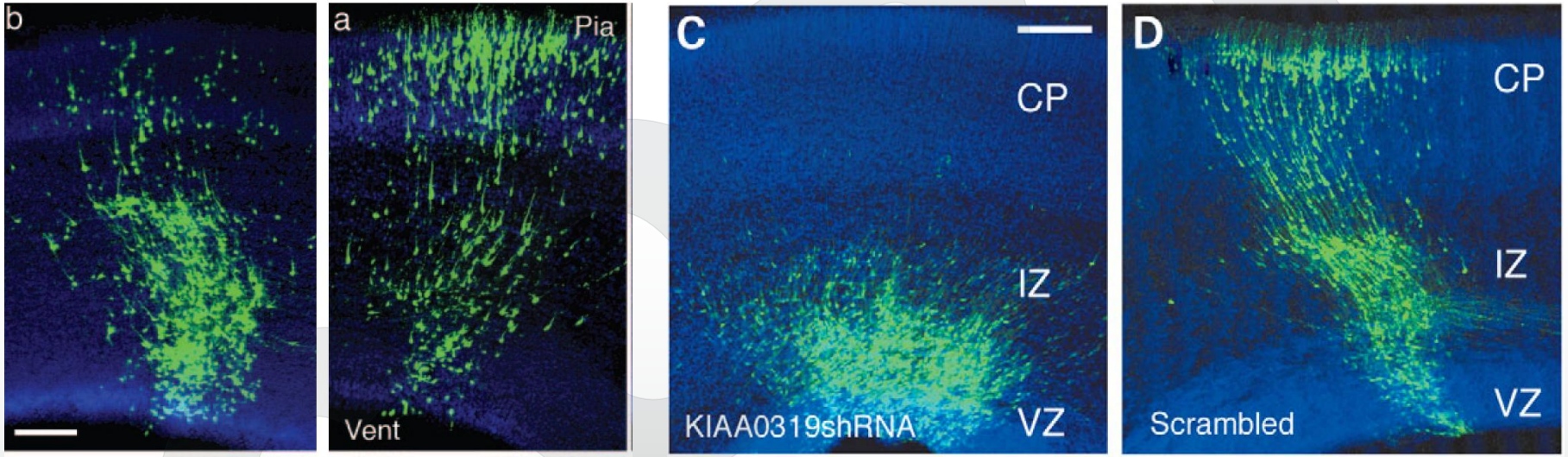
Cope et al. (2005) Am J of Human Genetics 76,581-591

Identified candidate genes for RD -2008

Name	Position	Status
DYX1C1	15q21	Is this only gene creating 15 linkage peak? Function not known.
ROBO1	3p12-13	Not replicated and causal status uncertain. Role in neuronal guidance.
DCD2	6p22	Replicated association. Role in neuronal migration.
KIAA0319	6p22	Replicated association. Role in neuronal migration.

