Trajectories of Problem Behavior in Children Born Premature: Risk and Protective Influences from Birth to Age 17

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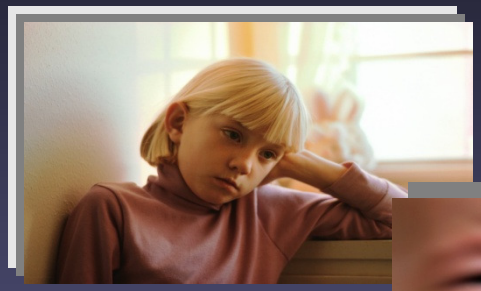
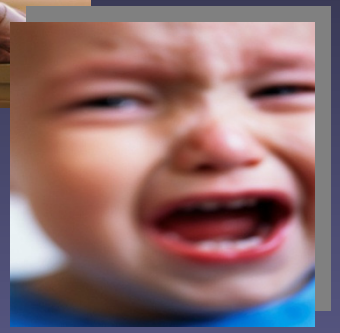
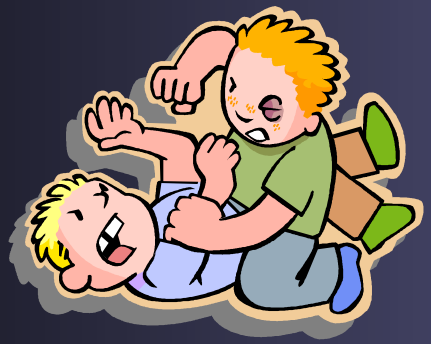
PROBLEM BEHAVIORS

- Internalizing
- Externalizing
- Somatic
- Attention/Inattention
- Hyperactivity







- Withdrawn
- Aggressive
- Social problems
- Thought problems

BACKGROUND

- **Preschool - School-Age (4y-10y)**
  - **Preterm > Full-Term**
- **Early Adolescence (11y-14y)**
  - **Equivocal results**
- **Adolescence (15y-18y)**
  - **Preterm > Full-Term**

    {Grunau et al 2004}

THE 'PROBLEM'

Problem Behaviors

{school-age} **Problem Behaviors {early adolescence}** **Problem Behaviors {adolescence}**

- **Do problem behaviors *continue* from preschool to late adolescence?**
- **Does *medical & environmental risk* influence trajectories of problem behaviors?**
- **Do protective factors influence trajectories of problem behaviors?**

PURPOSE

- Examine trajectories of problem behavior at ages 4, 8, 12, and 17
- Examine if variables risk or protection influence trajectories

HYPOTHESES

1. PT will have ↑ problem behaviors at ages 4, 8, 12, & 17

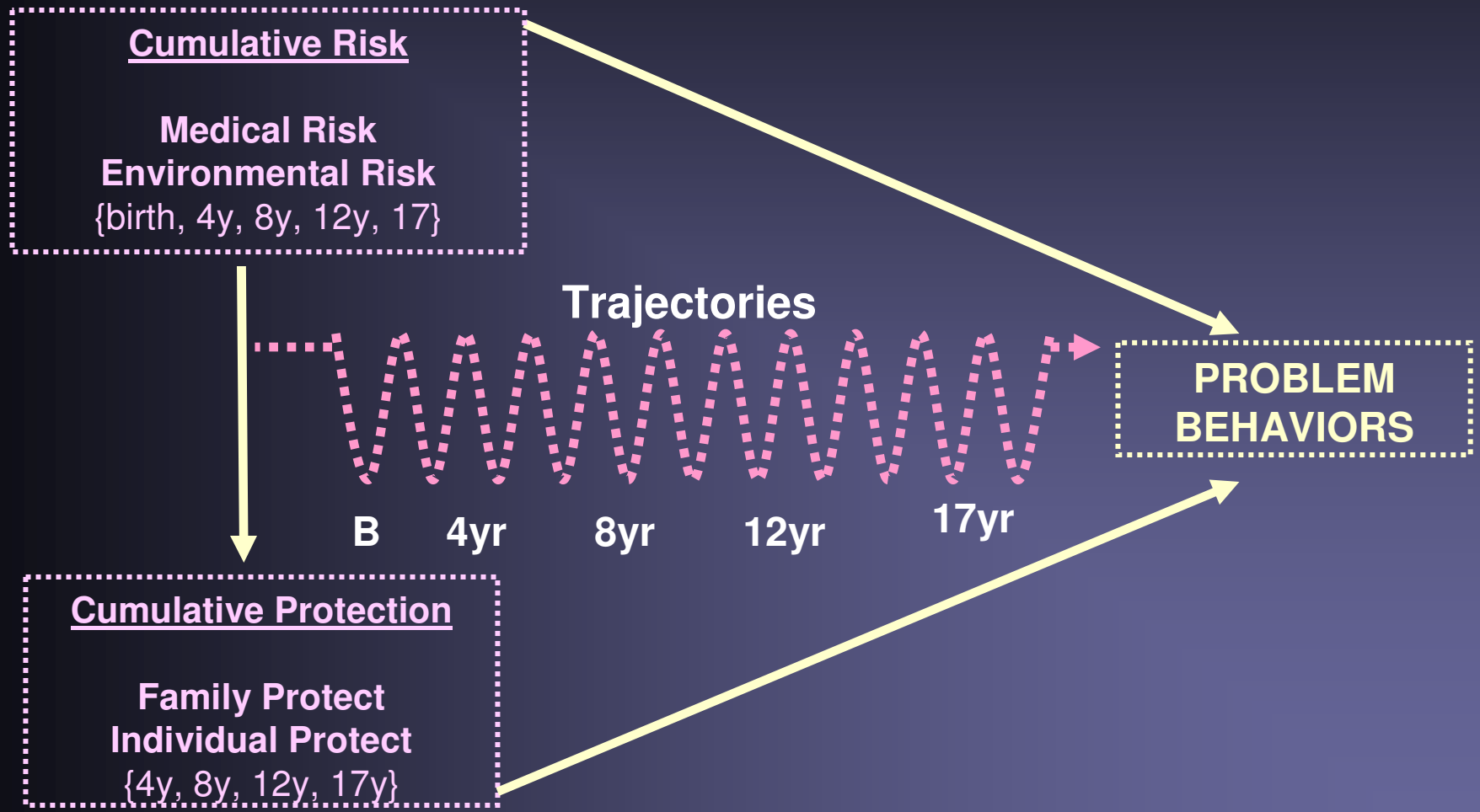
2. Medical & Environmental Risk will influence trajectory of problem behaviors

