

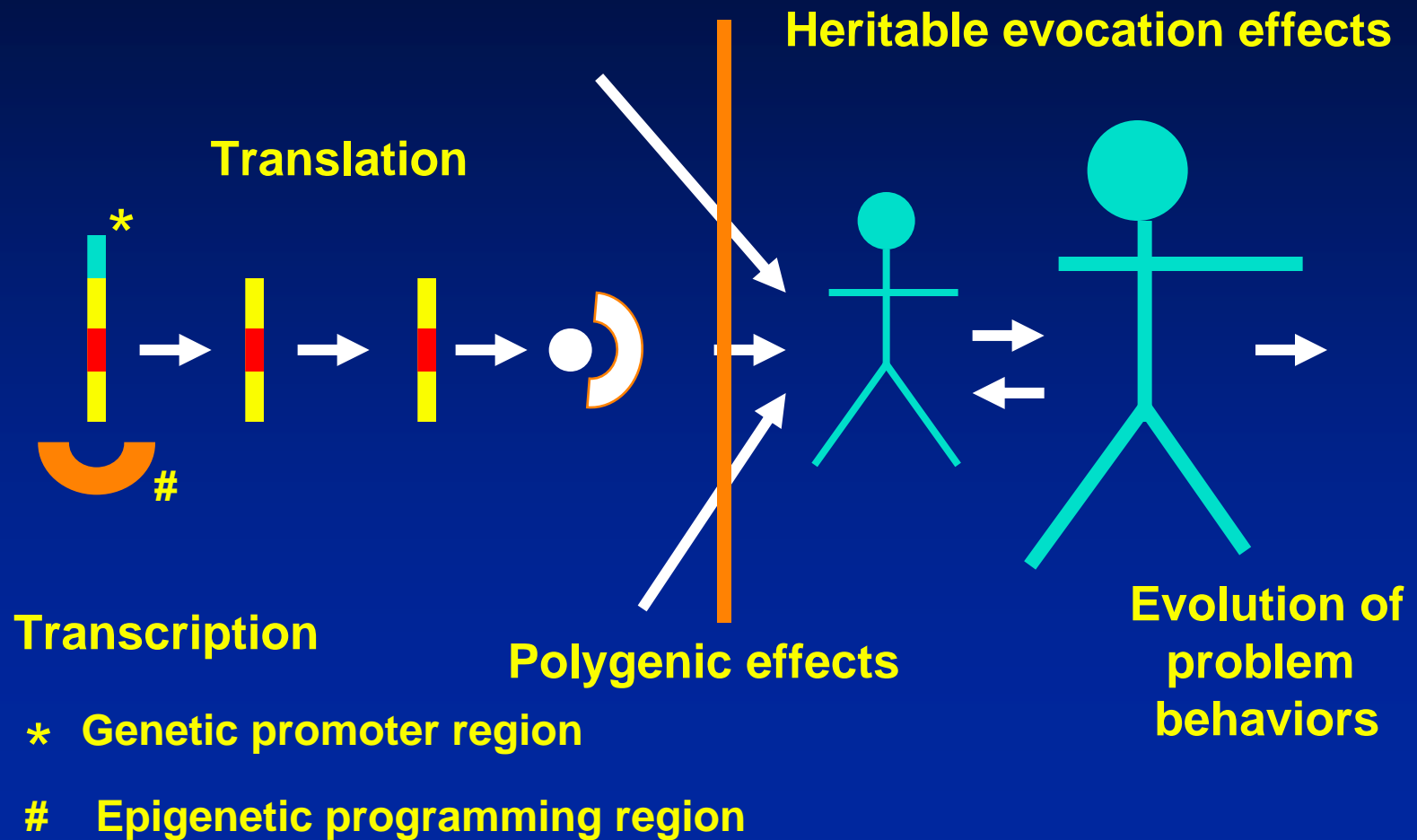
Genetic expression outside the skin: Implications for prevention

David Reiss
*Center for Family Research,
George Washington University*

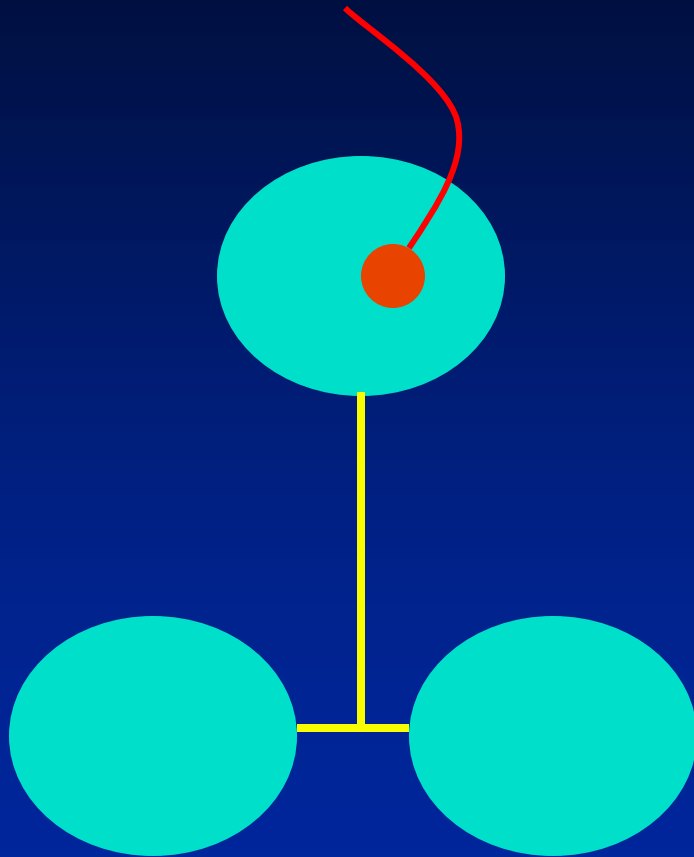
Society for Prevention Research
May 30, 2007

Note: Slides that are marked “unpublished” contain data that have not been peer reviewed and hence are particularly subject to additional analyses and amended interpretation

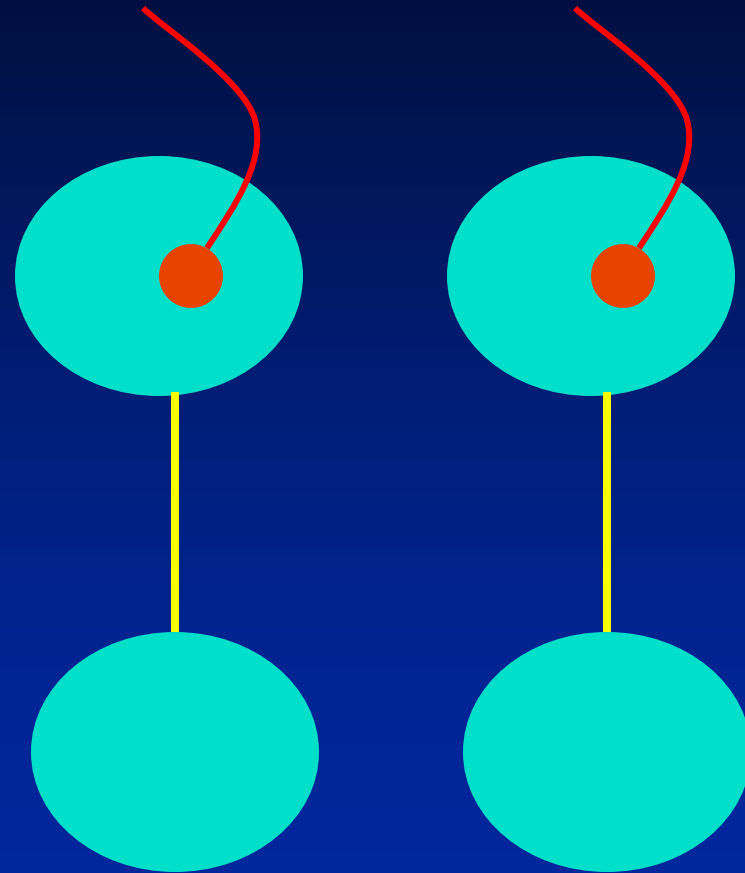
Dynamics of gene expression: a schema



Twins

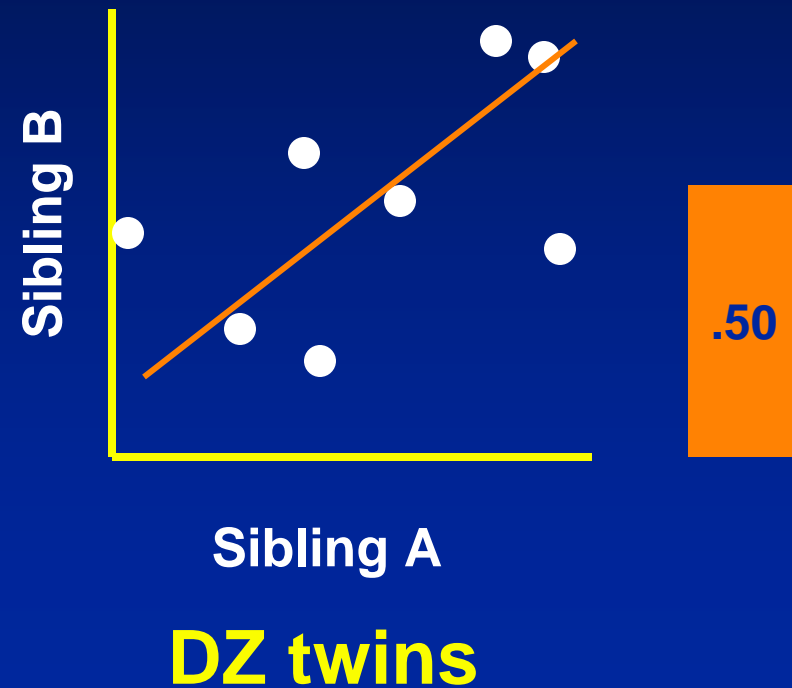
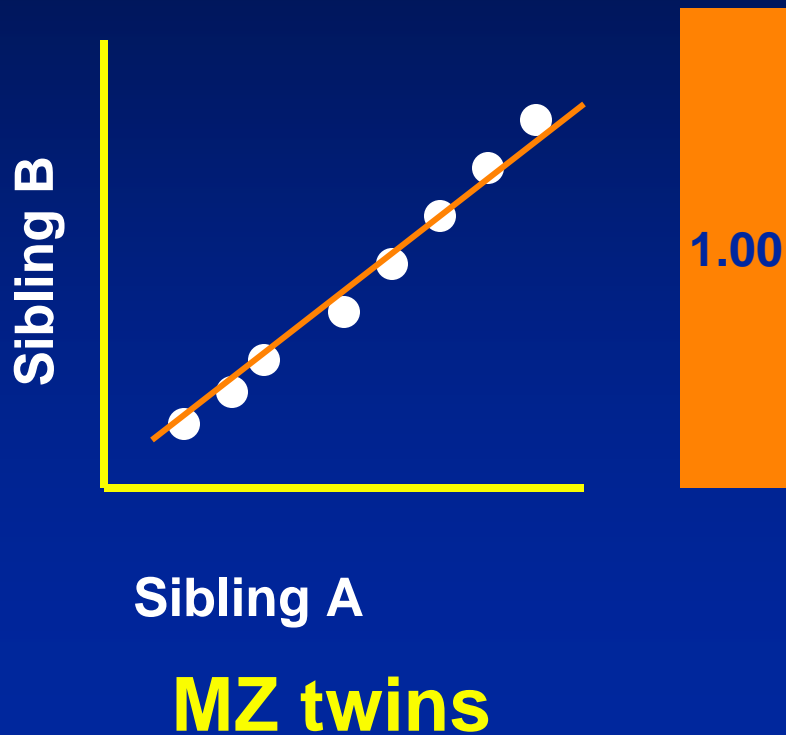


Monozygotic (MZ)

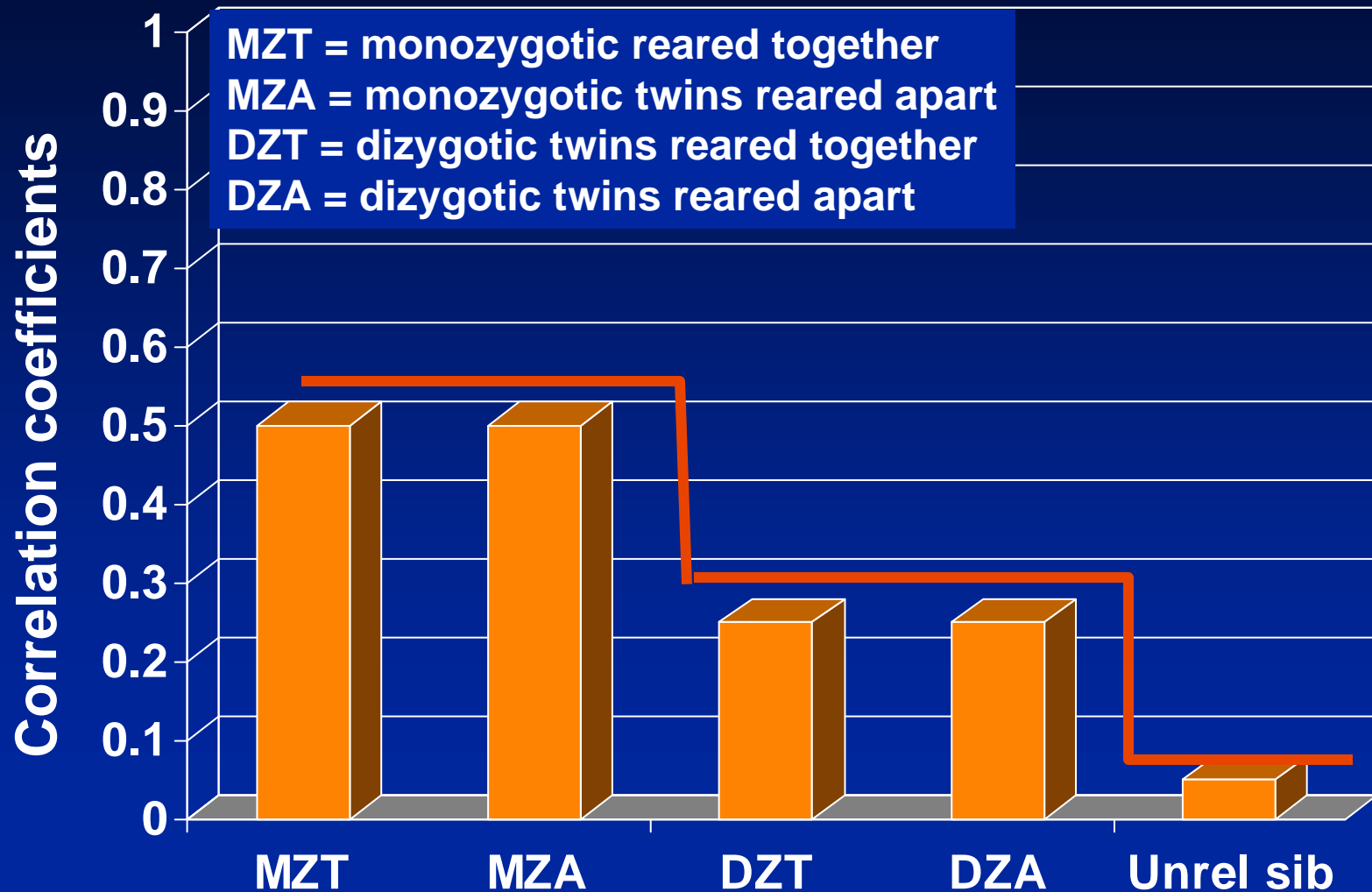


Dizygotic (DZ)

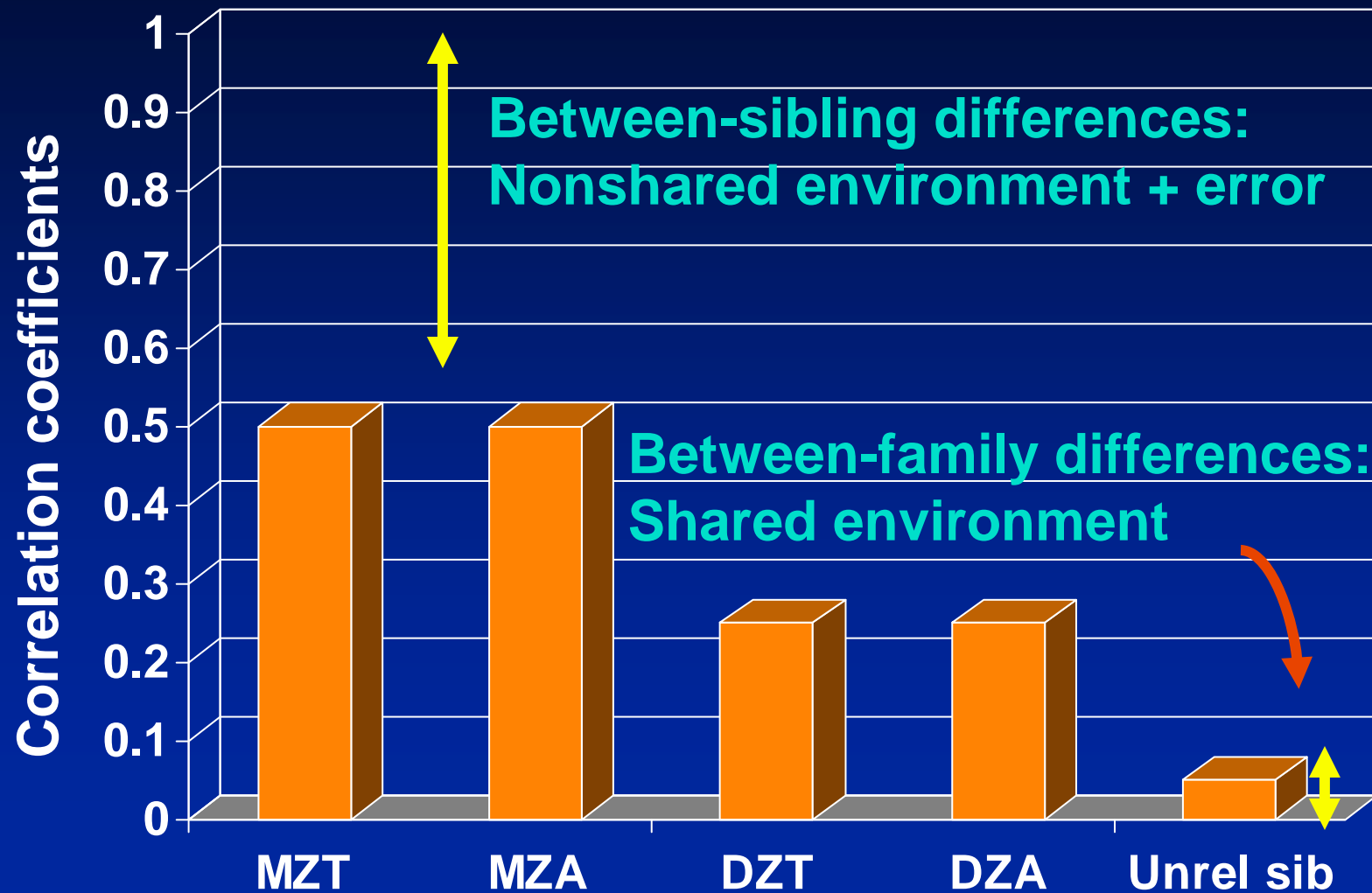
Comparison of MZ (identical) and DZ (fraternal) twins: comparing heights within twin pairs (contrived data)