Gene functions: neuronal and axonal migration in the rat brain

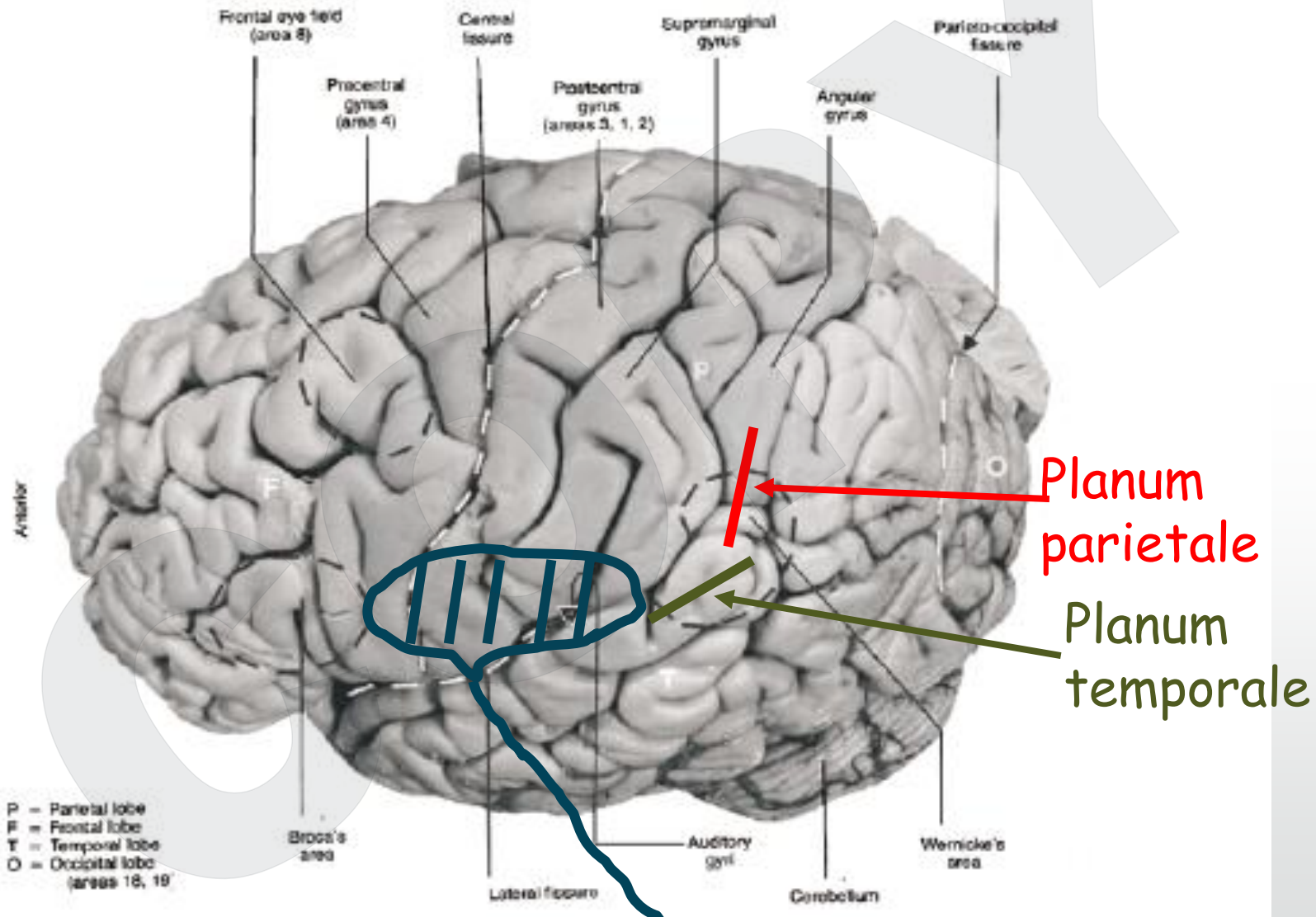
Treated Control Treated Control



DCDC2
Meng et al., 2005

KIAA0319
Paracchini et al., 2006

Evidence for interaction between DCDC2 and KIAA0319
Harold et al. (2006) Mol Psychiatry. 2006 Dec;11(12):1085-91, 1061.



Paulesu et al (1996)

From genes to behavior in developmental dyslexia

Albert M Galaburda, Joseph LoTurco, Franck Ramus, R Holly Fitch & Glenn D Rosen

NATURE NEUROSCIENCE VOLUME 9 | NUMBER 10 | OCTOBER 2006

"All four genes thus far linked to developmental dyslexia participate in brain development, and abnormalities in brain development are increasingly reported in dyslexia…Our perspective on dyslexia is that some brain changes cause phonological processing abnormalities…we propose a tentative pathway between a genetic effect, developmental brain changes, and perceptual and cognitive deficits associated with dyslexia."

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Antisocial behaviour is just an illustration of the principle that many aspects of adult social functioning have their origins in early development and that progress is just starting to be made in understanding the processes that mediate the GxE effects at play.

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