   - PT with ↑ risk will have ↑ problem behaviors

3. Family & Individual Protection will influence trajectory of problem behaviors

   - PT with ↑ protection will have ↓ problem behaviors

THEORETICAL FRAMEWORK



PERINATAL GROUP CLASSIFICATION

Perinatal Group	*Neonatal Criteria*
Full Term Infants	Full Term; medically & neurologically healthy
Healthy Preterm	Premature no medical/neurological complications
Medical Preterm	Premature neonatal medical illness (BPD, RDS, NEC, sepsis)
Neurological Preterm	Premature neonatal neurological illness (Grade III & IV IVH, meningitis, shunted hydrocephalus)
Small for Gestational Age	Premature birth weight for gestational age < 10th percentile

Full Term (≥37 weeks gestation)

Premature (<37 weeks gestation)

LONGITUDINAL SAMPLE DEMOGRAPHICS N=213

Infants

160 PT infants

53 FT infants

51% - Male

86% - White

Mothers

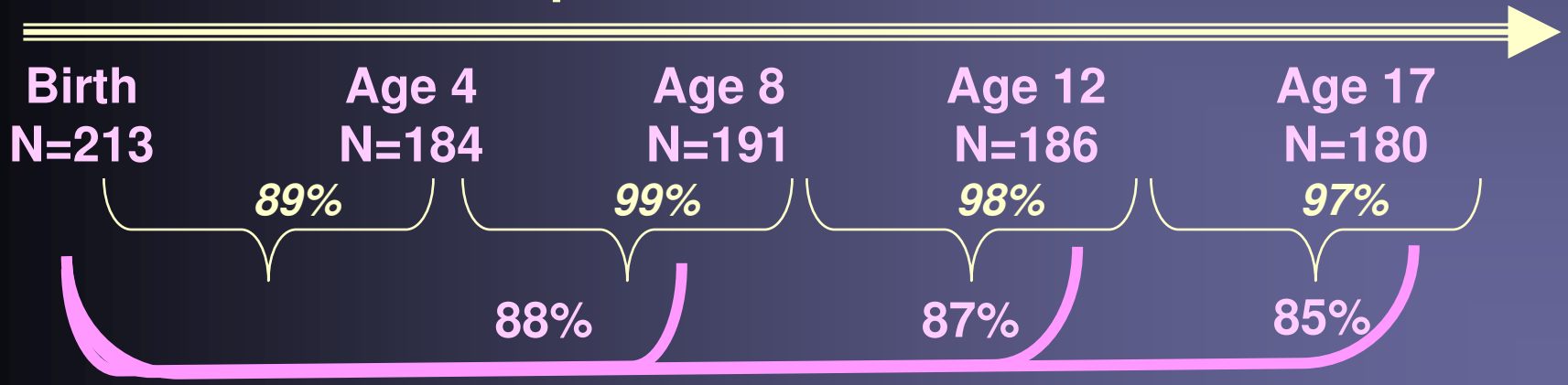
Age - M 26y

Education - M 13.1y

80% - Employed

86% - Married/Cohab

Sample Retention