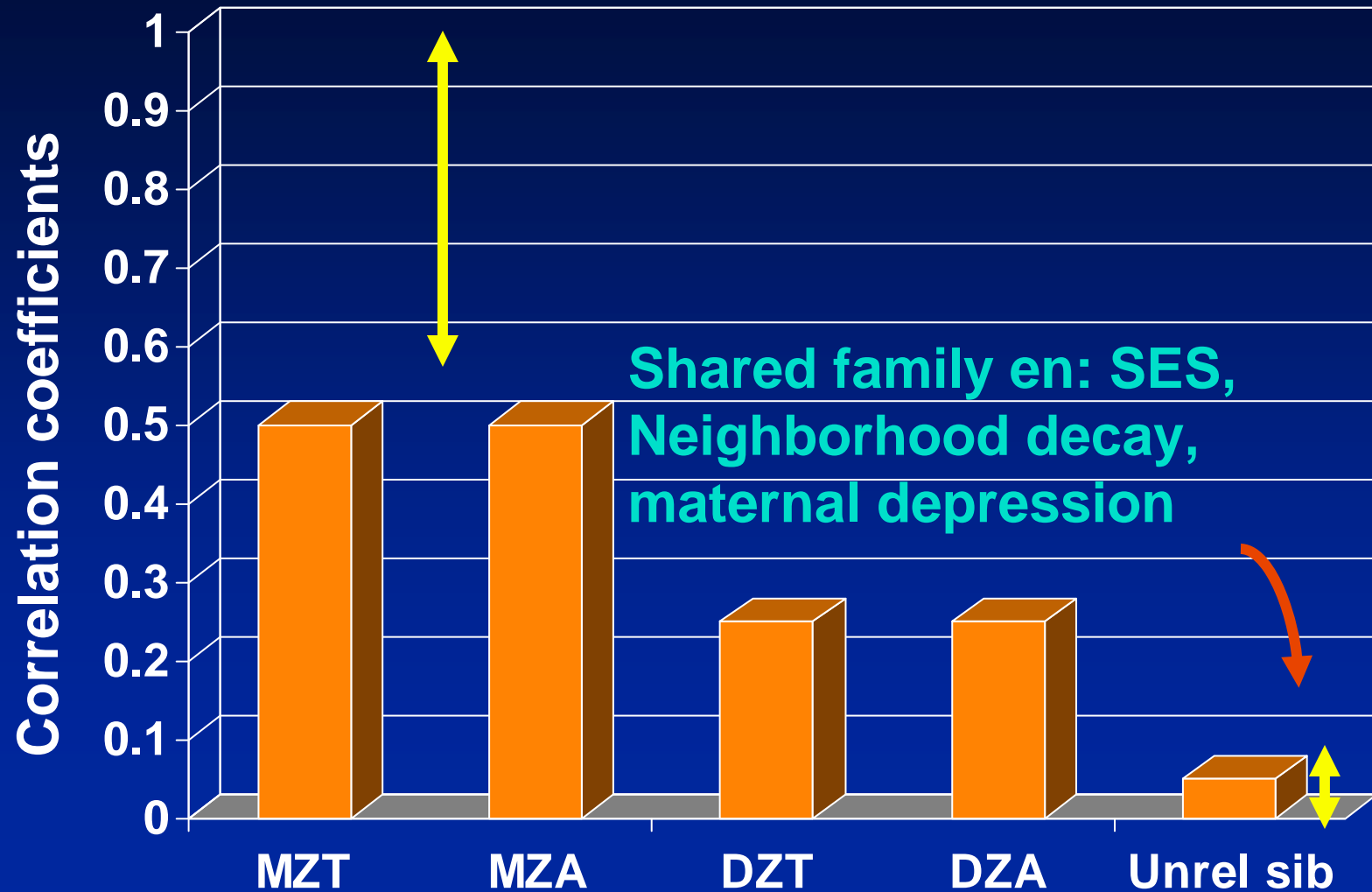
Plomin's summary of surprising findings on personality in the mid 80s (Swedish Adoption/Twin Study of Aging—SATSA)



Plomin's summary (2)



Plomin's summary (3)



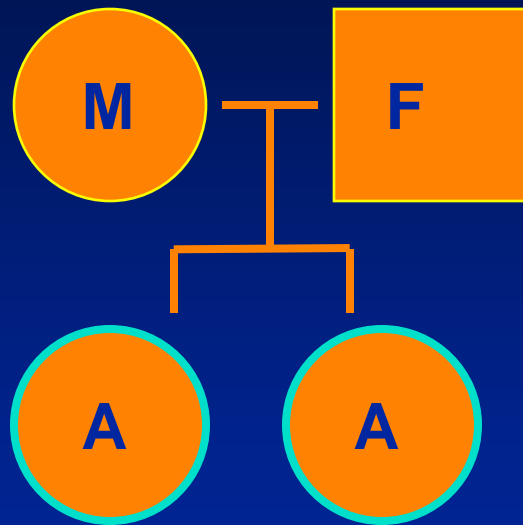


**Robert Plomin,
Institute of Psychiatry, King's
College, London**



**Mavis Hetherington,
University of Virginia**

Nonshared Environment in Adolescent Development (NEAD)



Sib type (A-A)		Genetic related.
93	MZ	100%
99	DZ	50%
95	FS-non div	50%
182	FS-step	50%
109	HS-step	25%
130	Blended step	0%

Child age	Time 1	Time 2
	11.5	14.5

Adolescent antisocial behavior

OBSERVER CODE

Disruptive, rude,
aggressive, coercive
behavior

brief, in home video

PARENT AND CHILD REPORT

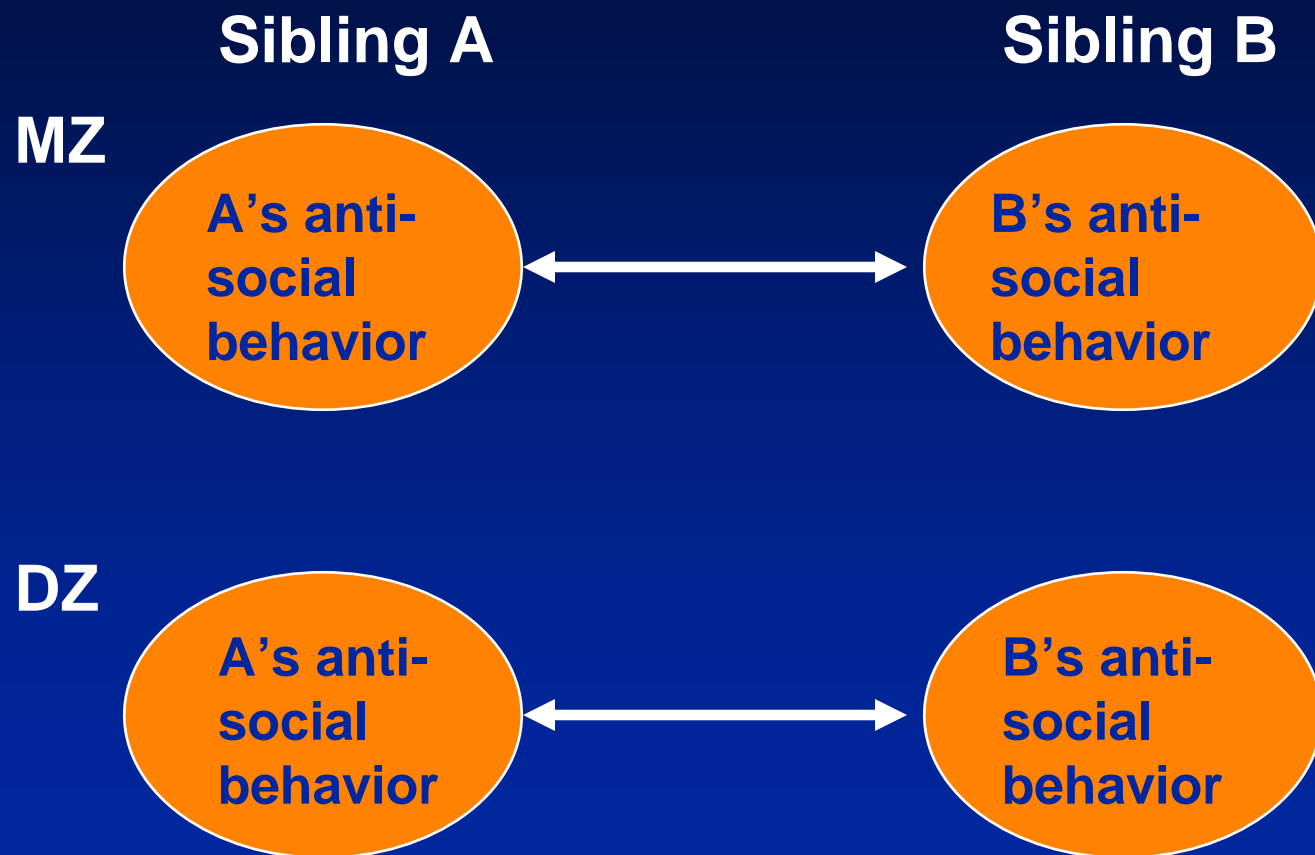
Trouble in school,
skipped school mean,
bully.

Stole, lied, cheated

home and neighborhood

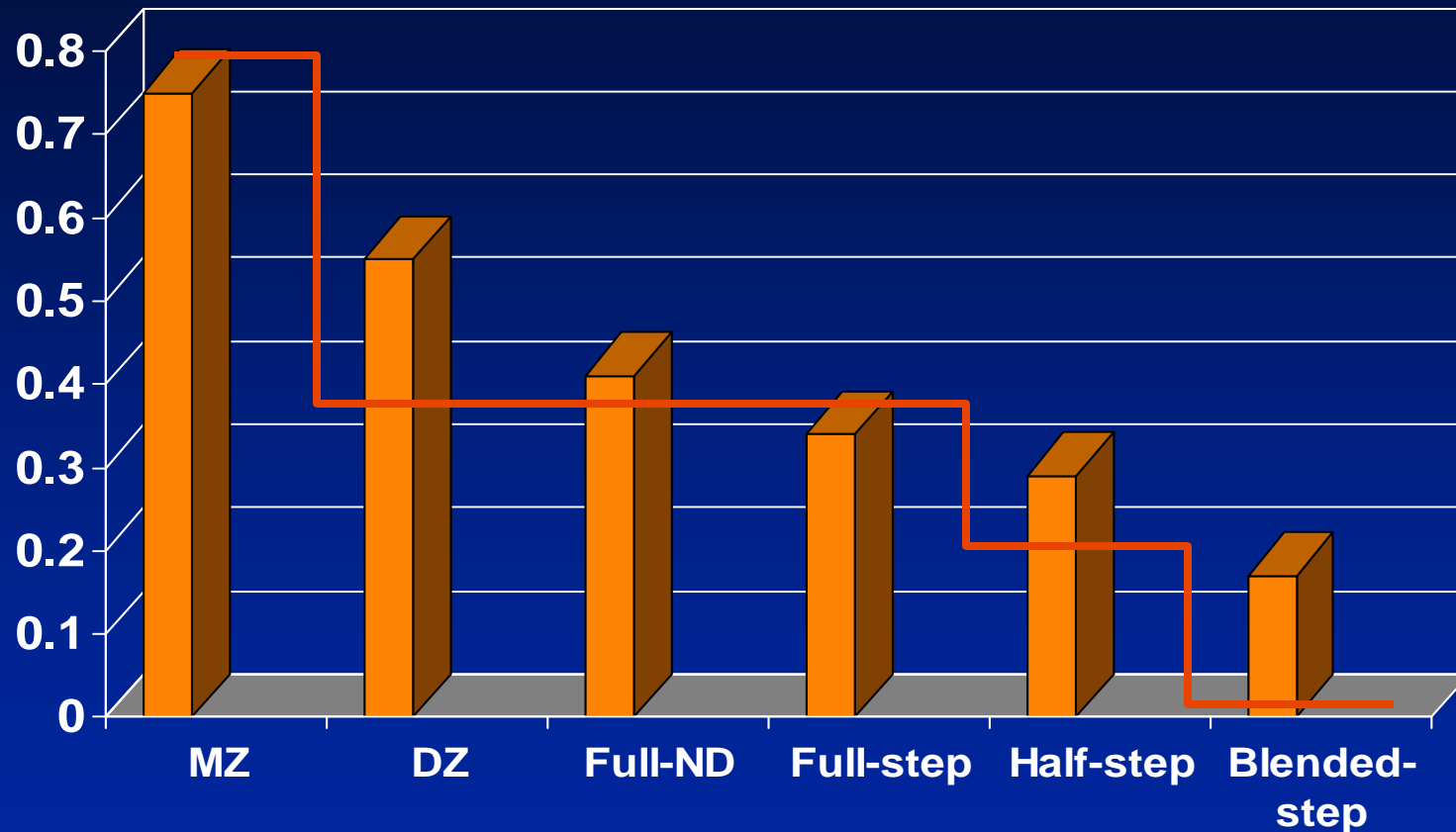
school behavior

Illustration of within sib pair correlations for estimating genetic influence on antisocial behavior



Antisocial behavior: Mother, father, child and observer reports

Numbers on vertical axis are intraclass correlations within sibships



Heritability = 67%

Environmentality: Shared = 12%

Nonshared = 21%

Parent-child negativity:

OBSERVER CODES

Anger and rejection

Coercion

Conflict

PARENT AND CHILD REPORT

Disagreement

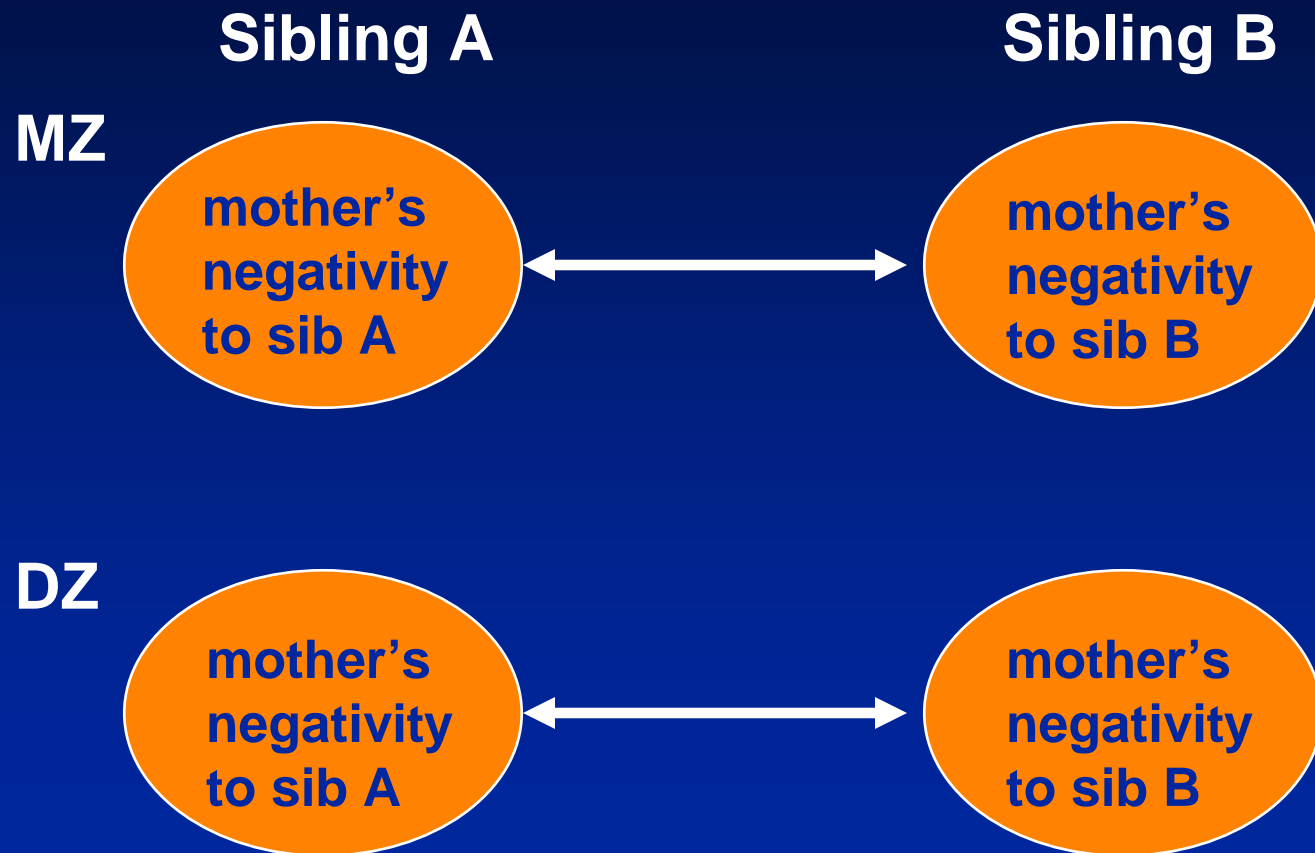
Punitiveness

Yielding to coercion

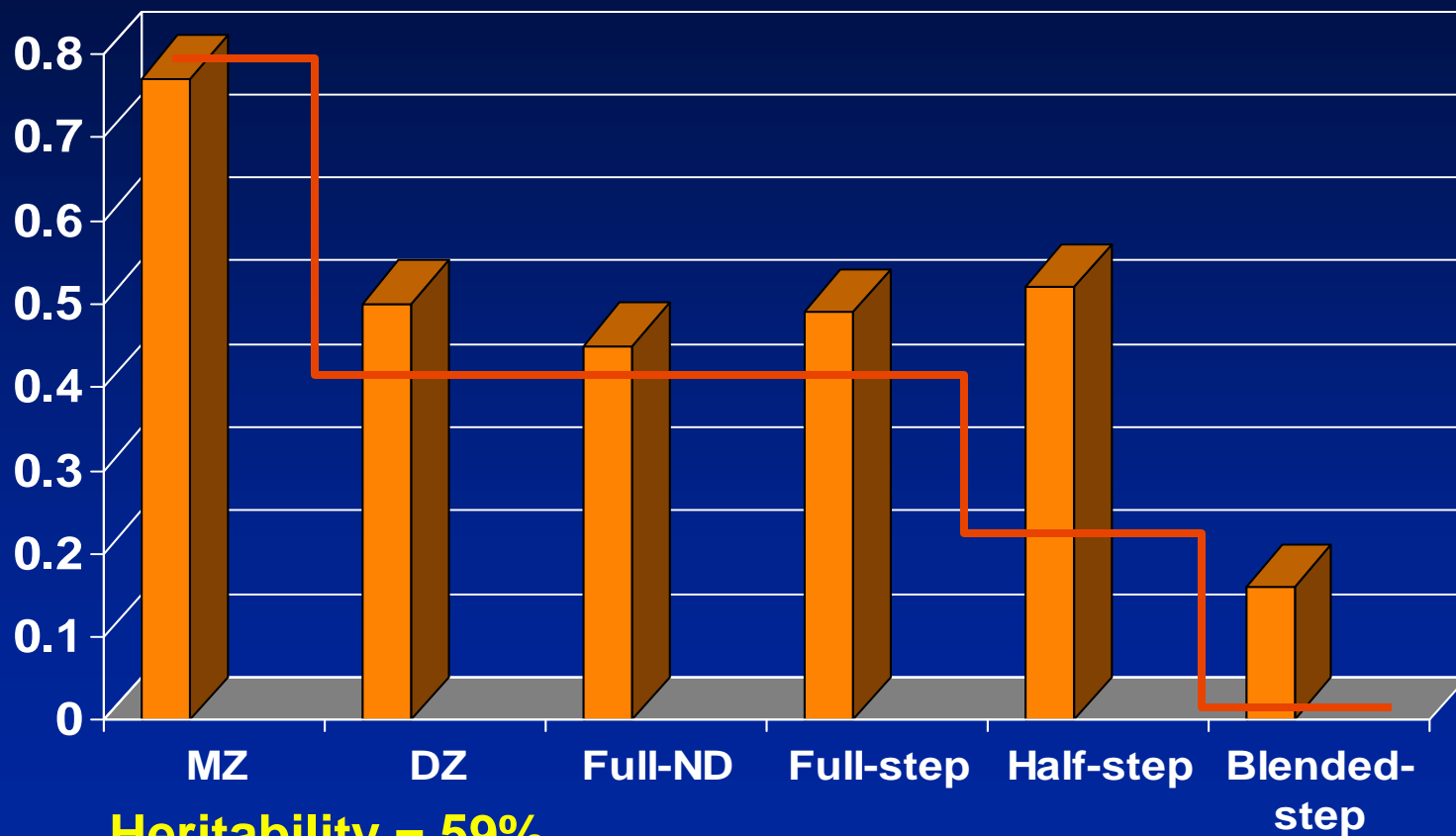
Open conflict

Verbal aggression

Illustration of within sibling correlations for detecting genetic influences on mother's negativity



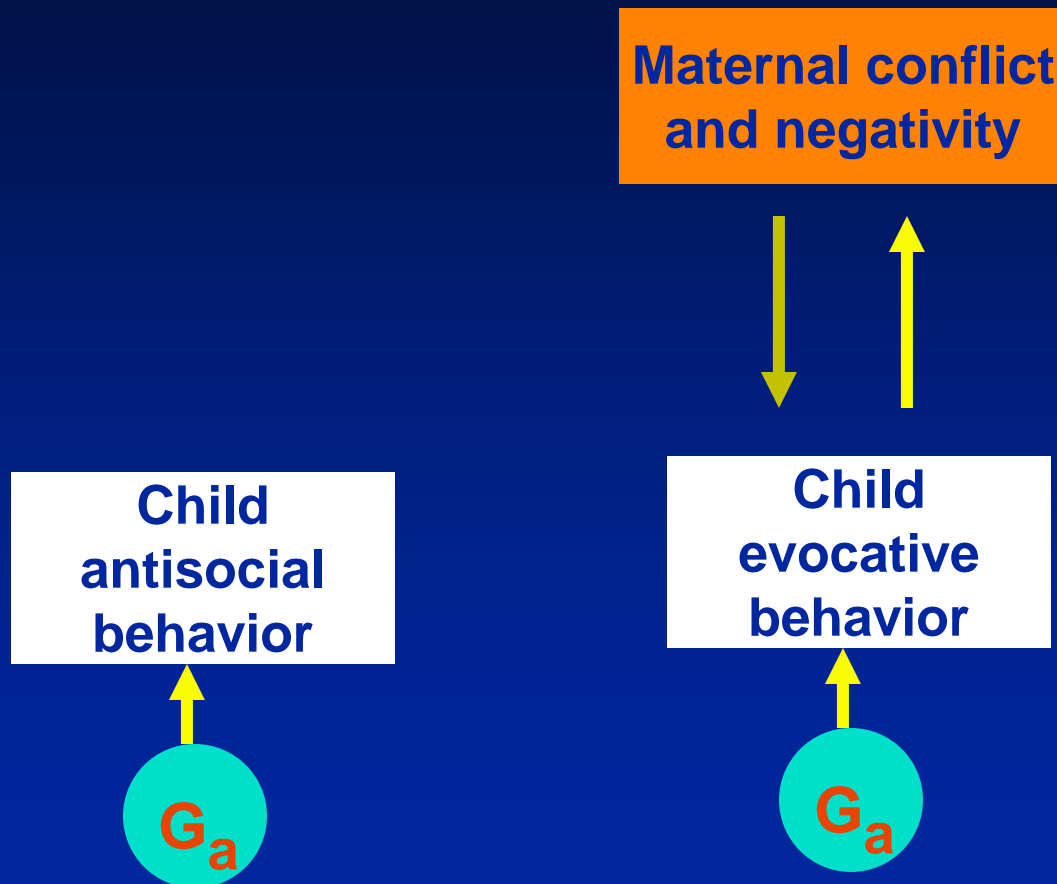
Mother's negativity towards child: ACTUAL within sibship correlations across sibling types.
Numbers on vertical axis are intraclass correlations within sibships



Heritability = 59%

Environmentality: Shared = 15% Nonshared = 26%

A simple schema of parent-child relationship



A simple schema of parent-child relationship

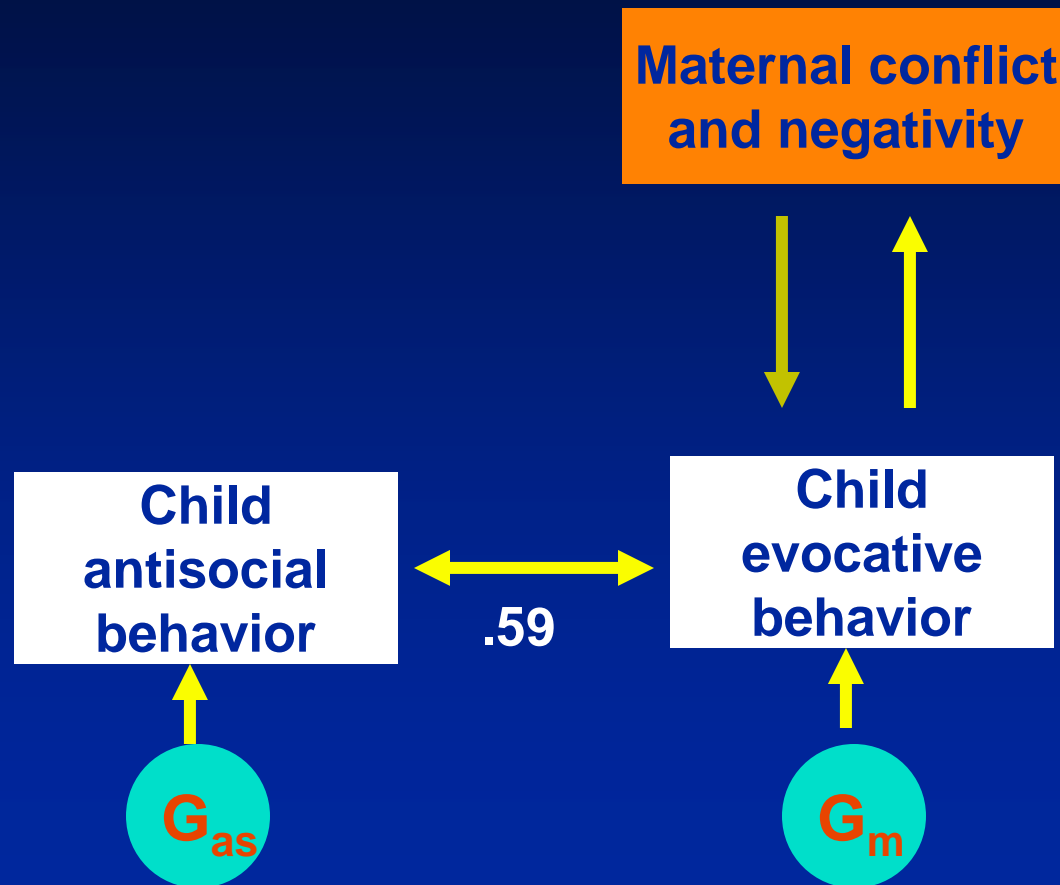


Illustration of *cross-variable*, within-sib pair correlations for detecting overlap of genetic influences

Sibling A

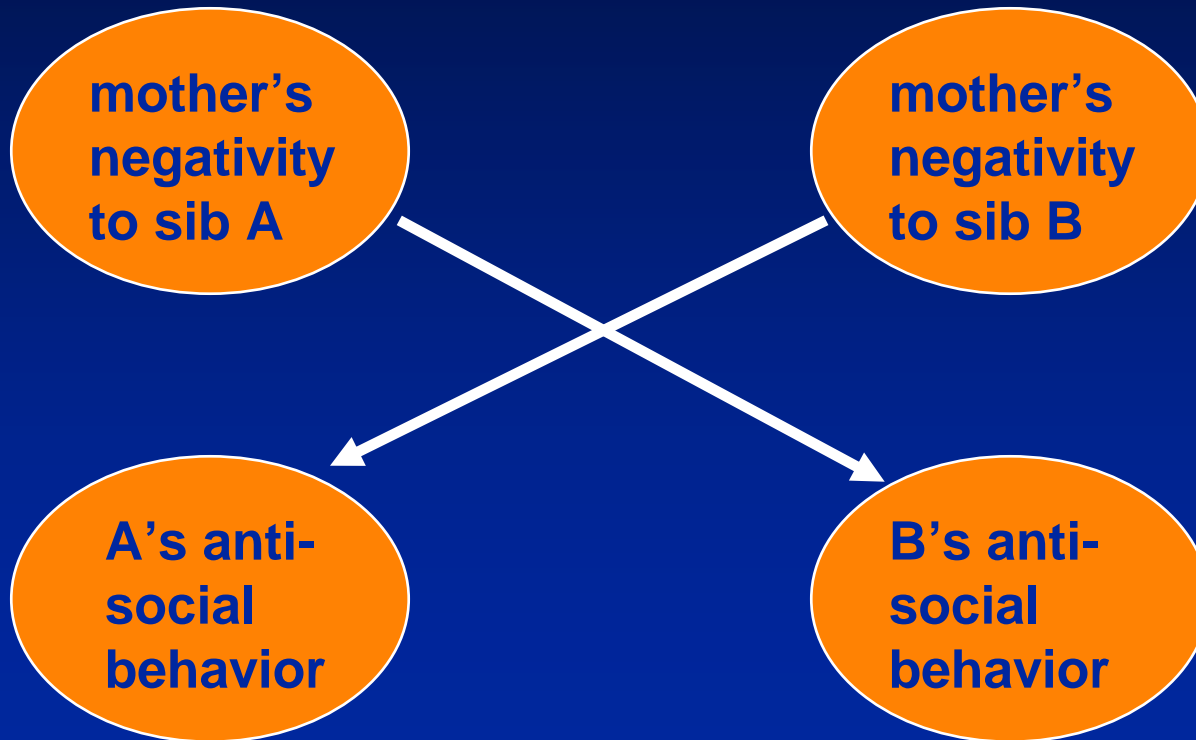
Sibling B

mother's
negativity
to sib A

mother's
negativity
to sib B

A's anti-
social
behavior

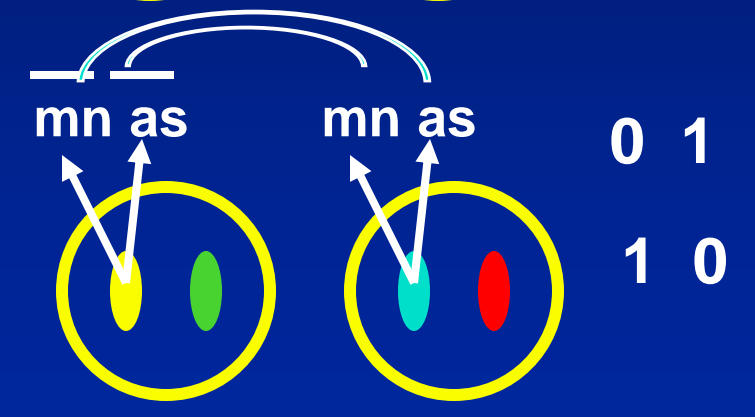
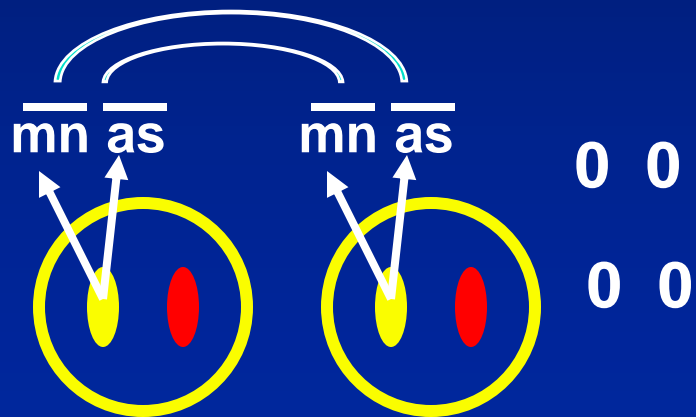
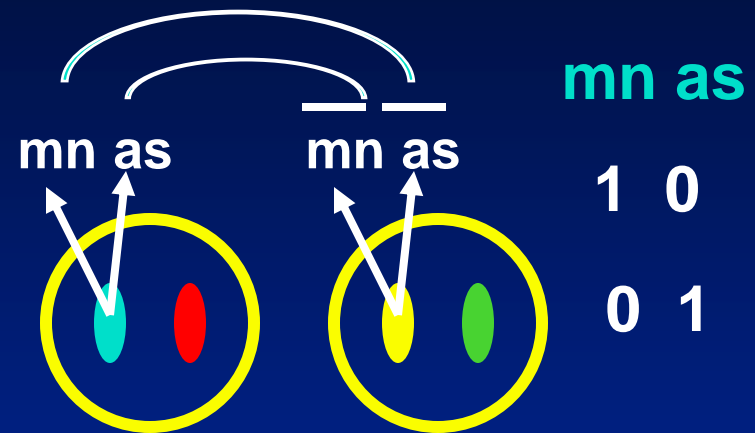
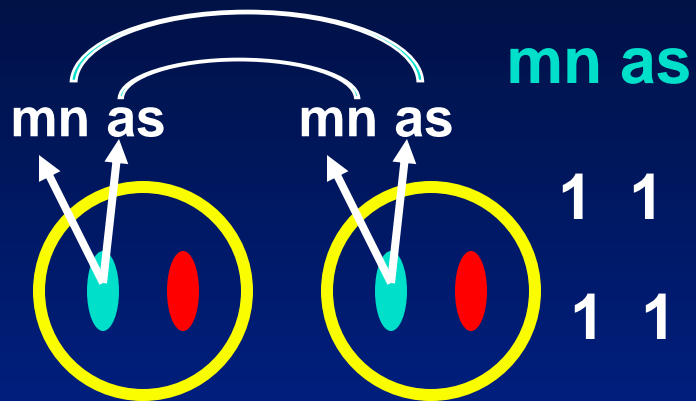
B's anti-
social
behavior



