

The Adoption Design as a Tool for Specifying Preventive Intervention Targets

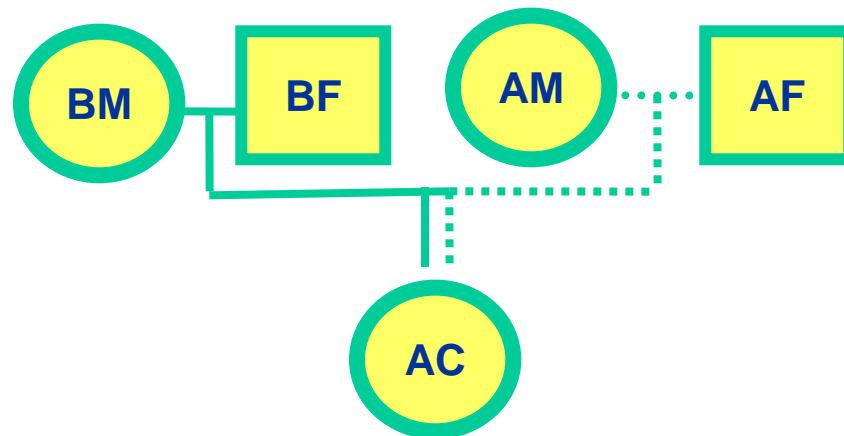
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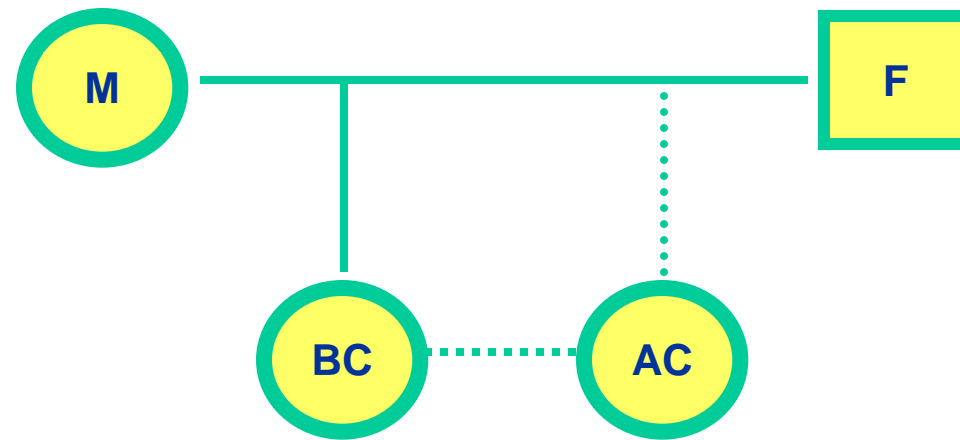
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Parent-Child Offspring Adoption Design



Child-Sibling Adoption Design



BC = biological child

AC = adopted child

Variance Components

- **Heritability:** Proportion of total variance that can be explained by genetic differences between individuals (similarity between birth parent and adopted child).
- **Shared Environment:** Environmental influences that serve to make individuals more similar to each other, such as parenting, SES conditions, neighborhood (similarly between adoptive parent and adopted child).
- **Nonshared Environment:** Environmental influences that serve to make individuals different from one another (e.g., peers, teachers, parenting). Includes measurement error.

Genetic Relatedness

	G	E-sh	E-ns
	Reared Together		
Full Sibs	.50	1.0	0
Half Sibs	.25	1.0	0
Adoptive Sibs	0	1.0	0
Bio Parent-Child	.50	1.0	0
Adopt Parent-Child	0	1.0	0

Important Misconceptions!

- Heritability *does not* equal immutability—highly heritable behavior can still change and be modified by the environment
- *Mean level shifts* can occur in the absence of correlational shifts
- Heritability can, and does, *change over time and across contexts*
- Genetic influences *do not operate in isolation*. The environment is needed for the expression of genetic influences

How Can Adoption Studies Inform Prevention Science?