OUTCOME MEASURE: PROBLEM BEHAVIORS

Ages 4, 8, 12

Child Behavior Checklist (CBCL) 4-18†

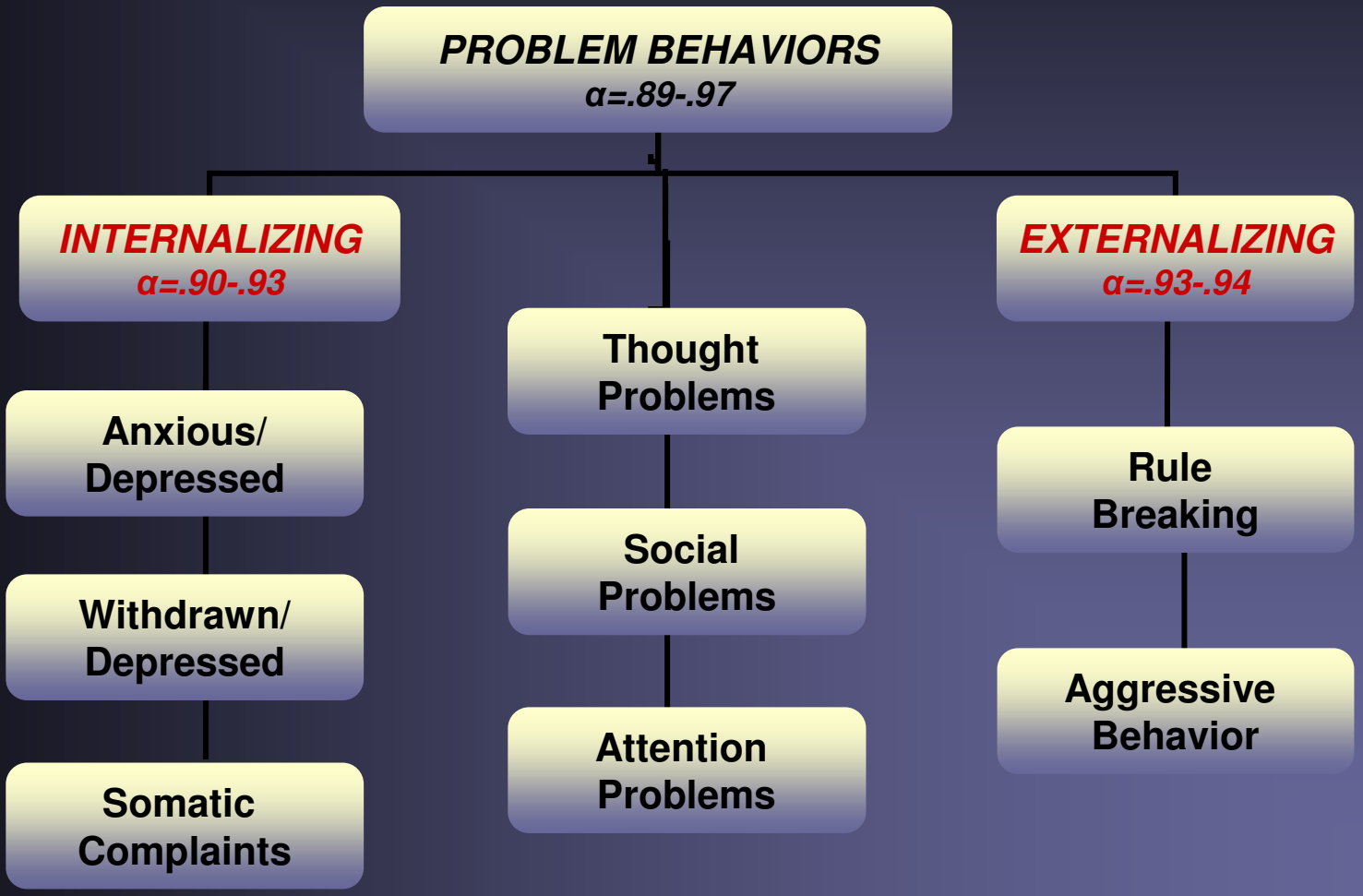
Age 17

Child Behavior Checklist (CBCL) 6-18‡

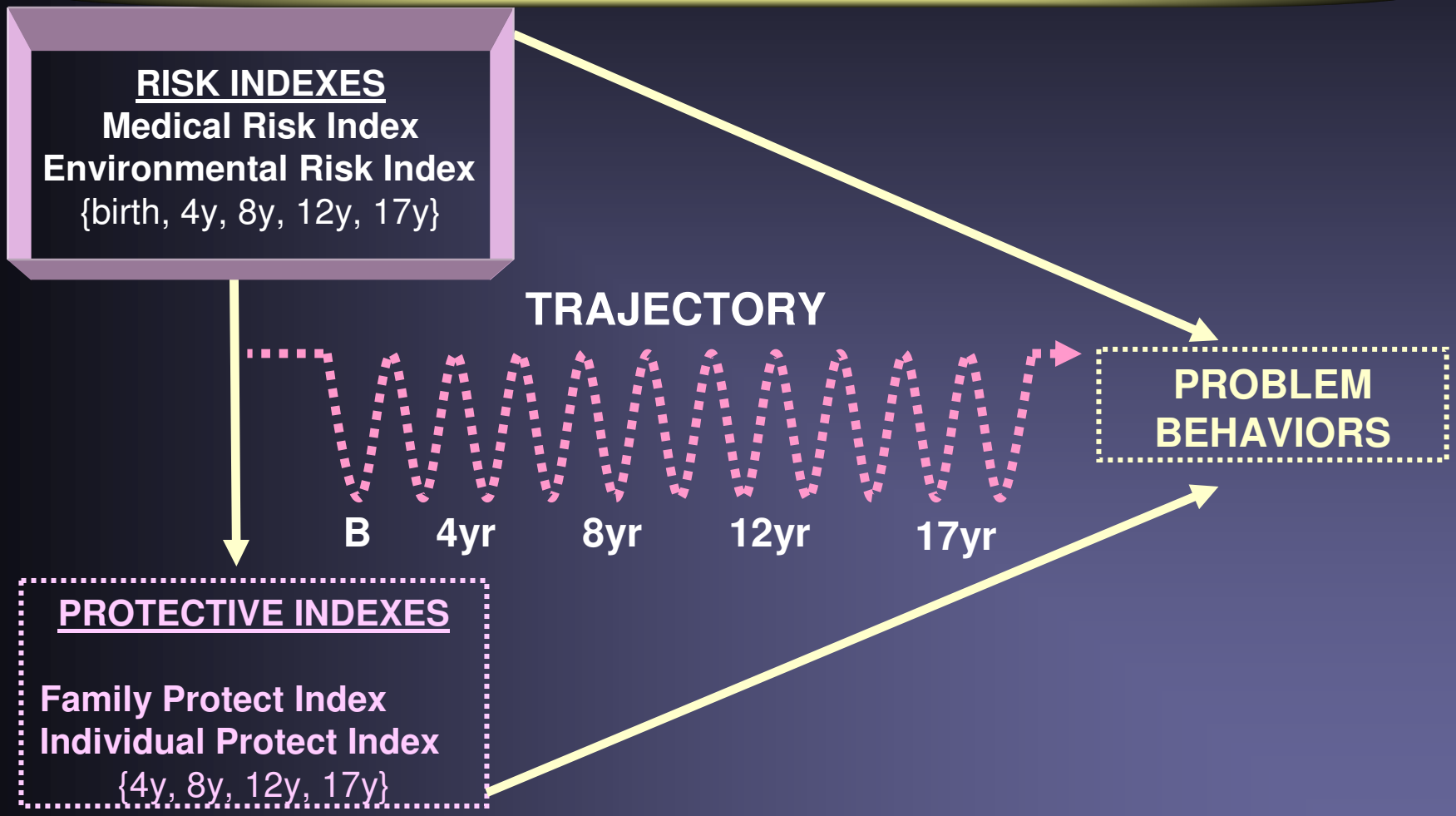
†Achenbach, T.M. (1991). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile.* Burlington, VT: University of Vermont, Department of Psychiatry.

‡ Achenbach, T.M., & Rescorla, L.A. (2001). *Manual for the ASEBA School-Age Forms and Profiles.* Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.