Schematic illustrating cross correlation

MZ twins (100%)

Blended sibs (0%)



mn = maternal negativity

as=antisocial behavior

Illustration of *cross-variable*, within-sib pair correlations for detecting overlap of genetic influences

Sibling A

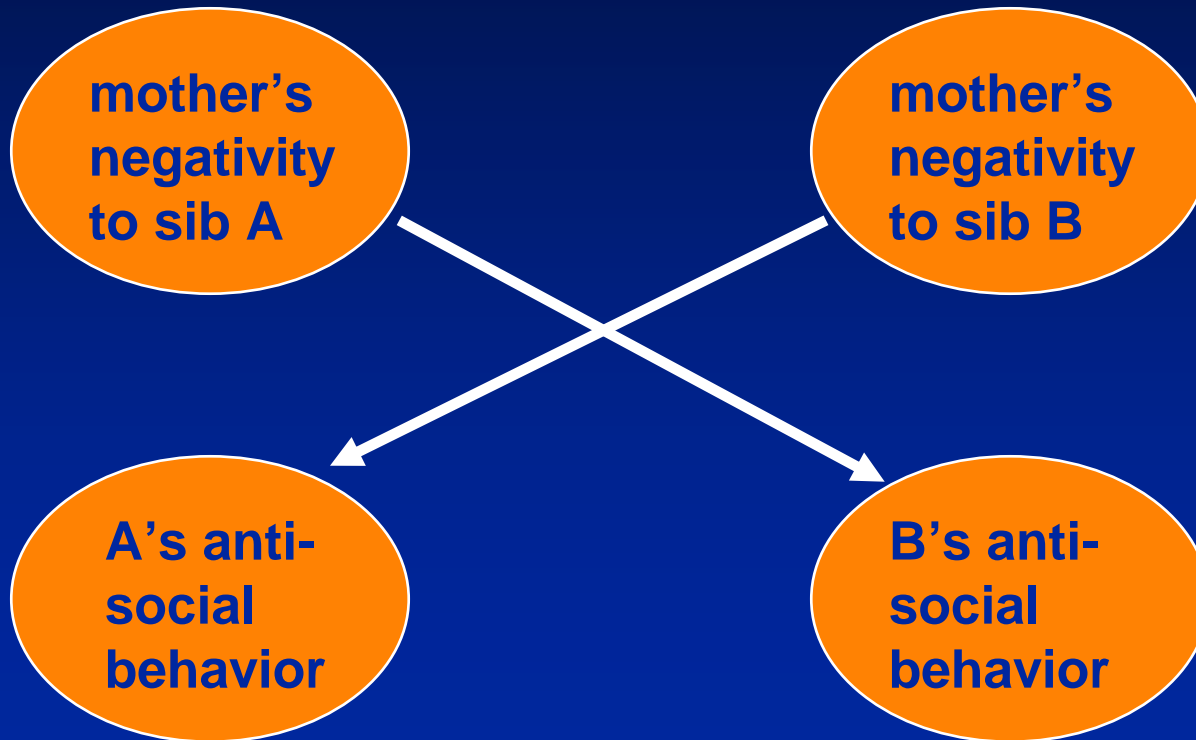
Sibling B

mother's
negativity
to sib A

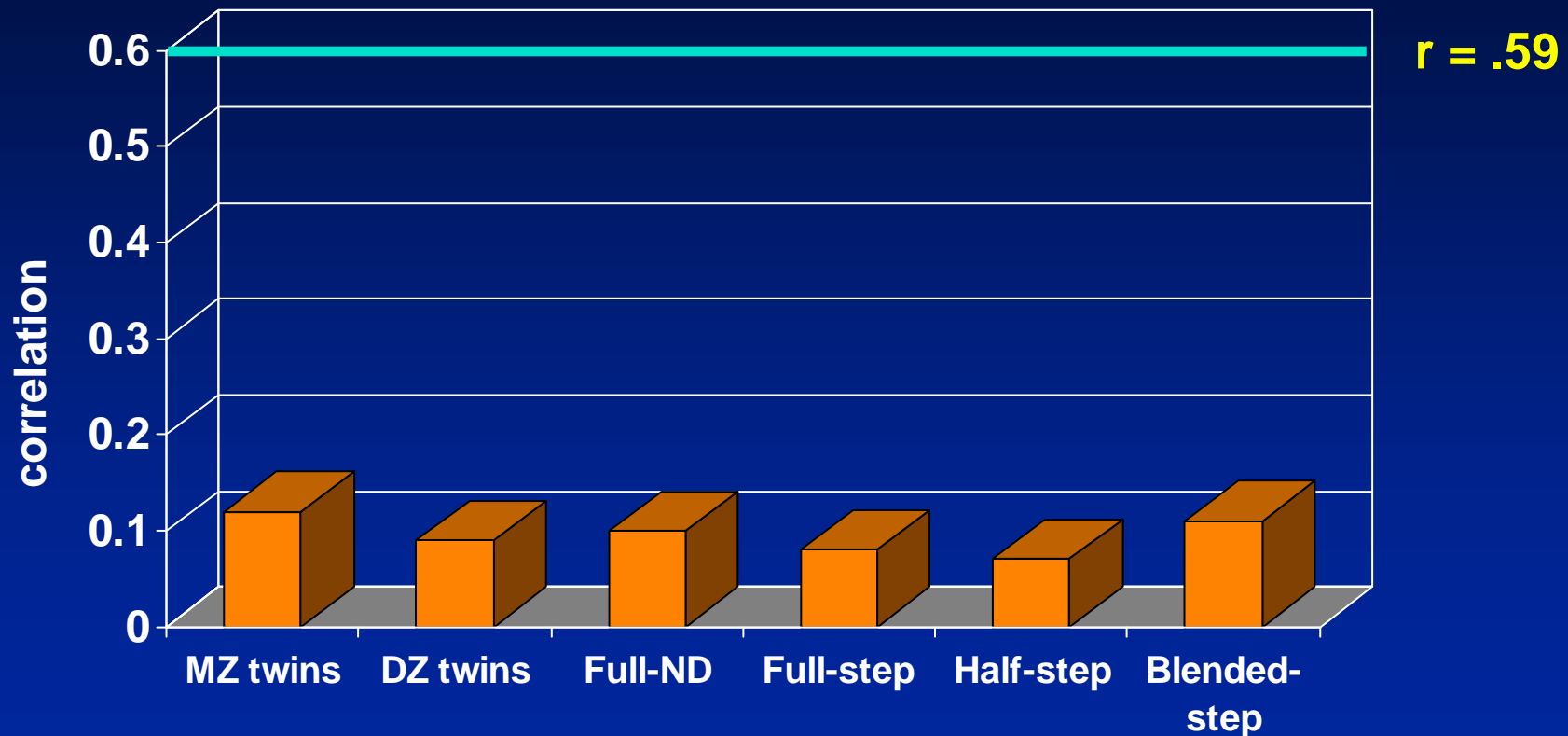
mother's
negativity
to sib B

A's anti-
social
behavior

B's anti-
social
behavior

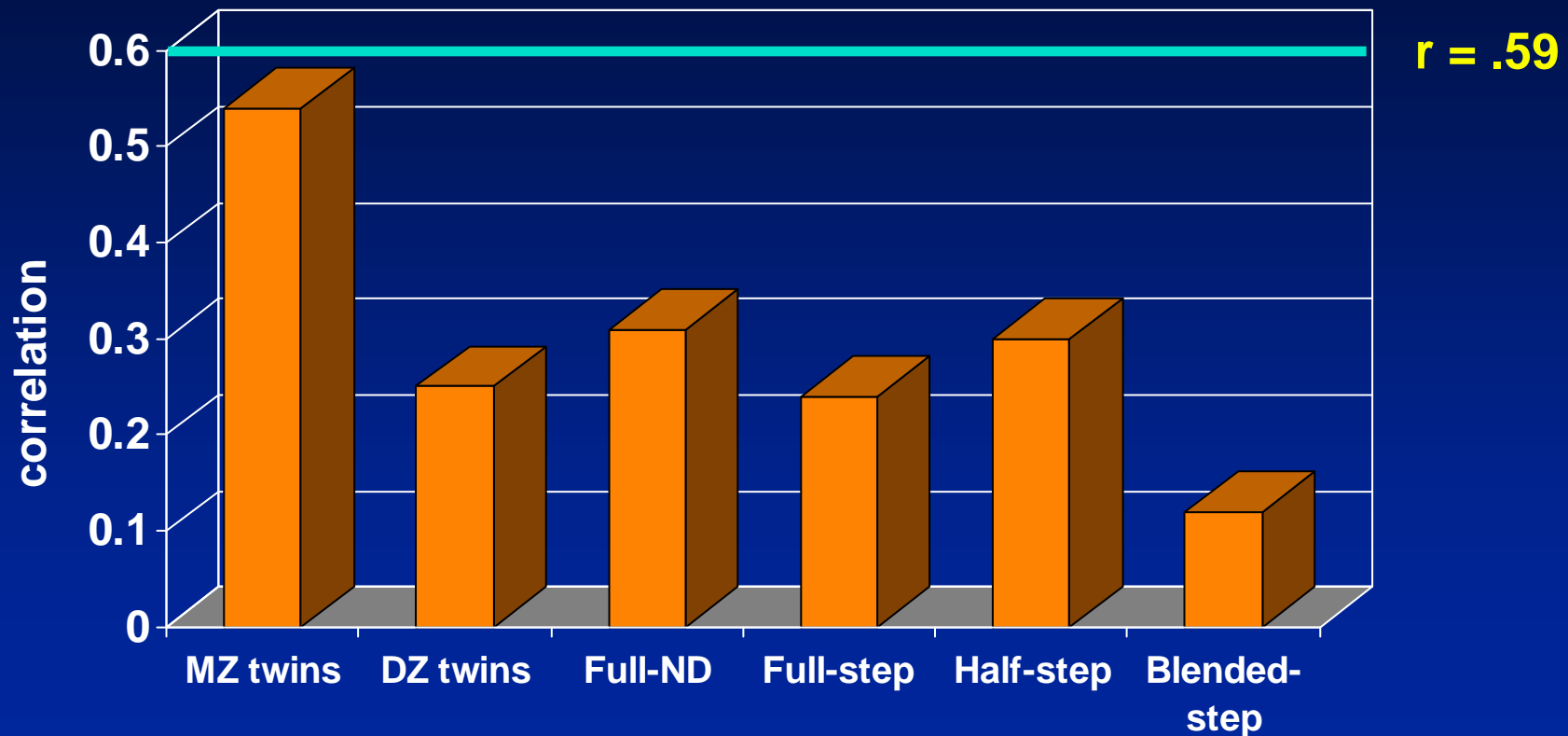


Overlapping genetic influences on mother's negativity and adolescent antisocial behavior: comparing *cross variable*, within sib pair correlations
WHAT WE EXPECTED TO FIND



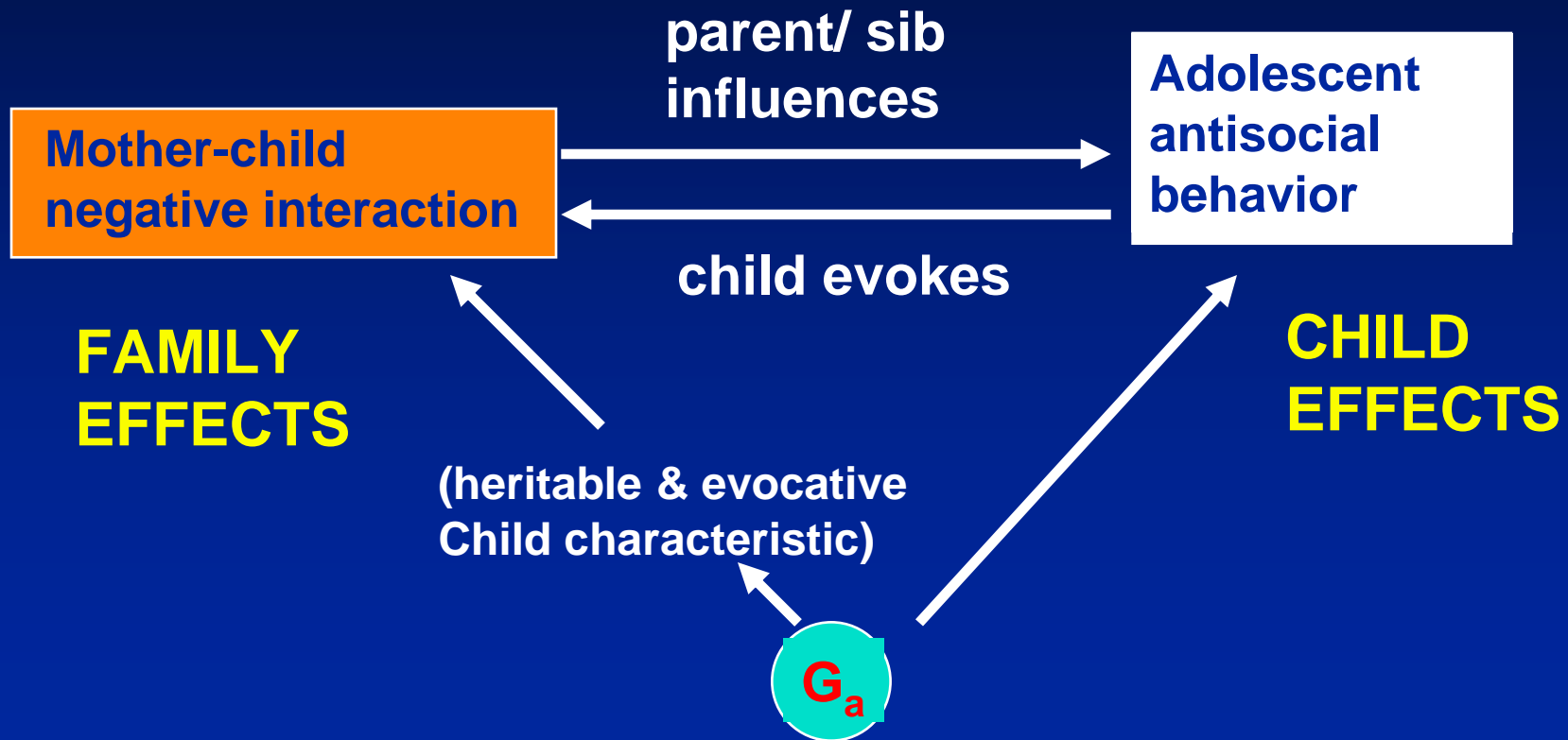
phenotypic correlation = .59 **>50%** of this is attributable to NS

Overlapping genetic influences on mother's negativity and adolescent antisocial behavior: comparing *cross variable*, within sib pair correlations



phenotypic correlation = .59 **69%** of this is attributable to G

Evocative gene-environment correlations: family effects and child effects versions

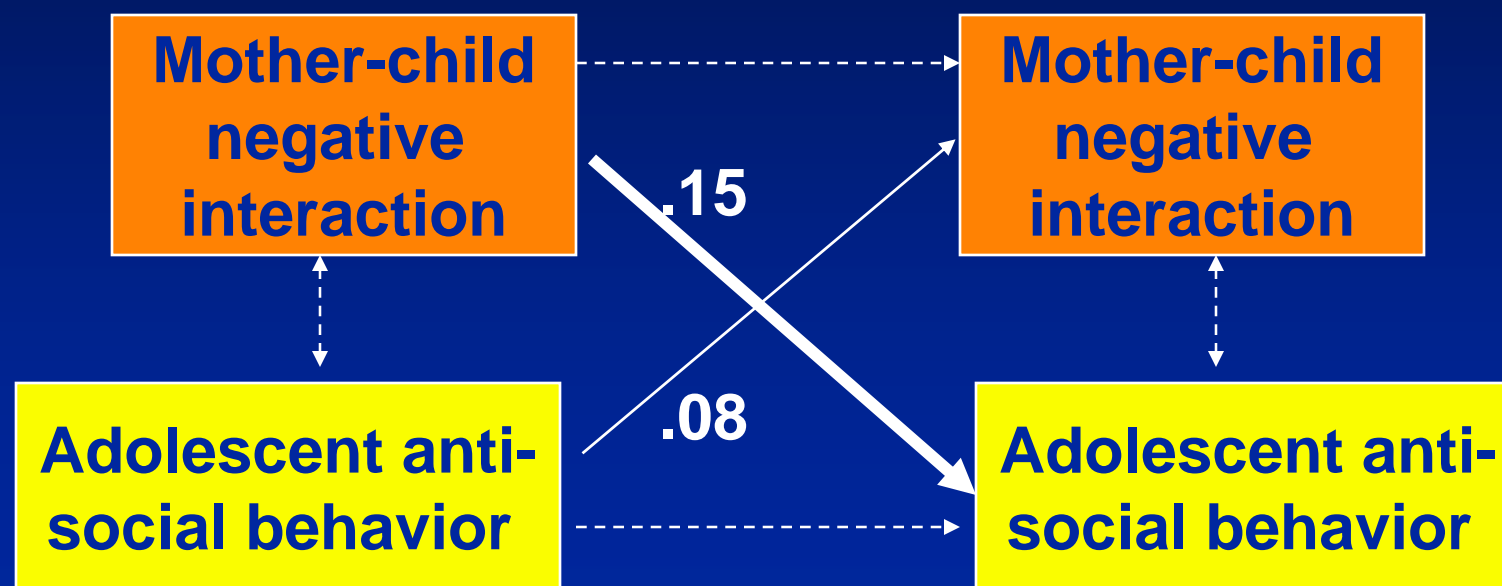


Relationships and development: longitudinal study of mother's negativity and adolescent adjustment

