Maternal and paternal antisocial disorder, prenatal exposure to cigarette smoke, and other risk factors for the development of conduct disorder

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Why measure parental psychopathology in studies of child behavior development?

- Psychopathology runs in families
- Genetically informative studies consistently find evidence for genetic contribution to psychopathology
- Parental psychopathology is associated with most suspected non-genetic (environmental) risk factors

Why measure parental psychopathology in studies of child behavior development?

- Difficult to assess whether risk factors are causal if correlated to possible (unmeasured) genetic factors
- Cannot measure possible gene-environment interactions
- Little is known about early environment of children with parents with different types of psychopathology because there are very few population based studies

Parental psychopathology in studies of child behavior development is necessary in order to:

- Better control possible genetic effects in measuring environmental risk factors
- Model possible gene-environment interactions
- Understand better the relationship between parental psychopathology and environmental risk

Parental psychopathology in the LSCDQ

- Three major psychiatric disorders assessed in both parents
  - Antisocial disorder
  - Alcohol and drug dependence
  - Major depression

Parental psychopathology in the LSCDQ

- Self-administered questionnaires
- DSM-based criteria used but adapted to needs of study
- Only antisocial disorder addressed in this presentation

Why assess parental antisocial disorder?

- Major goal of study is to determine risk factors for antisocial behavior
- Paternal antisocial disorder is the single most predictive factor for persistent antisocial behavior in offspring
- Outcome studies of conduct disorder have found most suspected risk factors for conduct disorder are also outcomes of conduct disorder

Why assess parental antisocial disorder?

- Impossible to determine if common suspected risk factors for offspring antisocial behavior are causal if association with parental antisocial disorder is not accounted for
- Very little is known about family environment in the first few years of life of children with antisocial parents

Assessing maternal and paternal antisocial disorder in the LSCDQ

- Use as a control or covariate
  - Difficulty with DSM ASP diagnosis presence/absence
- No well-established demarcation between presence/absence of disorder
- It is multiple behaviors and persistence over time that is believed to be the disorder
  - Individual symptoms are not specific

Assessing maternal and paternal antisocial disorder in the LSCDQ

- Parents are not a random sample of the population
  - Youngest parents have not opportunity to have adult behaviors
- Assessing antisocial behavior in mothers is difficult
  - Many fewer studies on antisocial women
  - Pregnancy and child-bearing reduce opportunities for antisocial behavior

Principles for assessing parental antisocial disorder in the LSCDQ

- Classify parents as:
  - No disorder
  - Clearly disordered
  - Intermediate/ambiguous
- Compare mothers to mothers and fathers to father
  - Gender specific criteria acceptable

Principles for assessing parental antisocial disorder in the LSCDQ

- Assess both child and adult antisocial behaviors
  - Classify young parents with child symptoms only
  - Does conduct disorder predict conduct disorder?
- Brief, self-administered questionnaire
  - Take advantage of on-going studies in various fields
  - A brief scale more likely to be used

Symptoms of antisocial disorder chosen for the LSCDQ

- Based on the NIMH Epidemiologic Catchment Area study of psychiatric disorder in the general population
- Mixture of most common symptoms
- Aggressive and non-aggressive symptoms

Symptoms of antisocial disorder chosen for the LSCDQ

- Conduct disorder symptoms: "Before the end of high school did you…"
- Adult symptoms "Since leaving or finishing school did you…"
- 4 CD symptoms for men; 5 for women
- 4 adult symptoms

Completion rates

- Questionnaires included questions on child behavior and other variables; antisocial symptoms near end
- 96.6% of mother returned questionnaire
- 97.7% of mothers who returned questionnaires answered all antisocial questions

Completion rates

- 85.2% of fathers completed questionnaires
  - 9.3% of fathers not living in the home
  - 42% of non returns were due to fathers not living in the home
- 98.8% of fathers who returned questionnaires answered all antisocial questions

Completion rates: conclusions

- Parents will answer questions in a self-administered questionnaire on antisocial behavior
- Fathers less likely to return questionnaires
  - Not due to antisocial questions
- Assessing fathers not in home remains a problem

Prevalence of conduct symptoms

	Mothers (2048)	Fathers (1763)
Stole more than once	17.7%	27.1%
More than one fight/*often started fights*	3.3%	9.9%
Arrested/in trouble with authorities	3.8%	8.5%
Skip school > twice in one year/*suspended*	47.5%	19.8%
Runaway from home overnight	9.7%	-

Prevalence of adult symptoms

	Mothers (2048)	Fathers (1763)
Fired from a job/ *more than once*	9.2	5.6
Arrested (other than traffic violations)	1.4	10.5
Hit or throw things at spouse/partner	10.4	
Fights more than once, or assaulted, hurt someone		7.2
Trouble due to drugs/alcohol	1.3	5.8

How do we classify parents for antisocial disorder?

- Symptoms are categorical variables
- Indicators of underlying latent (hidden; unmeasured) variable “antisocial disorder”
- Add up the symptoms?
  - How do you add up both child and adult symptoms?
  - Does this reflect the number of groups that we really think are there?
  - Equal weight to each symptom-is this realistic?

How do we classify parents for antisocial disorder?

- Problems with DSM-IV threshold
  - Where do we classify subjects with some symptoms but not enough to meet threshold?
  - What about young parents?
  - DSM-IV criteria largely developed on clinical/prison samples—applicability to the general population and or women?

