



Psychiatry / Neuropsychology  
DHMC

# TBI in Childhood: Conceptualizing Social and Behavioral Challenges

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## Learning Objectives

- Identify several behavioral challenges associated with childhood TBI
- Label at least 2 brain regions and systems implicated in behavioral dysregulation secondary to TBI
- Describe the impact of socioeconomic status upon childhood TBI

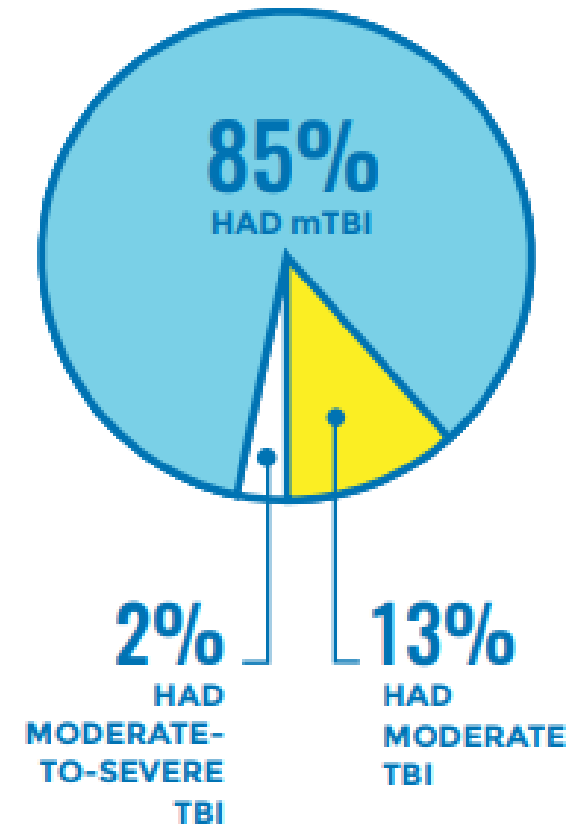
## Pediatric TBI Basics

- Significant public health burden
  - 640K ED visits
  - 18K hospitalizations
  - 1,500 death in kids < 14
- 0-14: falls or non-accidental trauma
- 15-24: MVC, falls
- Sports and rec: 325K



# TBI INJURY SEVERITY

	Mild	Moderate	Severe
LOC	None; < 30 minutes	30 minutes – 24 hours	> 24 hours
GCS	13-15	9-12	3-8
PTA	None; < 24 hours	> 1 day, < 7 days	> 7 days
Duration	Temporary (for most)	Some long-term impairment in at least 1 area of life	Long-term impairment in 1 or more areas of life
Imaging/ Neurophysiology	Nothing clinical	Signs on EEG, CT, MRI	Signs on EEG, CT, MRI



## The Impact

TBI is the  
leading cause  
of acquired  
disability in  
children



## Social Competence

- Individuals, interactions, relationships
- Individual goals
- Social goals
- A duality of self and other