(J. Neiderhiser, *Developmental Psychology*, 35, 680, 1999)

Earlier adolescence

Later adolescence

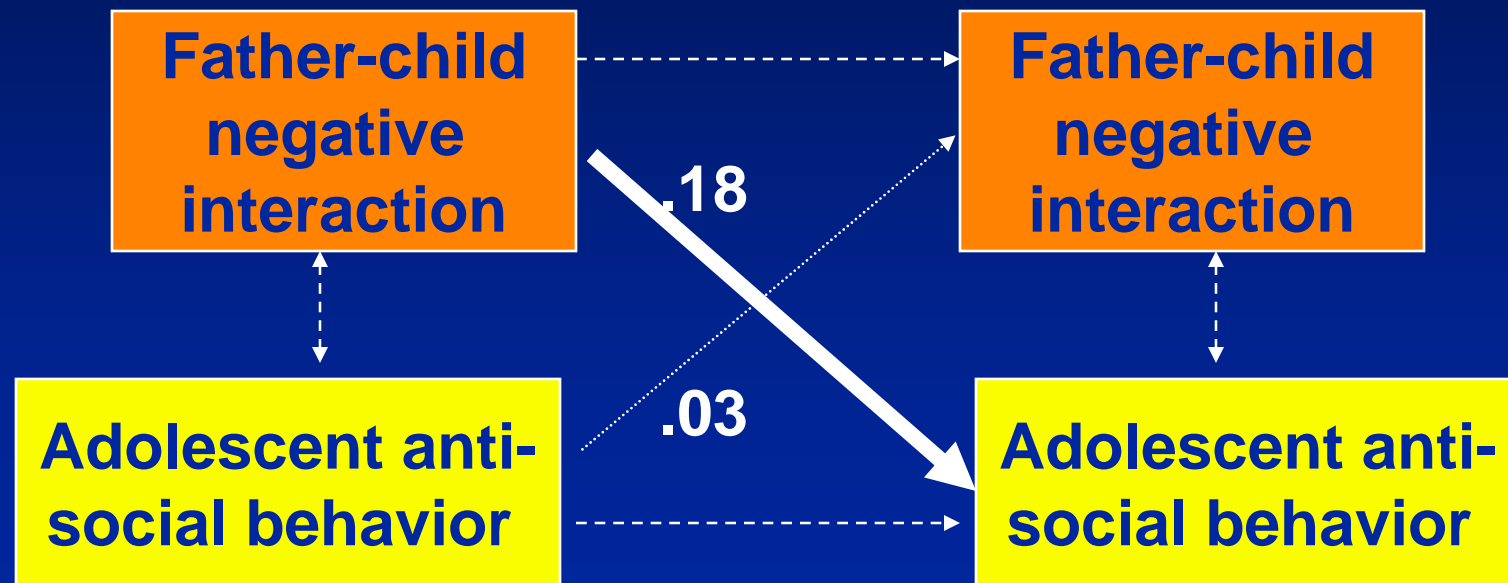


Relationships and development: longitudinal study of father negativity and adolescent adjustment

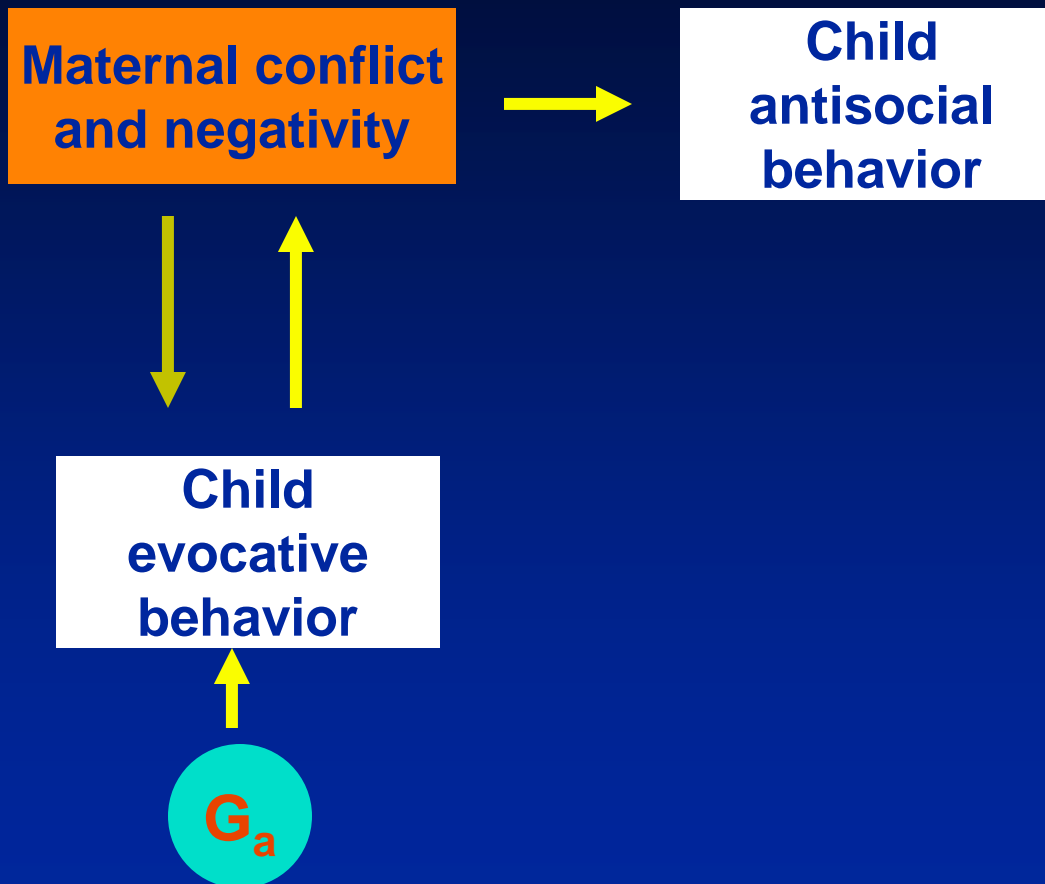
(J. Neiderhiser, *Developmental Psychology*, 35, 680, 1999)

Earlier adolescence

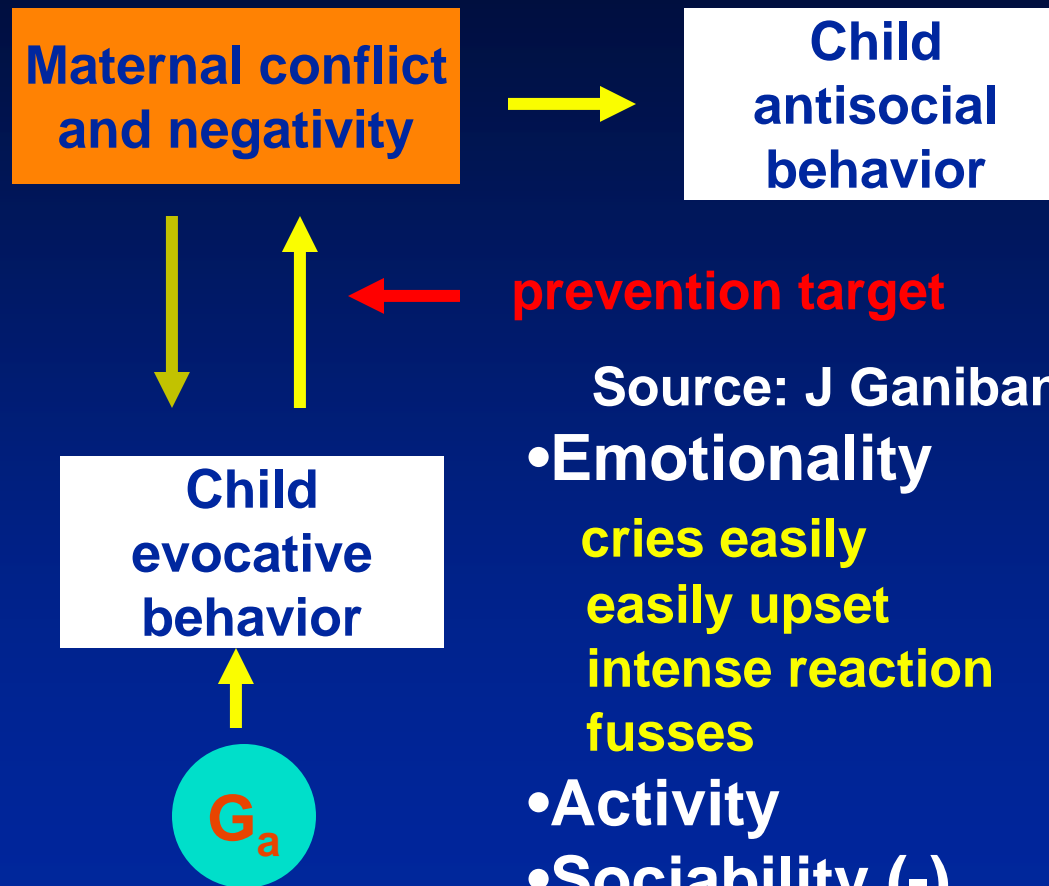
Later adolescence



A simple schema of parent-child relationship



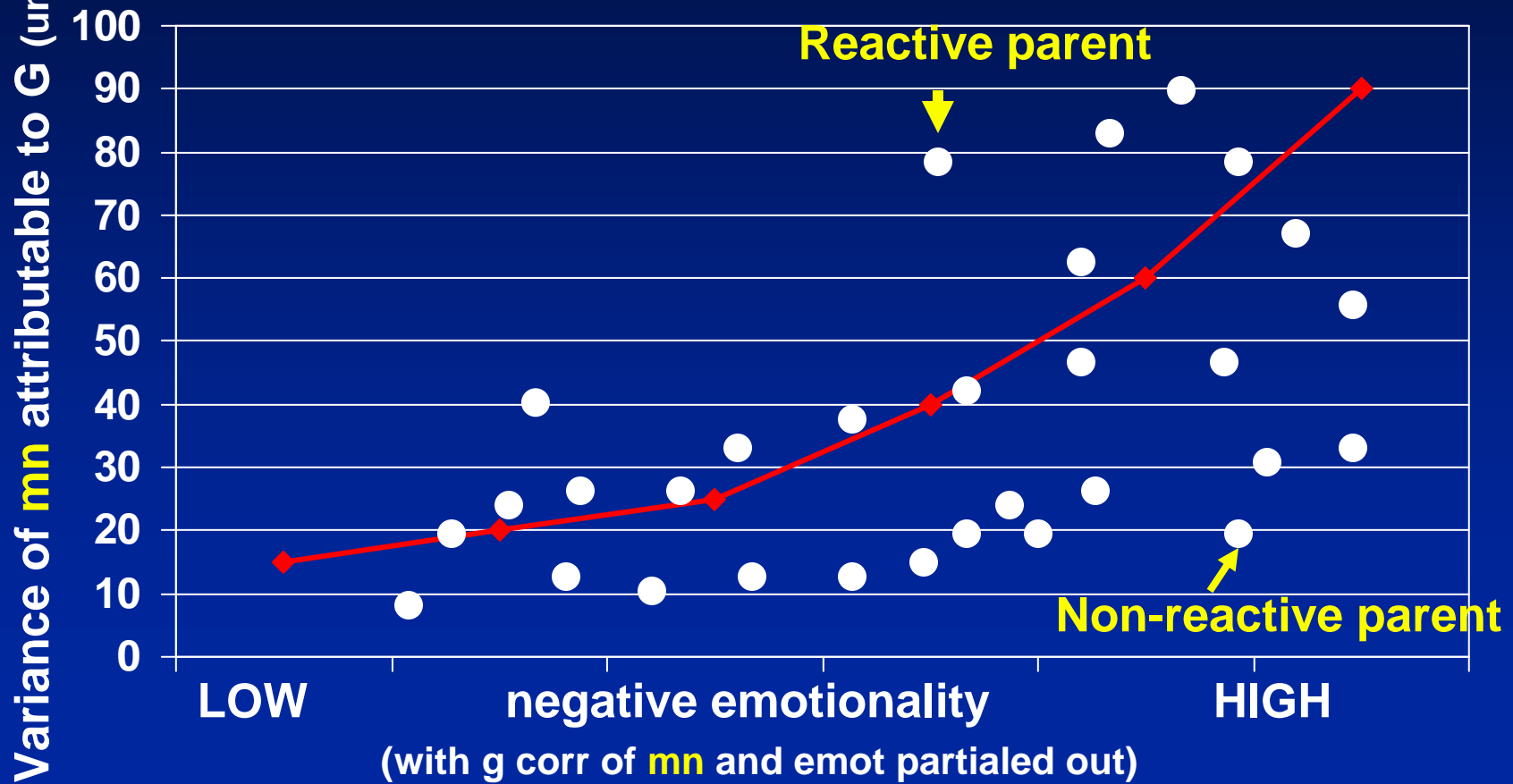
A simple schema of parent-child relationship



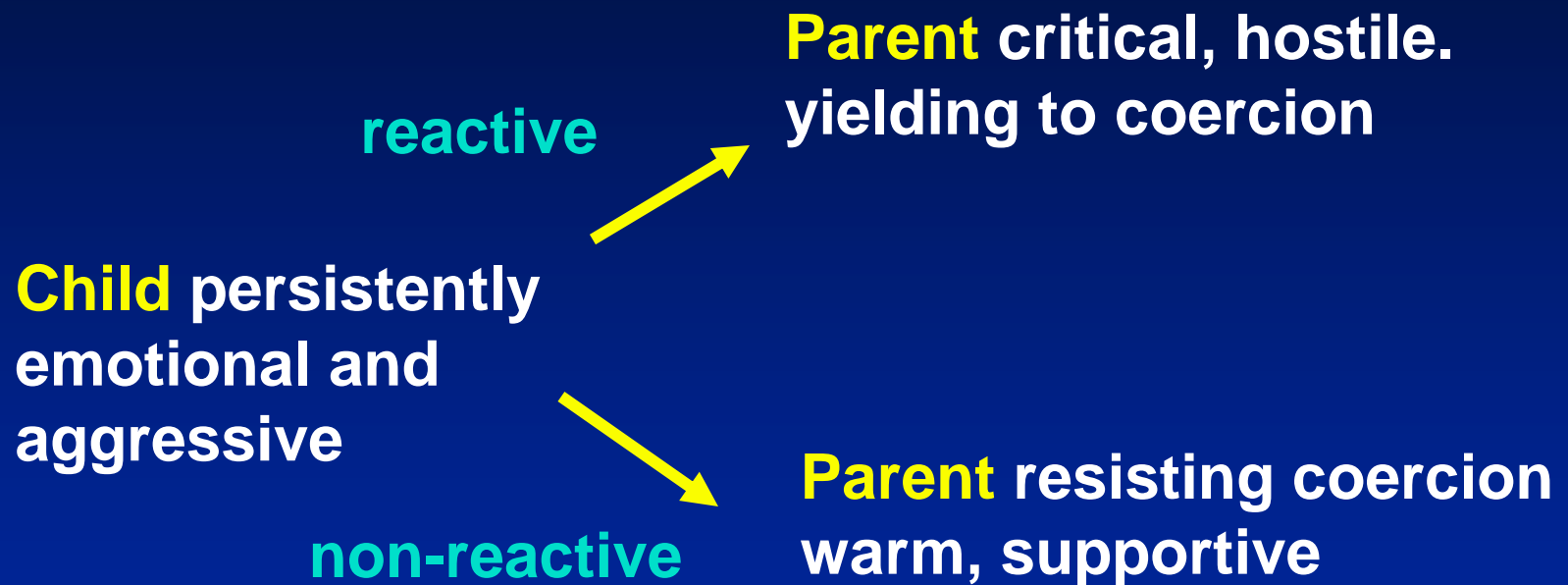
Source: J Ganiban, submitted

The relationship between child temperament and maternal negativity and conflict

Source: J Ganiban, *unpublished*

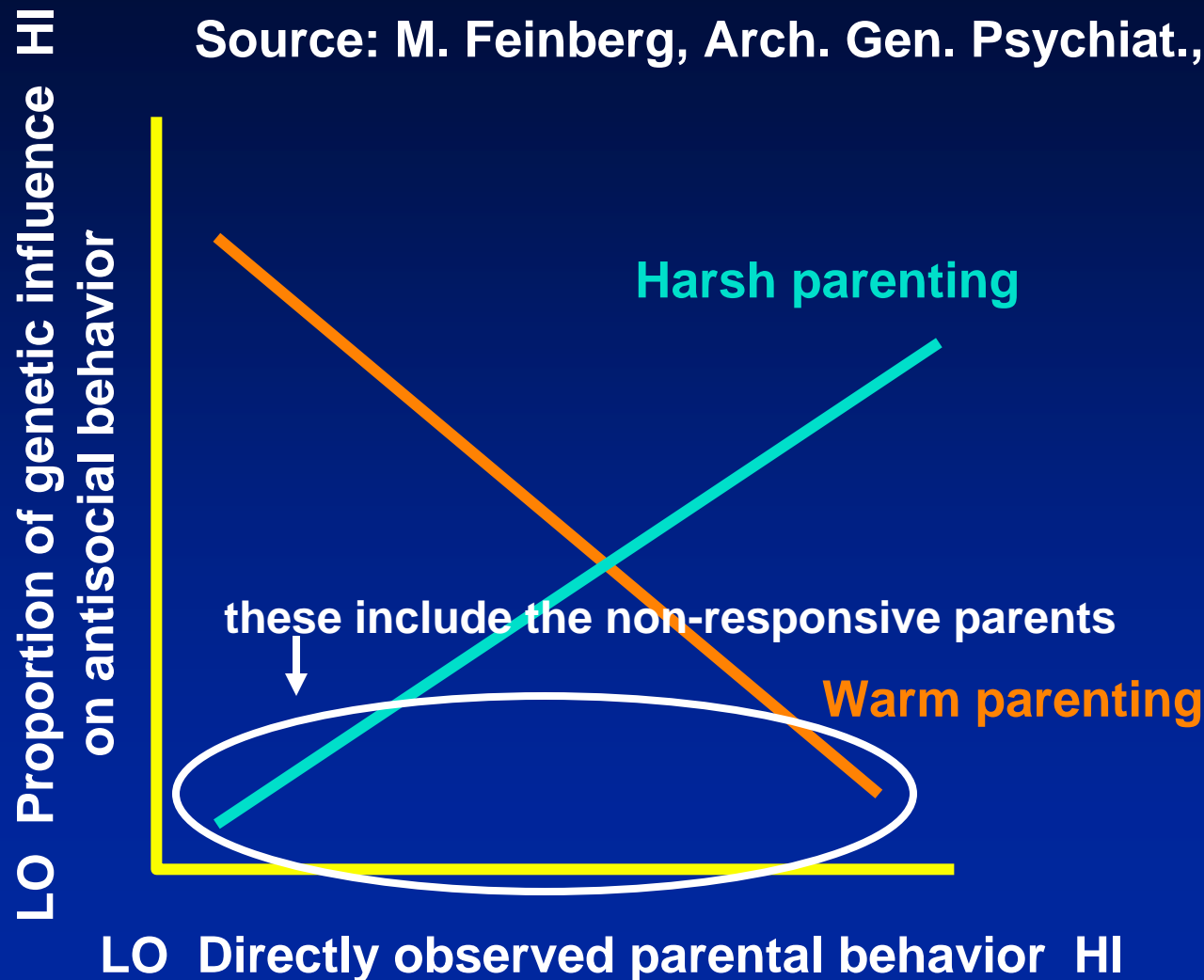


Parental “reactivity”