- Through advancing our understanding of etiology
- By suggesting developmental periods that may be more opportune for prevention
- By suggesting target behaviors that may represent early risk for specific outcomes
- Through identifying dynamic processes that present opportunities for intervention

Ongoing U.S. Adoption Studies

- *Colorado Adoption Study* (CAP; 245 sets of birth parents, adopted children, adoptive parents and 245 sets of matched biological parent-child dyads). Contact: <http://ibgwww.colorado.edu/cap/>
- *Northeast-Northwest Collaborative Adoption Projects* (N2CAP; 241 adoptive families and their 354 children with home visit data; 1162 families in total). Contact: Stephen Petrill, spetrill@ehe.ohio-state.edu
- *Sibling Interaction and Behavior Study* (SIBS; 409 adoptive and 208 nonadoptive sibling pairs). Contact: Matt McGue, mcgue001@umn.edu
- *Early Growth & Development Study* (EGDS; 358 sets of birth parents, adopted children, adoptive parents). Contact: Leslie Leve, lesliel@oslc.org

EGDS study design

- 558 domestic infant adoption placements to non-relative families throughout the US (358 in EGDS-Toddler and 200 in EGDS-Prenatal)
- Yoked Adoption Unit: Birth mother/birth father, adoptive mother/father, & adoptive child
- Adoption occurred within 3 mo. post-partum
- Infant free of major medical problems
- *3 major assessments for birth parents and 6 major assessments for adoptive families* spanning infancy through 1st grade
- Multimethod, multiagent approach

How Can Behavior Genetics Inform Prevention Science?

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Example: Etiological differences

- Adolescent alcohol and drug use *initiation* is influenced more by shared environment than is *problematic use or moderate use* (Rhee et al., 2003)
- Prevention application: Tailor the intervention to be specific to the etiology
 - ✓ *The family system (and other shared environmental systems) may be more effective intervention targets in preventing drug use onset and initiation than in curbing heavy use*

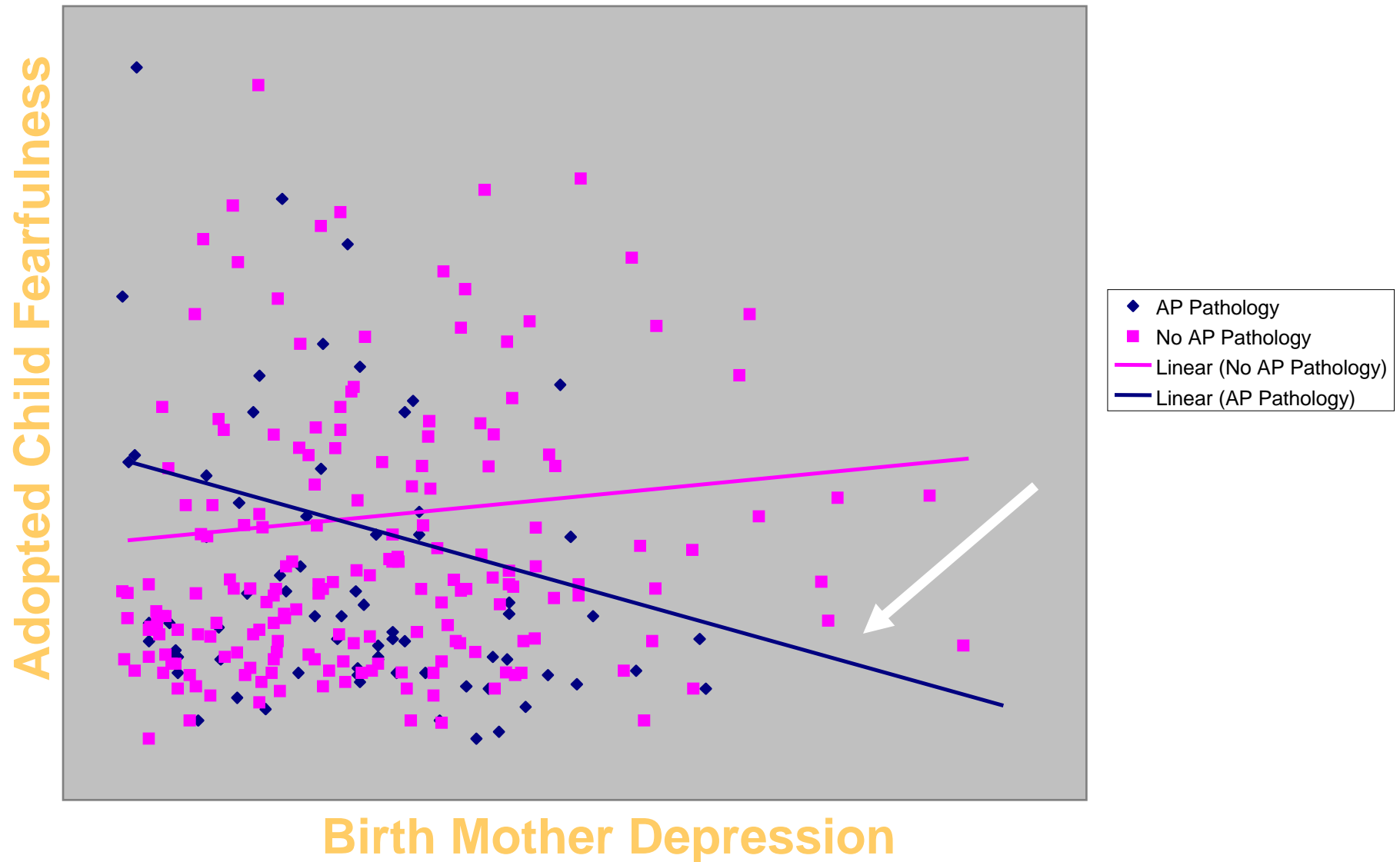
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Example: Developmental Sequencing

