



The Power and Pitfalls of Statistical Analysis

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Developmental Risk Factors for Early Start Offending in People with Schizophrenia: A Case Control Study of Special Hospital Admissions

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- Risk factors for antisocial behaviour
 - Moffitt¹ - biological-environmental interaction
 - Subtle brain abnormalities interact with environmental factors such as inadequate socialisation, poor parenting and poverty.

- Two antisocial behaviour groups
 - Early onset life course persistent
 - Adolescent limited

- Higher rates of offending in people with schizophrenia
- Psychotic symptoms account for some of the excess offending but not all
- Two type of offenders with schizophrenia: early and late starters²
 - More educational / conduct problems
 - Substance misuse
 - Parental separation

■ Hypothesis

“Early starters” would be more likely than 'late starters' to have experienced specific early adverse developmental factors.

Methods

- **Special Hospitals Case Register**
 - All first admissions between 1972 – 2000
 - Diagnosis of schizophrenia
 - At least one court appearance
 - N = 1315
- **“Early Starters”** – first court appearance <18 years
- **“Late Starters”** – first court appearance 18 or more

Exposure Variables

Gender	Male / Female
Birth Injury	Yes / No
Epilepsy <15	Yes / No
Social Class Father	Groups 1 – 5
Criminal history: Mother / Father / Sibling	One or more conviction (Yes / No)
Prison: Mother / Father / Sibling	One or more custodial sentence (Yes / No)
Youngest age drugs taken	1 = never, 2=<14 3=14-18, 4=>18
Separated from Mother / Father	Yes / No
Change in Parenting	Yes / No
Number of changes of parenting	Groups 1 - 6
Age at first change in parenting	No change, <6, 6-11, 12-16
Family size	Groups 1 - 5

Analysis

- Univariate analyses to test the association between ES and each variable individually (n=1315)
 - Outcome Variable (ES v LS) = binary
 - Exposure Variables not normally distributed
 - Used LOGISTIC REGRESSION

- Multivariate analysis to find important predictor variables while adjusting for potential confounder
 - MULTIVARIATE LOGISTIC REGRESSION
 - Forward stepwise regression
 - N=950

Results – Univariate analysis

Variable	OR	P	Age at first change of parenting	
Female Sex	0.60	0.009	No Change	1
Father Criminal	2.80	<0.001	< 6years	1.98 < 0.001
Father Prison	3.66	<0.001	6-11	1.96 < 0.001
Sibling Criminal	2.44	<0.001	12 - 16	2.60 < 0.001
Sibling Prison	3.80	<0.001	Age first used drugs	
Mother Psych	1.67	0.001	Never	1
Maternal Separation	2.62	<0.001	Under 14	6.45 <0.001
Paternal Separation	2.23	<0.001	14 – 18	4.27 <0.001
			Over 18	1.56 0.005
			Family Size	
			1	1
			2	1.53 0.01
			3	2.06 <0.001
			4	2.31 <0.001
			5	2.17 <0.001

Results – Univariate analysis

Variable	OR	P	Age at first change of parenting
Non Significant Results:			
Birth injury			No Change 1
Epilepsy < 15			< 6years 1.98 < 0.001
			6-11 1.96 < 0.001
Criminal History Mother			12 - 16 2.60 < 0.001
Mother – Prison			drugs
Social Class of Father			Never 1
Psychiatric History Father			Under 14 6.45 <0.001
			14 – 18 4.27 <0.001
Psychiatric History Sibling			Over 18 1.56 0.005
			Family Size
Maternal Separation	2.62	<0.001	1 1
			2 1.53 0.01
Paternal Separation	2.23	<0.001	3 2.06 <0.001
			4 2.31 <0.001
			5 2.17 <0.001

Results – Multivariate Analysis

Variable		Odds Ratio	95% CI	P value
Age at first use of drugs				
Never		1.0		
Under 14		17.24	(3.84 – 21.08)	<0.001
14-18		4.40	(2.83 – 6.85)	<0.001
Over 18		1.63	(1.08 – 2.47)	<0.001
Sibling prison				
	No	1.0		
	Yes	2.69	(1.59 – 4.53)	<0.001
Father prison				
	No	1.0		
	Yes	3.83	(1.21 – 12.05)	0.021
Maternal separation				
	No	1.0		
	Yes	2.53	(1.74 – 3.68)	<0.001
Family size				
	No Siblings	1.0		
	Unit increase	1.16	(1.00-1.36)	0.046

Conclusions

- Study adds weight to the hypothesis that early and late starter offender groups who have schizophrenia have different developmental / social risk factors
- Resources to support vulnerable children and families, and to minimise early exposure to drugs may reduce early start offending in people who develop schizophrenia

Questions.....

- Was I right to use logistic regression and what are the advantages and disadvantages over parametric methods?
- How do I know if I am getting false positives or false negatives?
- Why are so few variables significant in the multivariate analysis when there are so many significant in the univariate analysis?