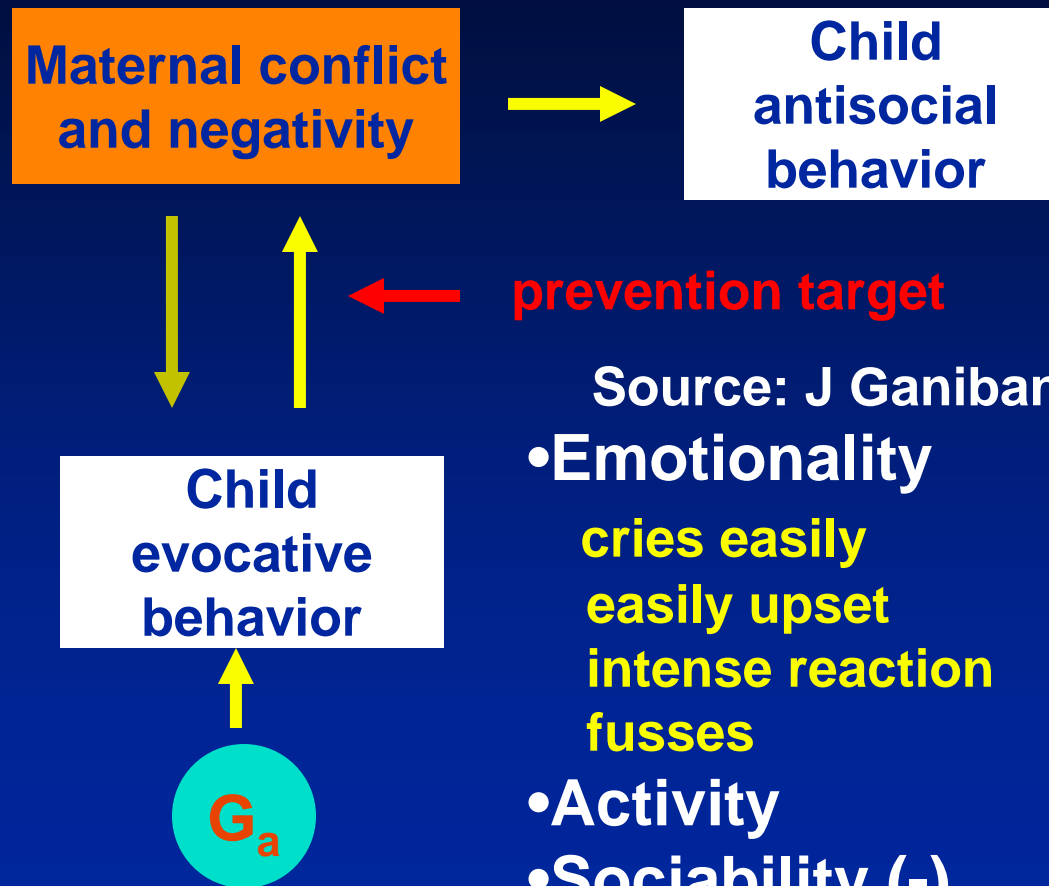


Parental behavior and expression of genetic influence on antisocial behavior

Source: M. Feinberg, Arch. Gen. Psychiat., 2007



A simple schema of parent-child relationship



Family subsystems: rich in genetic information

Mom's negativity }

Dad's negativity }

Mom's positivity

Dad's positivity }

Dad's knowledge }

Dad's attempted control }

Dad's actual control }

Mom's knowledge }

Mom's attempted control }

Mom's actual control

Sibling's positivity

Sibling's negativity

Mom-dad conflict re child

only 6 of 78 correlations show more genetic overlap than specificity

Does the relationship code translate into specific behavioral consequences?

Principal component FA (oblique rotation) of genetic correlations
 (J Loehlin, *Child Development*, 76:1104, 2005)



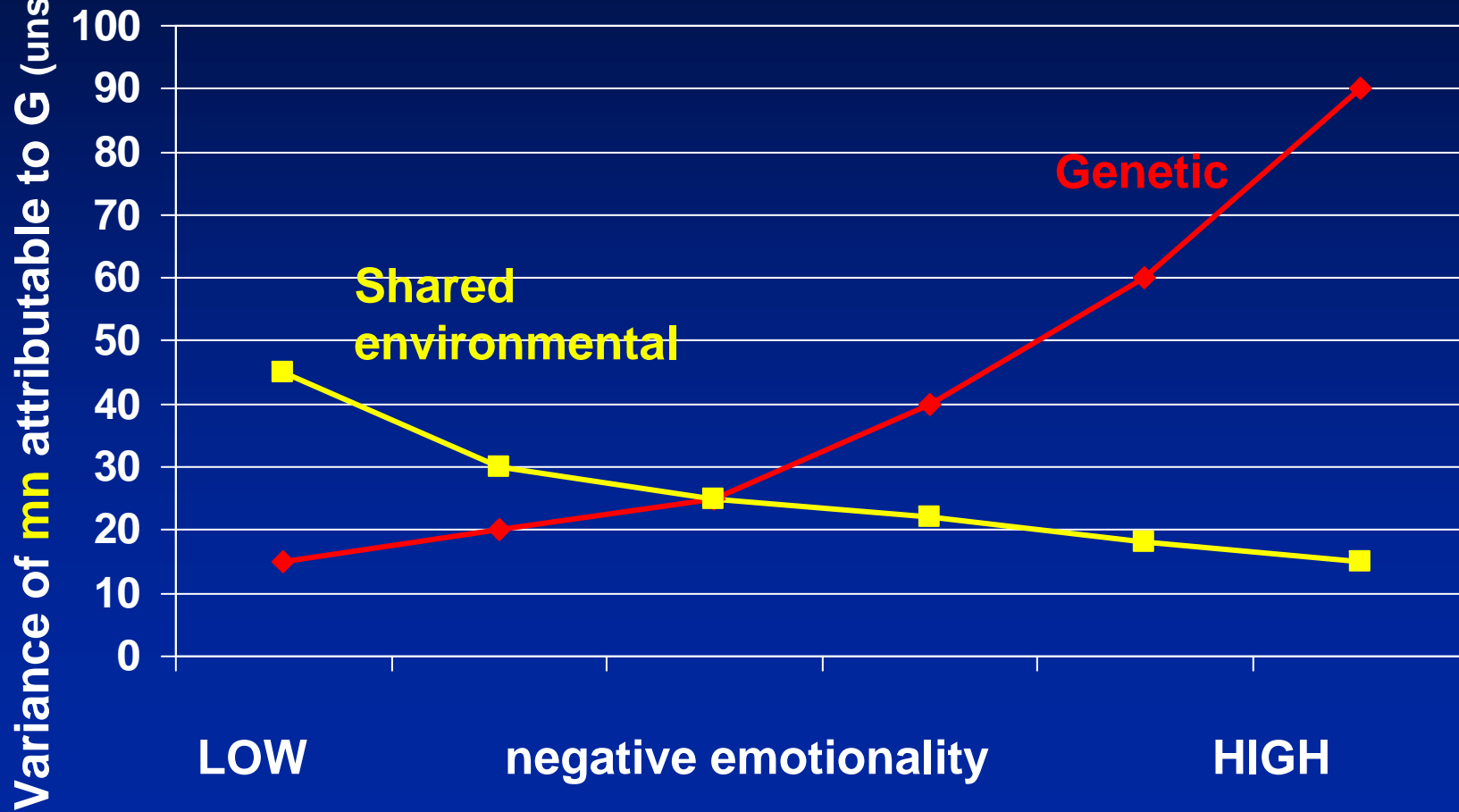
Parental negativity
 Parental positivity
 Parental control
 Antisocial behavior
 Autonomy
 Depressive symptoms
 Cognitive agency
 Sociability
 Social responsibility

Additive g correlations			Nonadditive g corr.		
1	2	3	4	5	6
Positive				Negative	
				Positive	
		Positive			Positive
Positive			Negative		
	Positive			Positive	
Positive			Negative		
	Positive				
					Positive
			Positive		

 Positive loadings  Negative loadings

The relationship between child temperament and maternal negativity and conflict

Source: J Ganiban, *unpublished*



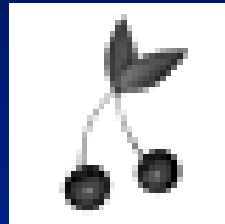




Nancy Pedersen
Karolinska Institute



Paul Lichtenstein
Karolinska Institute

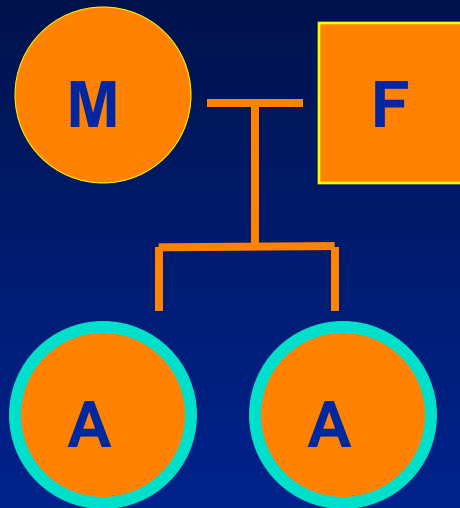


Marianne Cederblad
Lund University



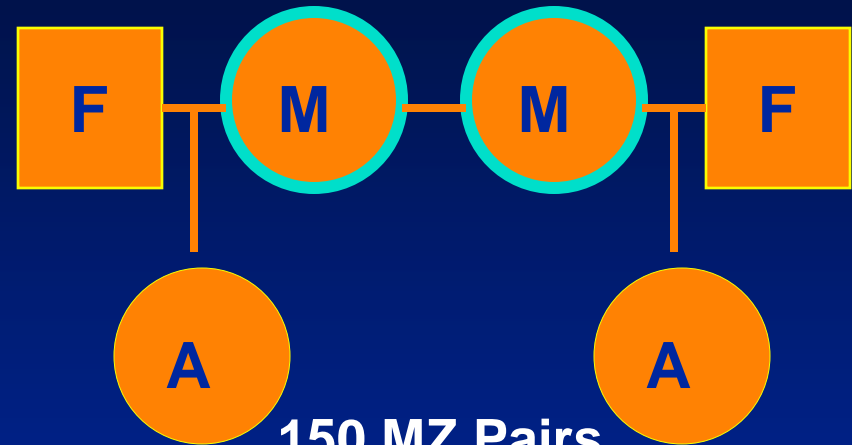
Jenae Neiderhiser,
George Washington U

TWIN AND OFFSPRING STUDY IN SWEDEN (TOSS): Comparison of parental and child ages with adolescent sib study (NEAD)



NEAD Time 2

Mn age, child 1 16.2 ± 2.1
 Mn age, child 2 14.7 ± 1.9
 Mn age, mother 40.5 ± 4.8
 Mn age, father 43.7 ± 6.1



150 MZ Pairs
 176 DZ Pairs

TOSS

15.3 ± 2.3
 43.9 ± 4.4
 46.0 ± 5.2

Parent-child negativity:

OBSERVER CODES

Anger and rejection

Coercion

Conflict

PARENT AND CHILD REPORT

Disagreement

Punitiveness

Yielding to coercion

Open conflict

Verbal aggression

Parent-child warmth and support

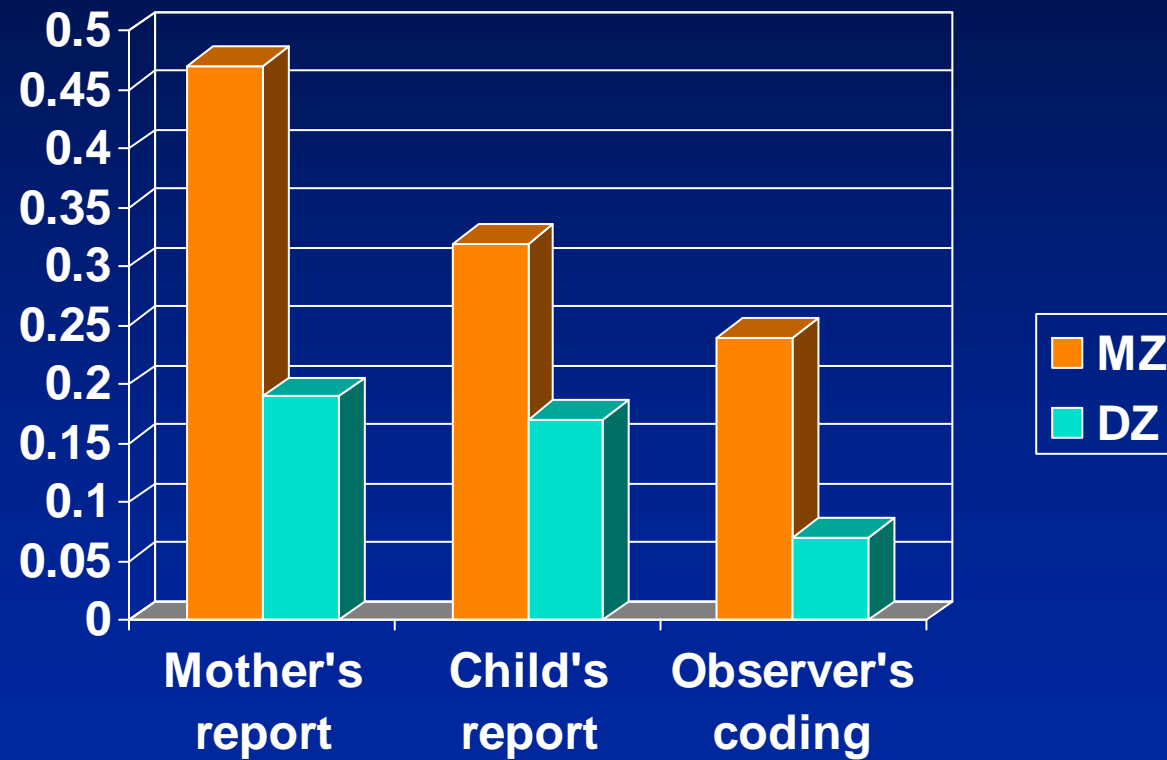
OBSERVER CODES

- Positive feelings and affection
- Self confident expression of needs
- Listening, explaining, eliciting
- Comfort with own and others initiative

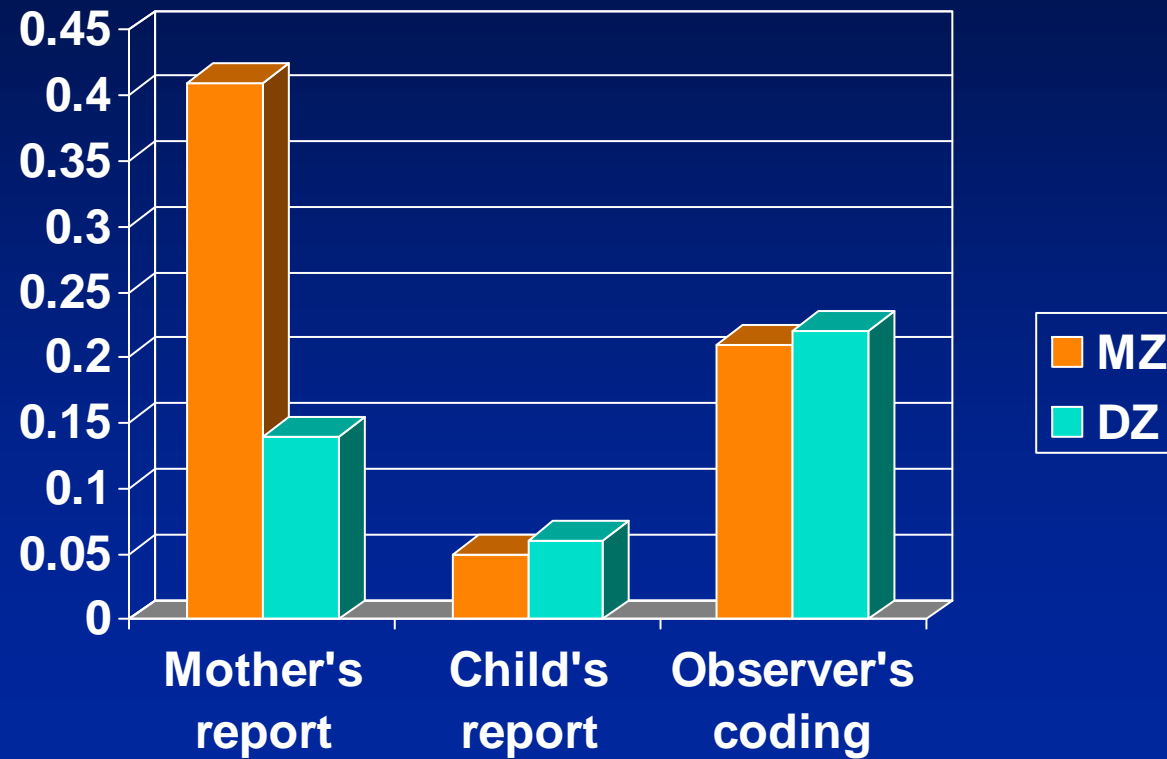
PARENT AND CHILD REPORT

- Closeness
- Rapport
- Pleasure in common activities
- Overt signs of affection

Maternal warmth and support:

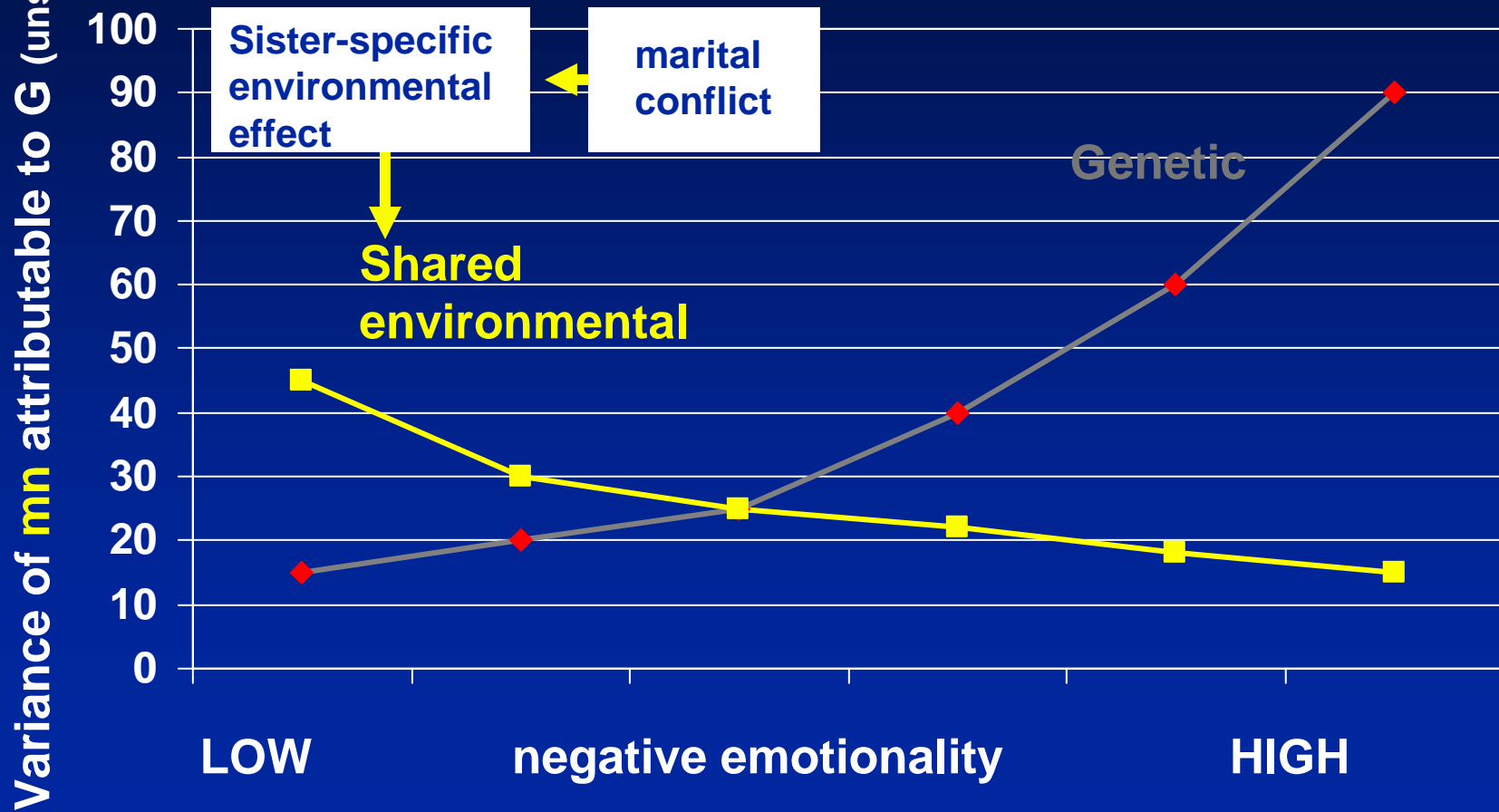


Mother-child negativity:



The relationship between child temperament and maternal negativity and conflict

Source: J Ganiban, *unpublished*



A simple schema of parent-child relationship

ADOLESCENT MEAN AGE

13

16

Maternal conflict
and negativity

Maternal conflict
and negativity

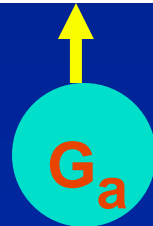


Preventive
intervention



emotionality and
aggression



emotionality and
aggression

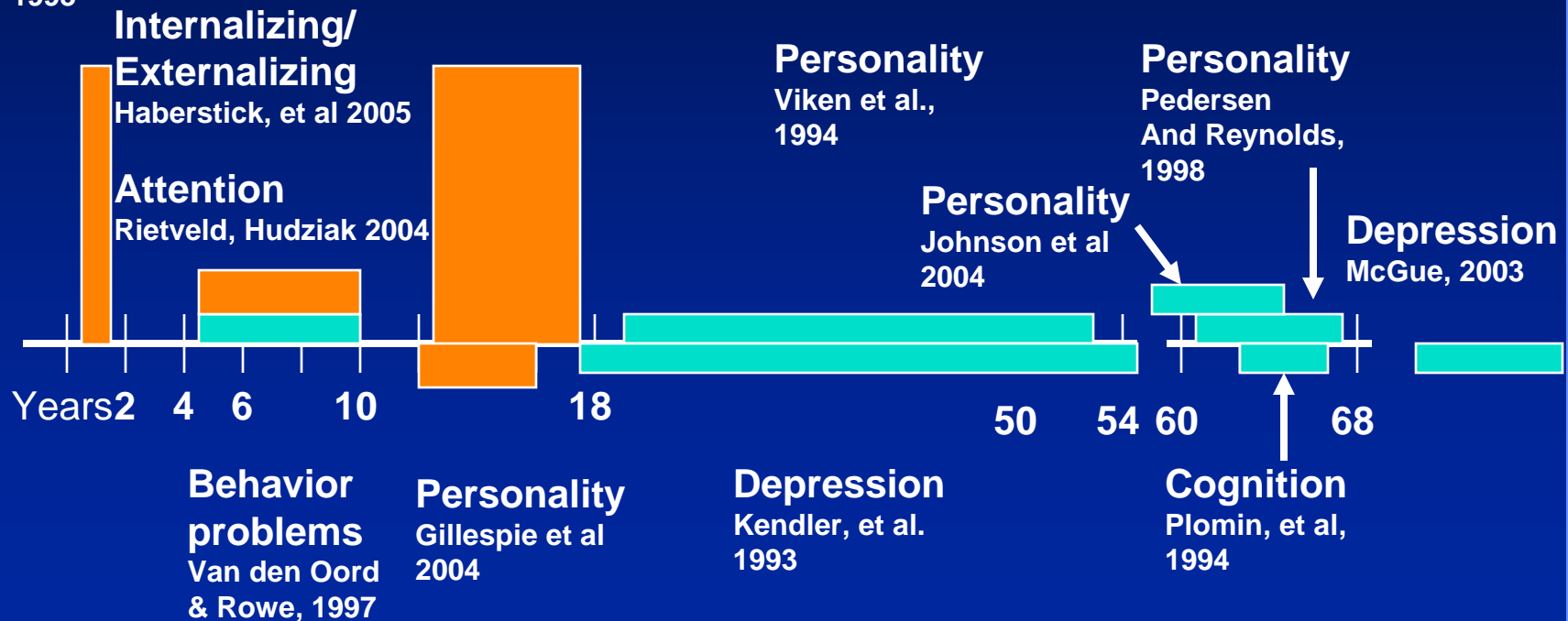


Change in genetic influences across the lifespan

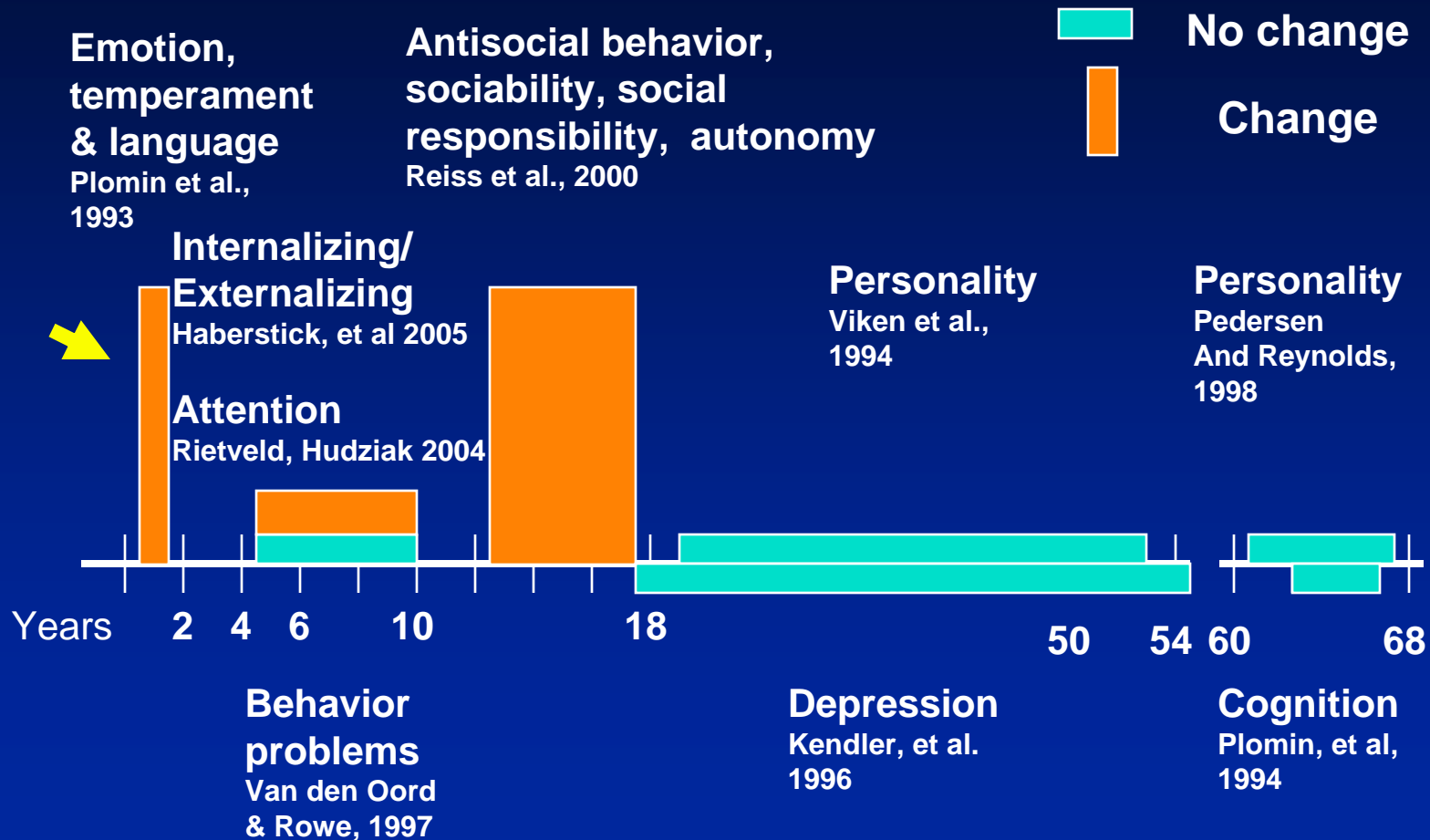
Emotion, temperament & language
Plomin et al., 1993

Antisocial behavior, sociability, social responsibility, autonomy
Reiss et al., 2000