A solution: latent class models

- Basic principle is indicators (symptoms) are independent within levels of a latent variable
    - Equivalent to assumption that symptoms are related, or due to, presence of antisocial disorder
- Uses log-linear modelling which is appropriate for categorical data

A solution: latent class models

- Most importantly can model latent variable directly as response or predictor variable
- Newer software is relatively user friendly
    - Latent GOLD by Magidson and Vermunt

Latent class models: basic strategy

- Fitting the large cross-classified table of all indicators (8 dichotomous indicators gives 256 cells)
- Number of latent classes chosen by investigator
- Find most parsimonious (least number of classes) model using BIC (Bayesian Information Criterion)
- Test to see if this model fits the data by comparing observed and expected cell frequencies for crosstabulation of indicators
- Add other variables as response or predictor variables to look for associations with latent class

Best model for mothers: 3 latent classes

Latent class size	"Not antisocial“ 0.60	"Indeterminate“ 0.37	"Antisocial“ .03
Stole more than once	0.02	0.37	0.94
More than one fight	0.004	0.05	0.39
Arrested/in trouble with authorities	0.002	0.06	0.63
Skip school > twice in one year	0.34	0.67	0.89
Runaway from home overnight	0.02	0.14	0.56
Fired from a job	*0.06*	*0.13*	*0.26*
Arrested (other than traffic violations)	*0.003*	*0.02*	*0.13*
Hit or throw things at spouse/partner	*0.03*	*0.19*	*0.66*

Maternal antisocial disorder: conclusions

- Symptoms clearly distinguished between "no disorder" and "antisocial disorder"
- Even with moderate antisocial symptoms only small percentage of mothers clearly have "antisocial disorder"
- Conduct disorder symptoms more important than adult symptoms

Maternal antisocial disorder: conclusions

- But, large group of mothers who are "ambiguous"
  - In part reflects common symptoms such as truancy
  - Adolescence limited in this group?
- Reflects (limited) knowledge about antisocial behavior in females

Risk factors by latent classes for mothers

Latent class size	"Not antisocial" 0.60	"Indeterminate" 0.37	"Antisocial" .03
Age <21 (.06)	0.03	0.09	0.21
Biologic father not in the home	0.06	0.20	0.51
Smoked during pregnancy	.18	.33	.53

Maternal antisocial disorder and risk factors

- Being a young, single mother who smokes during pregnancy does not occur "at random"—it is often a constellation of other problem behaviors
- Offspring of these mothers may be at risk for antisocial disorder due to mother's own history of antisocial disorder and/or interaction among all these risk factors

Best model for fathers in two parent families

Latent class size	"Not antisocial" 0.73	"Adolescence only" 0.16	"Antisocial" 0.11
Stole more than once	0.14	0.74	0.47
Often started fights	0.05	0.20	0.06*
Arrested/in trouble with authorities	0.002	0.37	0.24
School suspension	0.09	0.41	0.56
Fired from a job	*0.04*	*0.07*	*0.17*
Arrested (other than traffic violations)	*0.03*	*0.07*	*0.63*
Fights more than once, assaults	*0.03*	*0.03*	*0.41**
Trouble due to drugs/alcohol	*0.01*	*0.02*	*0.40*

Age as covariate for latent classes for fathers

Latent class size	"Not antisocial" 0.73	"Adolescence only" 0.16	"Antisocial" 0.11
Age groups of fathers			
<25	.06	.16	.15
25-29	.25	.38	.23
30-34	.36	.36	.20
35-39	.25	.08	.25
40 and older	.08	.02	.17

Paternal antisocial disorder: conclusions

- 11% of fathers in two parent families "persistently antisocial" in general population sample—not rare or negligible!
- Latent class method very useful in distinguishing adolescent limited from persistently antisocial

Paternal antisocial disorder: conclusions

- Age of father significant relation to latent classes
  - Some “adolescence limited” may turn out to be “persistently antisocial” as they get older
  - Illustrates importance of looking at age
- Further analyses need to be done to look at how these latent classes differ on other variables

Risk factors by latent classes for fathers in two parent families

Latent class size	"Not antisocial" 0.73	"Adolescence only" 0.16	"Antisocial" 0.11
Mother smoked during pregnancy	0.20	0.23	0.44
Yes	0.61	0.17	0.22
No	0.80	0.14	0.06

Maternal prenatal smoking and paternal antisocial disorder

- Strong association between maternal prenatal smoking and "persistently antisocial disorder" in fathers
- Absence of association to adolescence limited shows usefulness of latent class method
- Infants exposed to prenatal smoke during pregnancy are also 3.7 times more likely to have a persistently antisocial father

Maternal prenatal smoking and paternal antisocial disorder

- Because having an antisocial father is a strong risk factor for offspring antisocial disorder this association must be controlled for when looking at prenatal smoke as a risk factor
- NONE of the published studies on effects of prenatal smoke have adequately controlled for paternal antisocial disorder

Conclusions

- Assessing maternal and paternal antisocial disorder can be done easily with a brief self-administered questionnaire in large-scale studies
- Latent class models give meaningful classification of antisocial symptoms and allow modelling of latent classses with other variables

Conclusions

- Parental antisocial disorder is related to a variety of suspected risk factors for adverse behavior development in the child
- Researchers should include measures of maternal and paternal antisocial disorder in studies looking at adverse child development

Future directions (and problems)

- Need to model the child as the unit of analysis with mother and father characteristics jointly
- Need to account for missing fathers, who are not missing at random
- Need to incorporate genetic relatedness into models