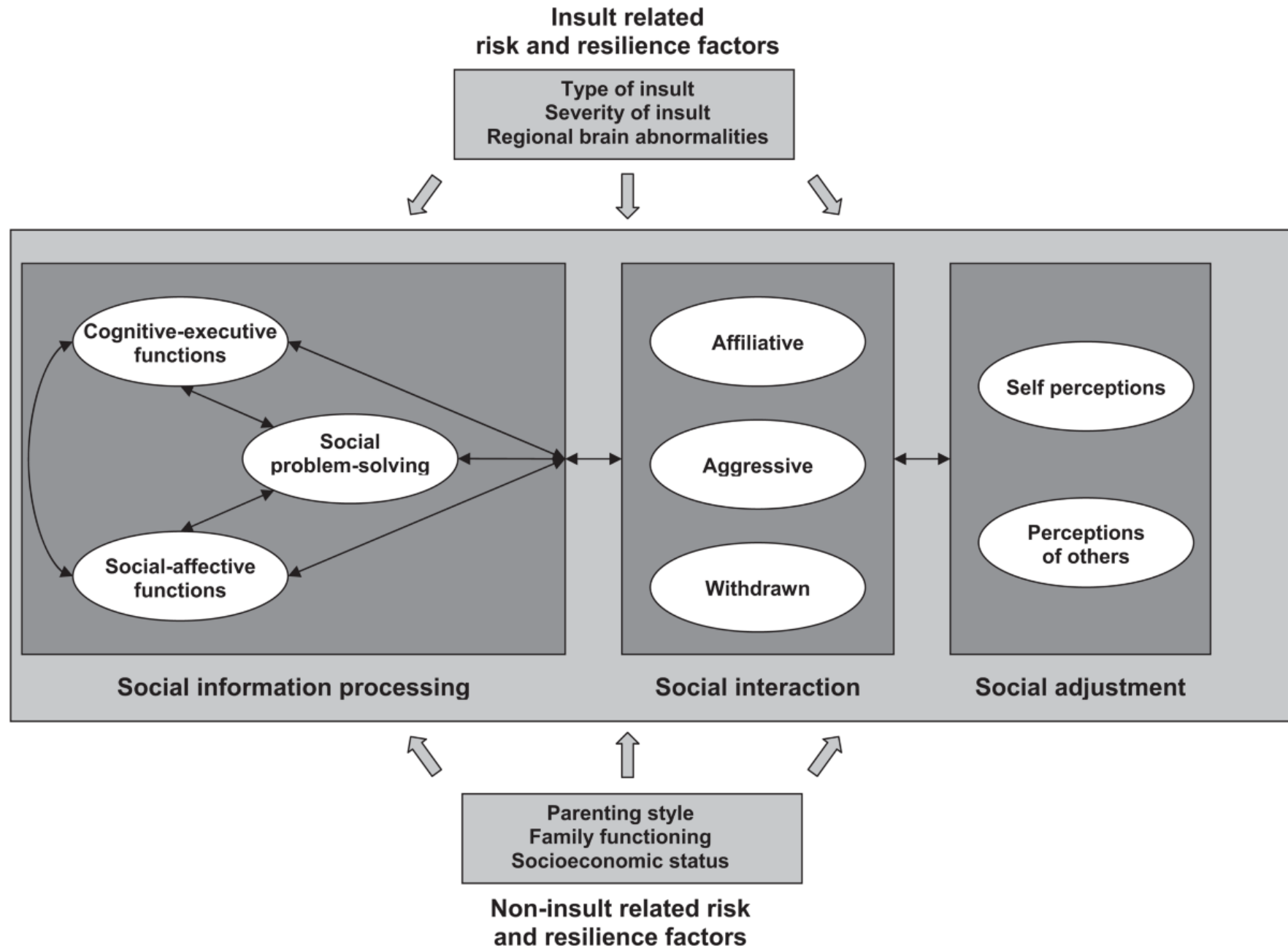


*Journal of Clinical Child Psychology*  
1990, Vol. 19, No. 2, 111–122

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# **Social Adjustment, Social Performance, and Social Skills: A Tri-Component Model of Social Competence**

**Timothy A. Cavell**  
*Texas A&M University*



Yeates et al., 2007  
*Psychol Bull*



## Social Information Processing

- Problem solving steps
- Success depends upon pragmatic language, exfx, emotion regulation
- Most challenging in severe TBI
  - Long-term deficits



## Cognitive Sequelae of Childhood TBI

- Moderate to severe in early childhood
  - Broad intellectual and academic deficits
- Ubiquitous
  - Attention, concentration
  - Processing speed
  - Pragmatic language
  - Visuospatial

Memory



## Executive Functions and Childhood TBI

- Deficits are common
- “Hot”
- “Cold”



## Social-affective functioning

- Understanding of emotions, appreciating mental states
    - Differentiate between internally experienced vs. socially expressed emotion
  - Kids with TBI struggle when/with:
    - Expressed emotions are incongruent with the actual emotion
      - If TBI before age 7
      - Frontal lobe injury
- Most impaired**
- Understanding ironic criticism or deceptive praise



## Social Interaction

- Varies based on situation and people
- Children's behaviors will differ across contexts and relationships



## Internalizing Problems in Childhood TBI

- 25-50% of school-aged children
  - Lower SES
  - Fam hx of anxiety disorders
  - Older age at injury \*\*



## Externalizing Problems in Childhood TBI

- 25-33% demonstrate aggressive behavior
  - Depression, younger age at injury
- Secondary ADHD
  - 15-20% in mod-severe TBI



## Social Adjustment

- Self-perception vs. perception of others
  - Peers, teachers, parents
- Time of life matters
  - Behaviors are viewed differently
  - Implications for long-term adjustment





## Coming Together

- Social problem solving deficits
  - More aggressive or anxious/withdrawn → peer rejection
- Social problem solving intact
  - Can initiate and maintain relationships, use prosocial behaviors → social accepted by peers, better relationships