- Genetic risk for internalizing (anxiety/atypical approach/inhibition patterns during inhibition tasks) in 9-month-olds only present when one of the adoptive parents elevated on anxiety or depression (EGDS team, in prep)
- Prevention application: This shared adoptive parent-child phenotype is **not** the result of shared genes; an averse family context may bring out adverse genetic influences early in development
 - ✓ *A preventive intervention enhancing sensitivity with depressed/ anxious parents during early infancy may buffer against adverse genetic influences on internalizing problems*

Infants with depressed birth parents and adoptive parents with elevated depression/anxiety show atypical approach/fear during novel situations



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Example: Age expression

- Birth parent externalizing behavior and drug use is related to the adopted infant's problems with attention decay (EGDS, in prep)
- Prevention application: Adoption studies can provide utility in identifying early risk for disorders (or strengths) through child behaviors that are genetically linked to an adult behavior, but have different phenotypic manifestations
 - ✓ *Since young children often do not display psychopathological behaviors or substance use, adoption studies can form a link between child behaviors that are genetically-linked to maladaptive adult behaviors*

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Example: Evocative effects

- Biological parents' psychiatric disorders are significantly related to children's antisocial behavior, which then mediates the association with adoptive parenting behavior (Ge et al., 1996)
- Prevention application: Identification of situations suited to child- vs. parent-focused interventions
 - ✓ *Harsh parenting in response to genetically-influenced child inhibition may be more effectively served by a parent-based intervention that works with parents on not responding to child triggers*

Recap: How Can Behavior Genetics Inform Prevention Science?

- Tailor intervention to be specific to the etiological risk
- Adjust intervention for subpopulation etiology
- Consider how etiological, developmental changes might interact with intervention; consider booster
- Examine sequelae that share etiology
- Link adult psychopathology with behavioral indicators in young children
- Increase cost-effectiveness
- Consider parent-based vs. child-based interventions
- Identify conditions under which environmental and genetic risk is most likely to lead to poor outcomes
- Reduce expression of genetic risk in next generation

Next Steps

- Sharing of information between experts in BG and experts in prevention in order to more thoroughly integrate the findings from the two fields
- Measurement of specific environmental processes (mediators/moderators) in BG studies
- Bring *prevention* research into *BG* research
- Randomized intervention trials with genetically-informed samples
- Molecular genetic studies
- Meetings/workshops *like this!*