CBCL SUBSCALES



RISK INDEXES



MEDICAL RISK INDEX

B
I
R
T
H

- Perinatal Group
- Hobel Neonatal Score
- Intraventricular Hemorrhage
- Necrotizing Enterocolitis
- Meningitis
- Bronchopulmonary Dysplasia
- Hydrocephalus
- Duration of O_2 in first 24 hours

- Medical Status
- Neurological Status

18 mo, 30mo,
4y, 8y, 12y, 17y

α =.60-.79

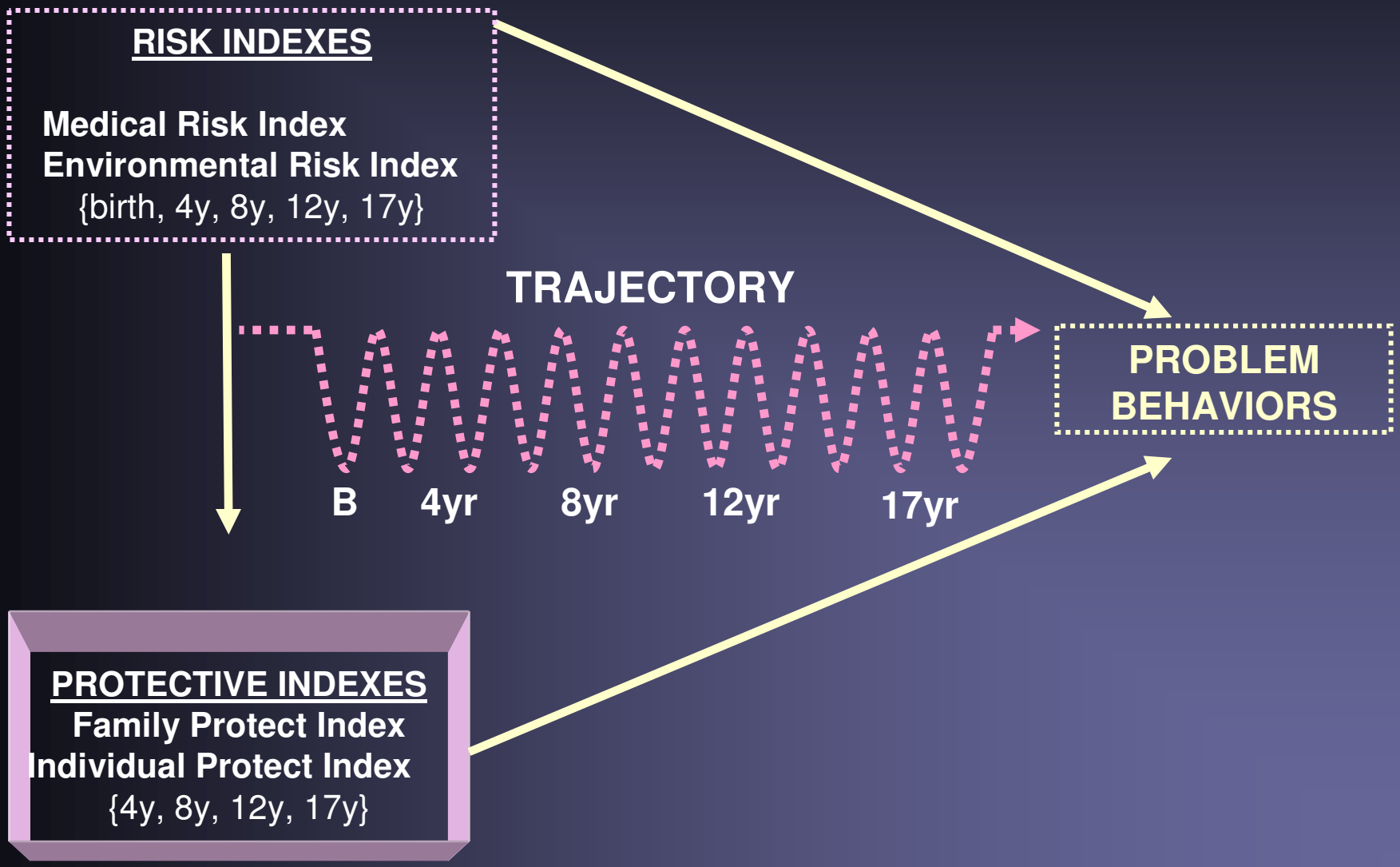
ENVIRONMENTAL RISK INDEX

Birth, 4y, 8y, 12y, 17y

SES Group Score	**Mom/Dad Absence**
Mom/Dad Education	**Maternal Depression**
Mom/Dad Occupation	**Mom Psychological Distress**
Marital Status	**Life Stress**
Minority Status	**Family Resources**

α =.62-.88

PROTECTIVE INDEXES



FAMILY PROTECT INDEX

4y, 8y, 12y, 17y

MATERNAL VARIABLES	FAMILY VARIABLES
Maternal Control Style	Family Support
Maternal Involvement	Family Cohesion
Maternal Responsivity	Family Adaptability
Maternal Perception	Parental Presence
Maternal Self-Esteem	Family Connectedness
Maternal Assistance	Parent-Child Relationship
Maternal Teaching Style	Family, Discipline, Sibling Concerns