 No change
 Change



Change in genetic influences across the lifespan





Leslie Leve,
Oregon Social Learning
Center, Eugene
PI, First grade follow-up



Jenae Neiderhiser,
GWU
PI, Prenatal follow-up

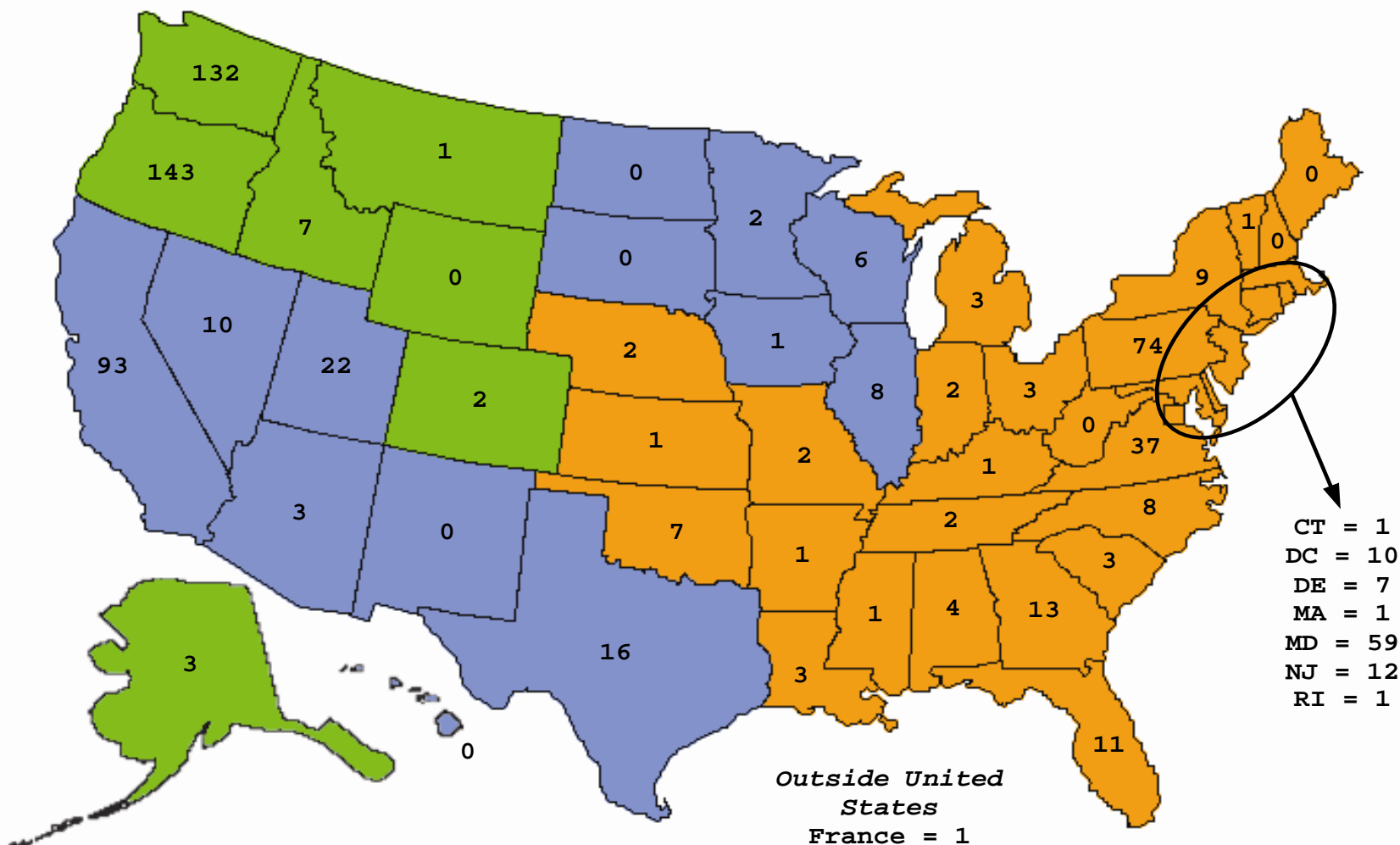


Xiaojia Ge,
UC Davis/U. Minnesota



Laura Scaramella,
U. Of New Orleans

Geographical distribution of birth parents and adoptive families



UC Davis

OSLC

GWU

- CT = 1
- DC = 10
- DE = 7
- MA = 1
- MD = 59
- NJ = 12
- RI = 1

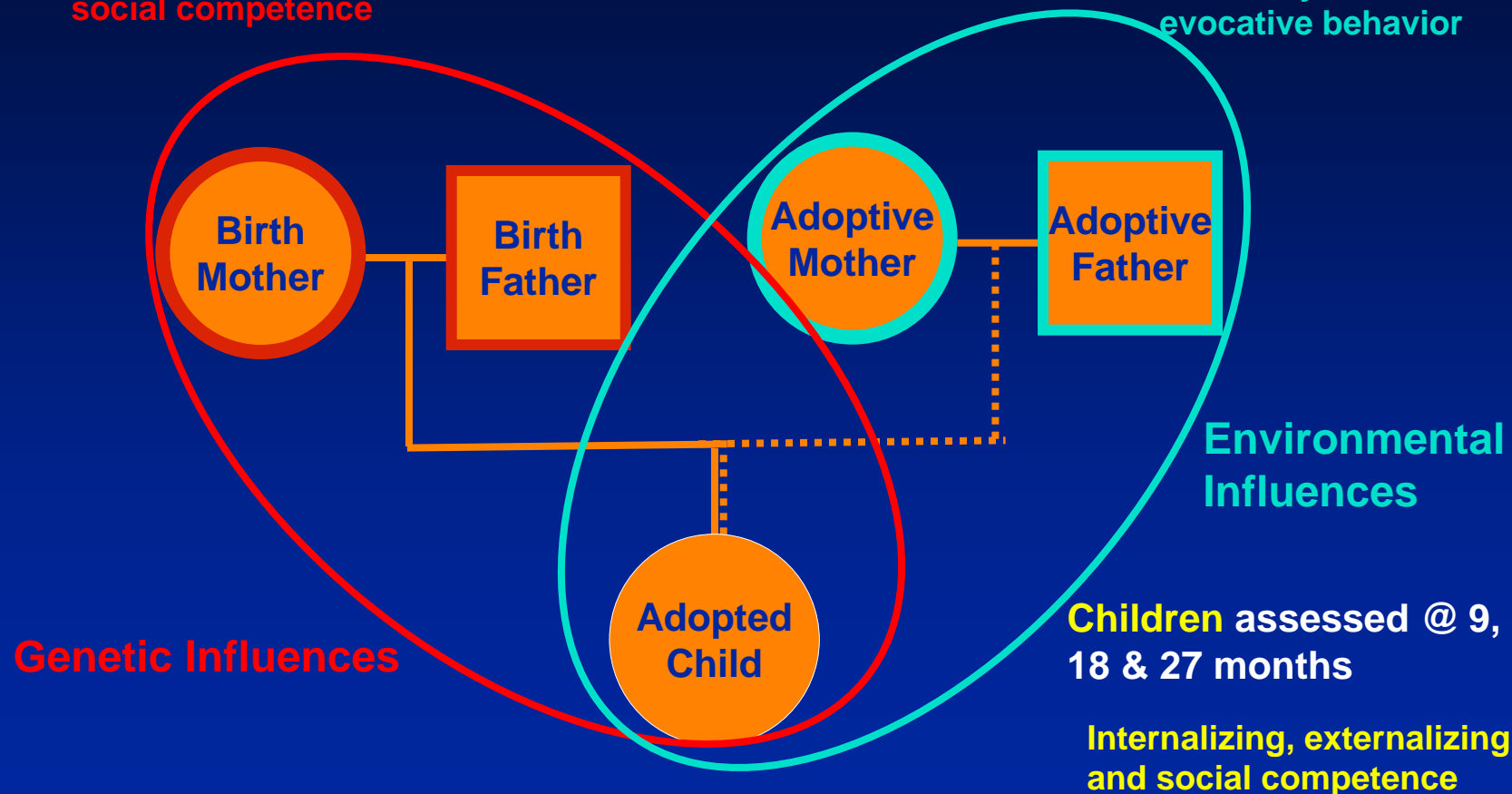
Early Growth & Development Study (EGDS)

Birth Parents Assessed @ 3 & 16 months postpartum

Temperament psychopathology and social competence

Adoptive Parents Assessed @ 9, 18 & 27 months

Reactivity to child's evocative behavior



Genetic Influences

Environmental Influences

Children assessed @ 9, 18 & 27 months

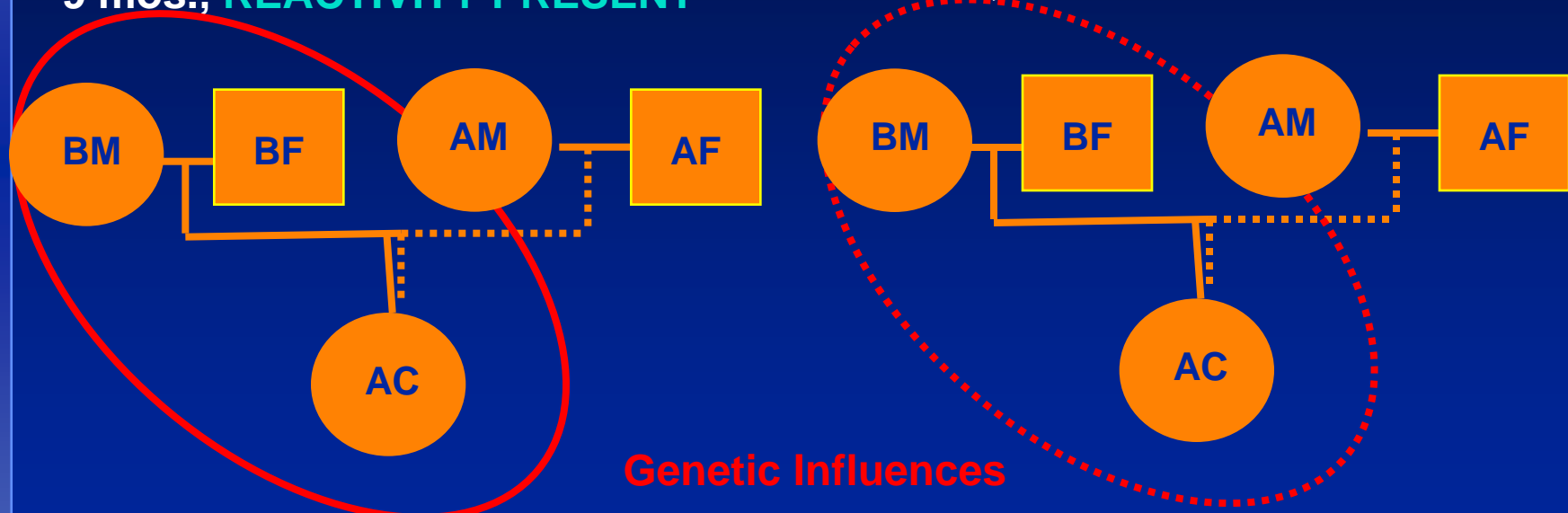
Internalizing, externalizing and social competence

**Prospective adoption study: wave I
n= 357 “yoked” unit (BM, BF, AM, AF, AC)**

Birth Parents Assessed @ 3 & 16 months postpartum: temperament, psychopathology, substance use and social competence

Adoptive Parents assessed at 9 mos., **REACTIVITY PRESENT**

Adoptive Parents assessed at 9 mos., **REACTIVITY ABSENT**



Genetic Influences

Genetic Influences

Children assessed 9 months
Early appearing heritable risk factors (e.g. negative emotionality and attentional decay) and social competence



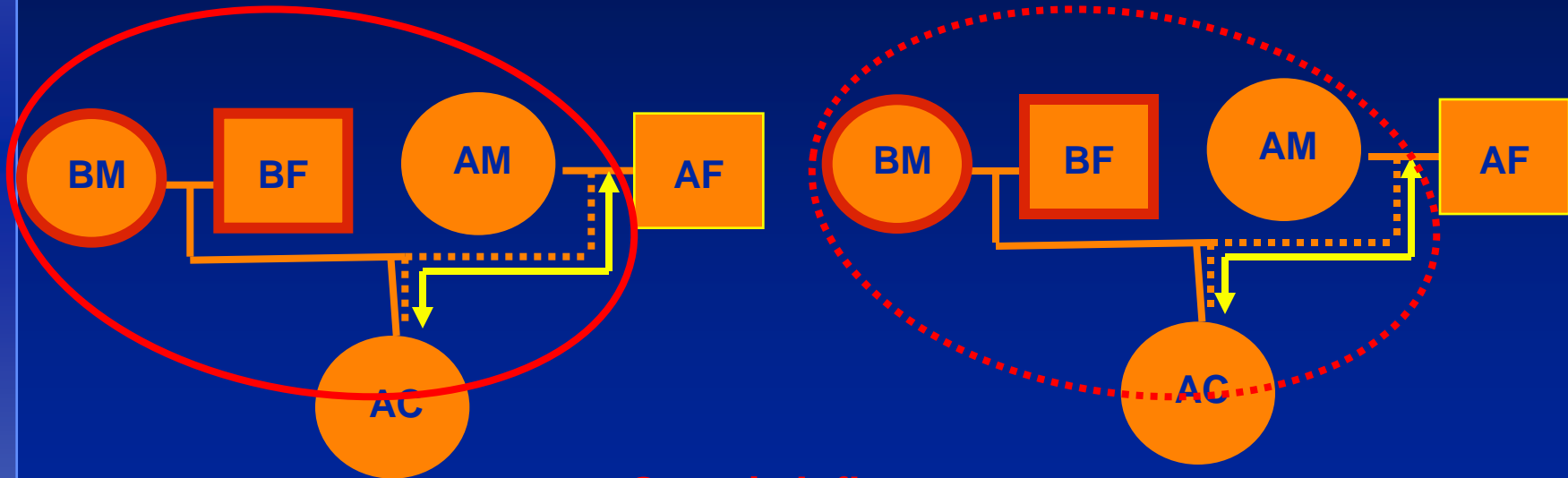
FEB 26 2005
1:03:58 PM

EGDS Prospective adoption study: unfolding of genetically influenced parent-child relationship

Birth Parents Assessed at 3 and 16 months postpartum, temperament, psychopathology drug use and social competence

Adoptive Parents Assessed at 9 & 18 mos., **REACTIVITY +**

Adoptive Parents Assessed at 9 & 18 mos., **REACTIVITY -**



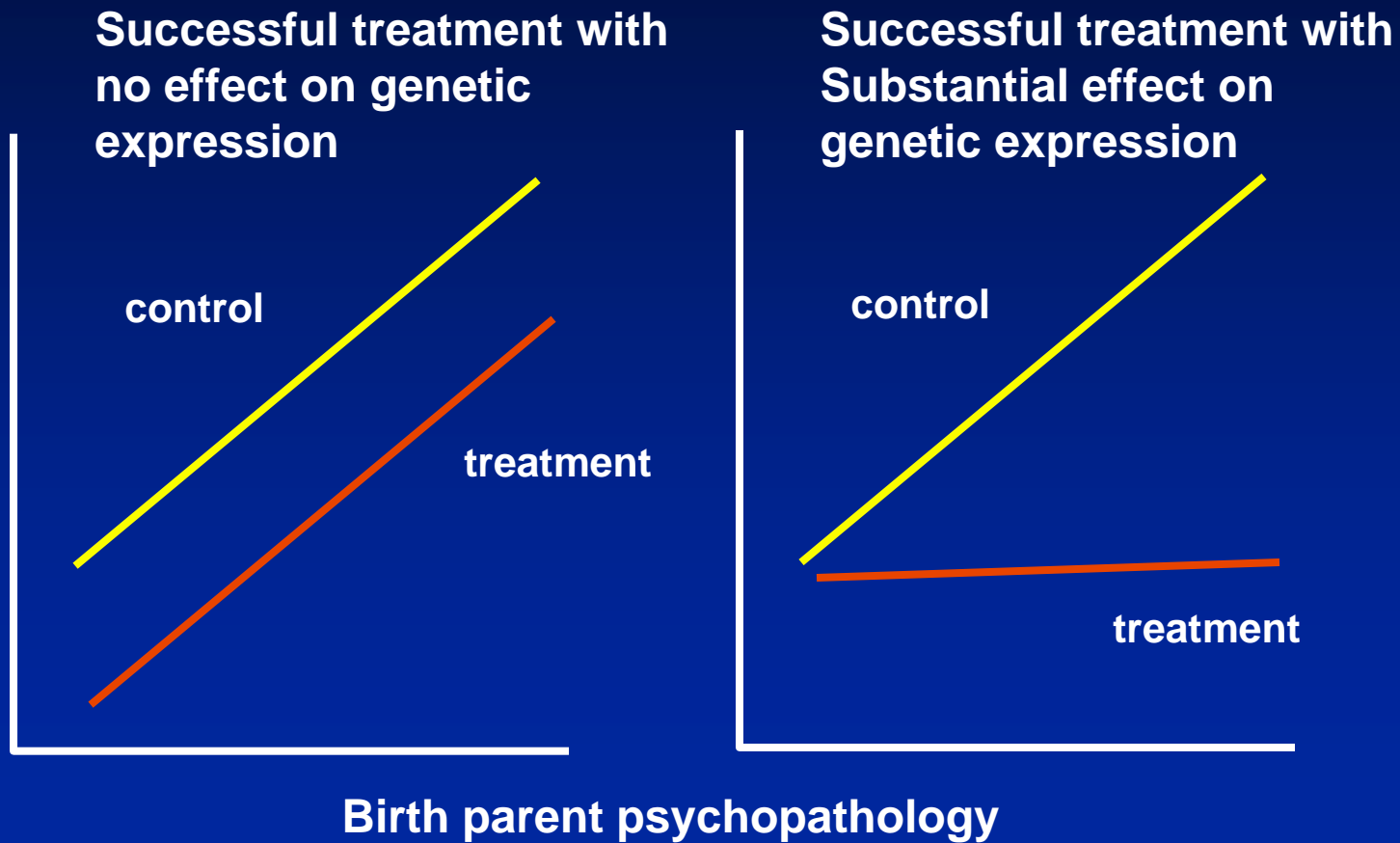
Genetic Influences

Genetic Influences

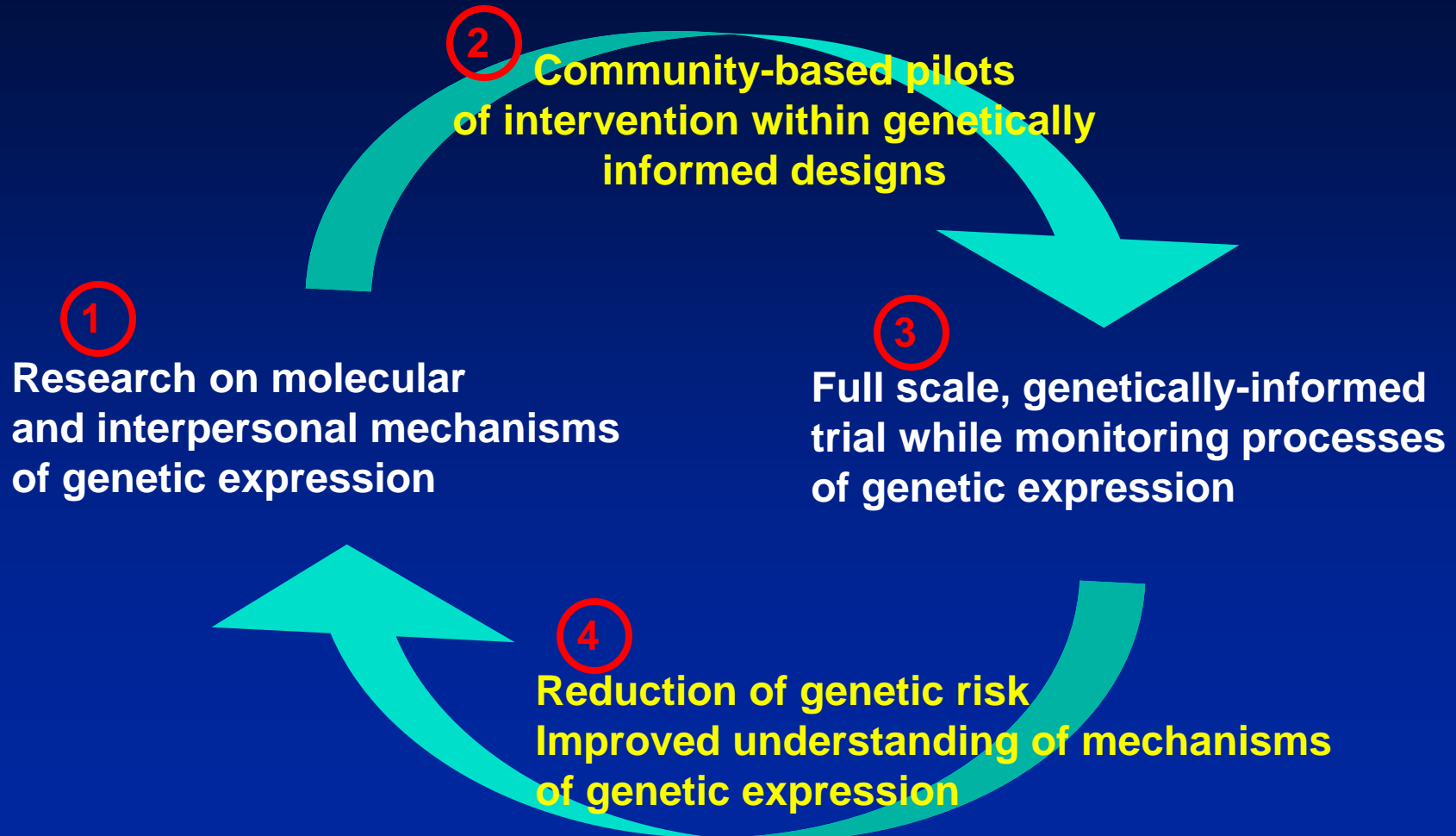
Parent-child relationship assessed at 9 and 18 and 27 monthmonths

Specific family preventive intervention and genetic expression: testing a theory with an adoption design

Adopted child psychopathology

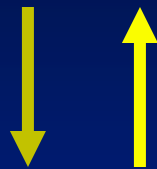


The genetic prevention-intervention research cycle (with apologies to Rick Price)



A simple schema of parent-child relationship

Maternal conflict
and negativity



Parented-
directed
child behavior



Emotionality

G_a

Other studies

- Ge, X 1996
defiance, aggression,
conduct problems
- Burt, S. A. 2005
temper, spiteful, conduct
problems
- Narusyte, J 2006
aggression, irritability
- Reprise of Olweus D, 1980