α =.60-.77

INDIVIDUAL PROTECT INDEX

4y, 8y, 12y, 17y

Mood	Physical Confidence
Persistence	Religiosity
Approach	Life Events
Adaptability	
Negative Emotionality	

α =.61 -.64

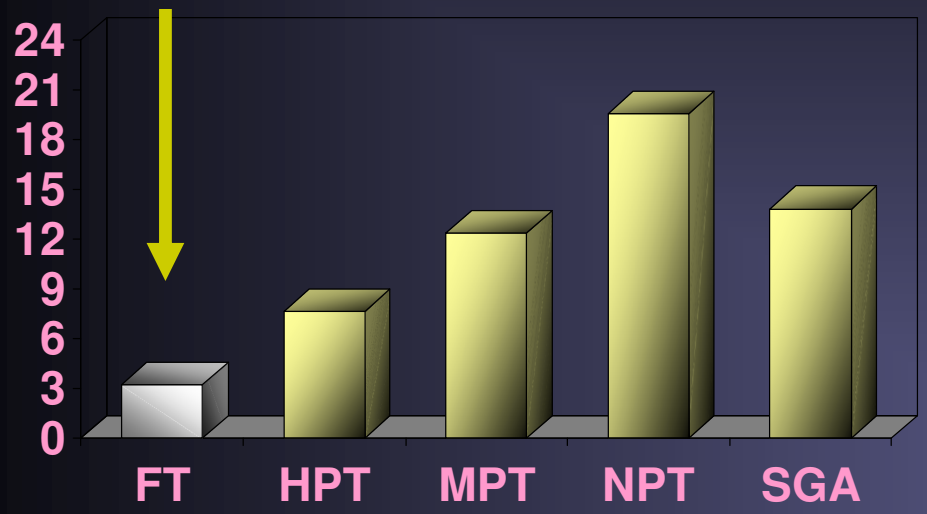
DATA ANALYSIS

1. **ANOVA**
   Perinatal Group Differences
   Risk Indexes
   Protect Indexes

2. **Mixed Effects Modeling**
   Trajectory of Problem Behaviors (CBCL)

RESULTS

ANOVA: MEAN RISK INDEX SCORES by PERINATAL GROUP

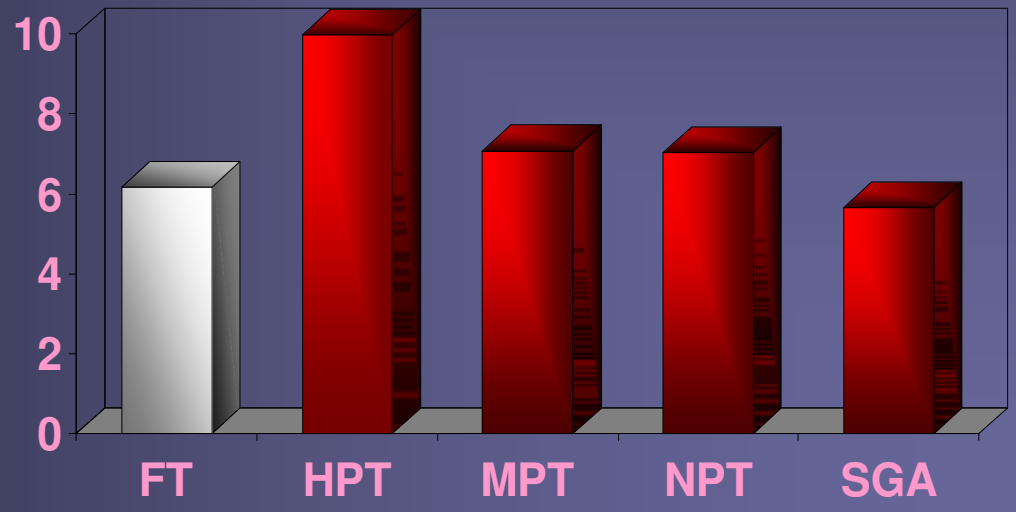


MEDICAL RISK INDEX

$F(4,208)=55.7, p<.0001$

ENVIRONMENTAL RISK INDEX

$F(4,208)=2.5, p<.05$



ANOVA: PROTECT INDEX SCORES by PERINATAL GROUP

No differences between perinatal groups -
Family Protect Index
Individual Protect Index

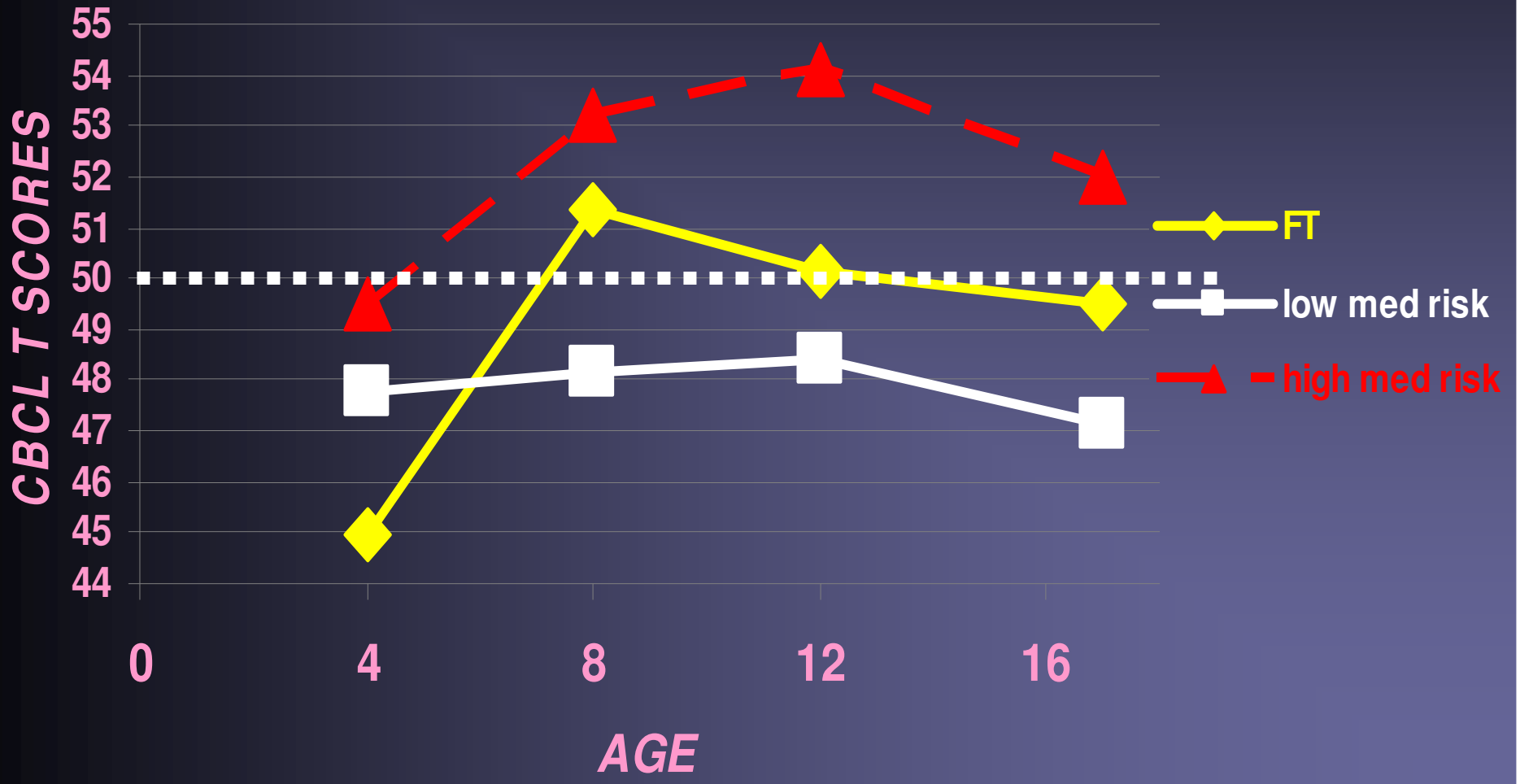
LONGITUDINAL TRAJECTORY OF PROBLEM BEHAVIORS: MIXED EFFECTS MODELING

- Outcome *N*=208
  - Total Problem Behaviors *T* score – 4y, 8y, 12y, 17y
- Independent Variables
  - Time
  - Gender
  - Risk Indexes
    - medical, environmental
  - Protective Indexes
    - family, individual
  - Interactions
    - Time x Risk
    - Time x Protect

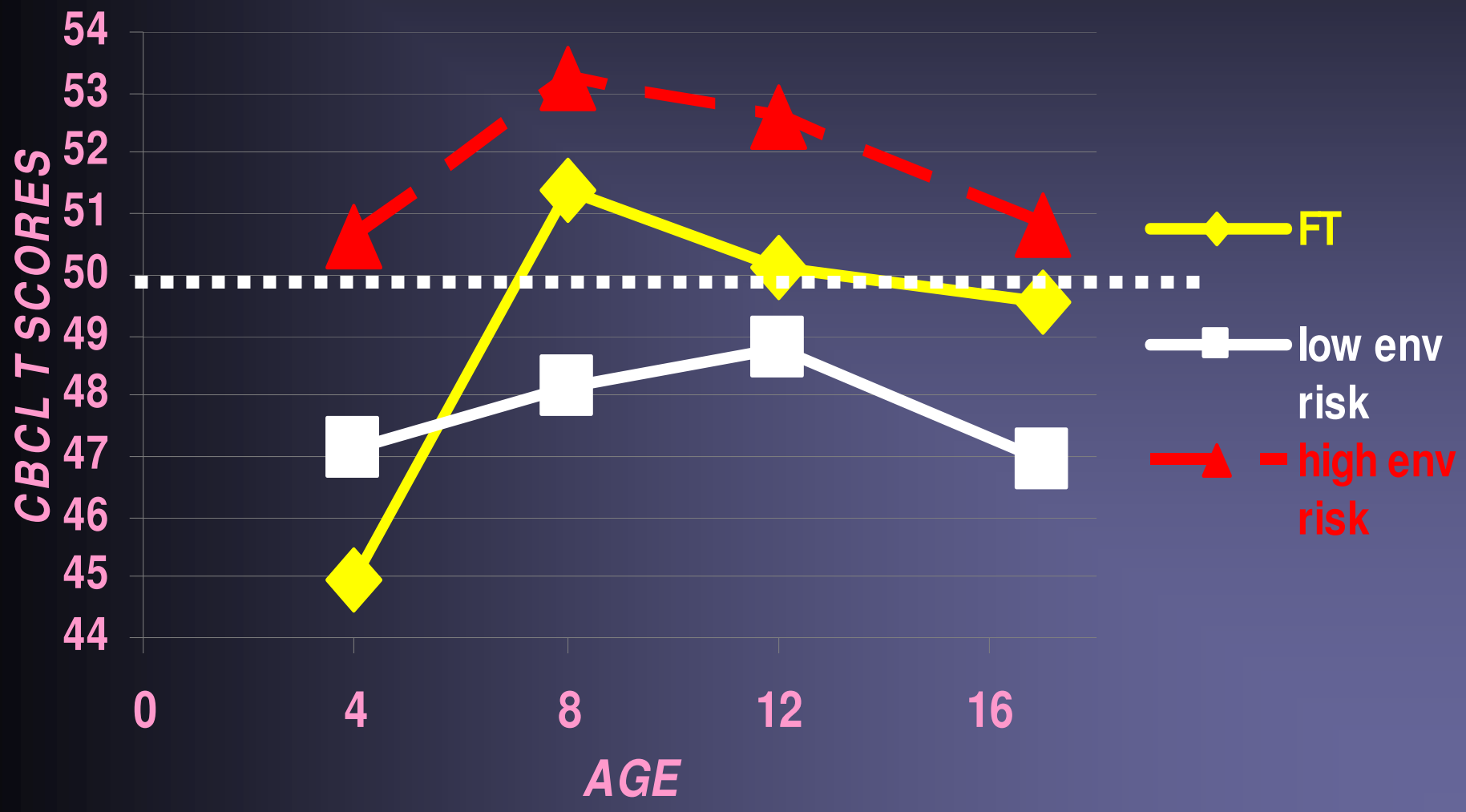
Final Trajectory Model: Total Problem Behaviors

Variable	DF	*F*	*P*
Time	1, 181	4.09	0.0445
Medical Risk	1, 228	22.73	<.0001
Environmental Risk	1, 228	0.64	0.4248
Individual Protection	1, 228	36.52	<.0001
Time x Environmental Risk	1, 228	8.64	0.0036

TRAJECTORY OF CBCL TOTAL PROBLEM BEHAVIORS by MEDICAL RISK INDEX



TRAJECTORY OF CBCL TOTAL PROBLEM BEHAVIORS by ENVIRONMENTAL RISK INDEX



CONCLUSIONS

- **Do problem behaviors *continue* from preschool to late adolescence?** ***YES***
- **Does *medical & environmental risk* influence trajectories of problem behaviors?** ***YES***
- **Do protective factors influence trajectories of problem behaviors*?*** ***YES***

IMPLICATIONS

Indexes - Risk and Protection

1. Alpha coefficients - adequate reliability

2. Predictive Utility - helps parents & clinicians anticipate critical time periods

- Children born preterm with high medical risk at birth & beyond - anticipate greater levels of problem behaviors, especially at age 12.
- Children born preterm with high environmental risk - anticipate greater levels of problem behaviors at age 8.
- Enhancing child-level behaviors such as religiosity and self-confidence, minimizes problem behaviors over time.

RESEARCH TEAM

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