## Risk and Resilience Factors

- Intrinsic to the child
- Environmental influences
  - Neurological insult
  - Parenting behaviors
  - Poverty
  - Parent mental health
  - Stigma





## Family Burden

- TBI – significant family stressor
- Heightened family dysfunction
- But the home is crucial in determining outcomes

# Home & Environment Factors

## Early childhood TBI

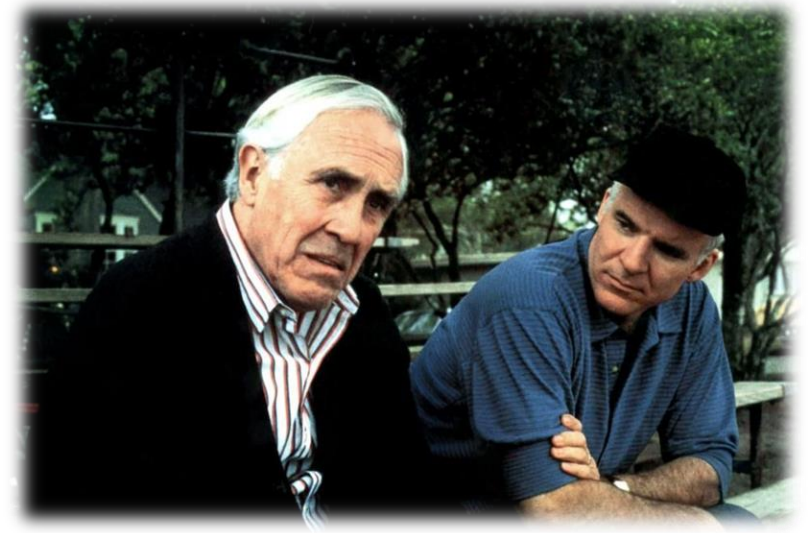
- Higher quality early and late → better school performance and behavior
- Higher quality late → better long-term exfx

## Higher income and education

- Fewer bx problems and better fx after TBI
- Parental education predictive of outcomes
- Disciplinary practices and dyad interactions also predictive

# Parenting Styles

- Authoritative – the good one!
- Permissive
- Authoritarian



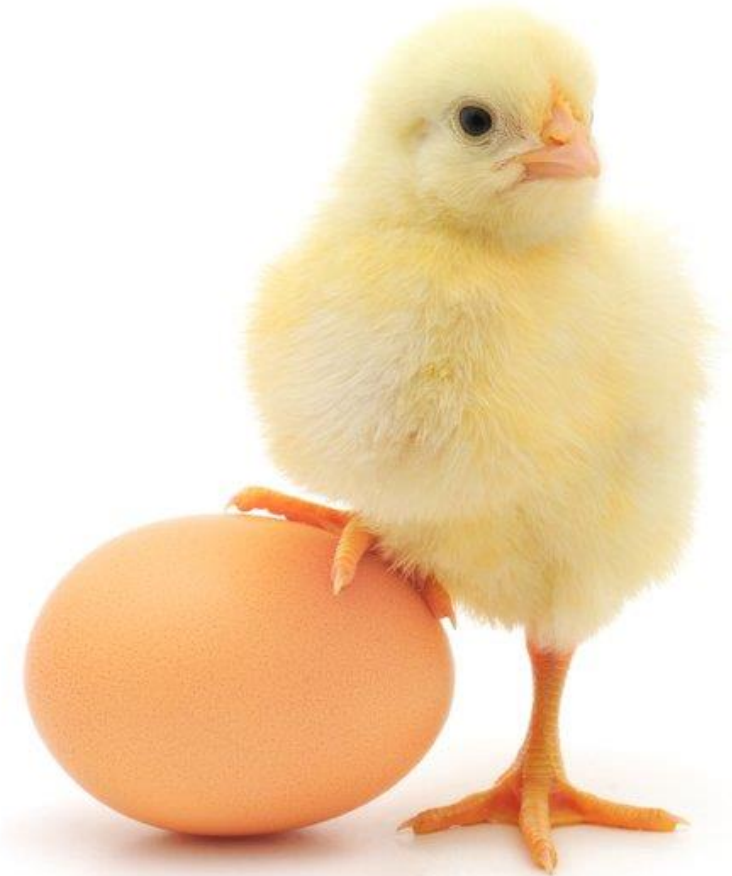
# Parenting Styles

- Predicts long-term psychosocial fx in early childhood TBI
- Might moderate effect of early TBI
  - Less impactful with severe TBI
- Authoritative style → better social competence and exfx
- Mom vs. Dad differences

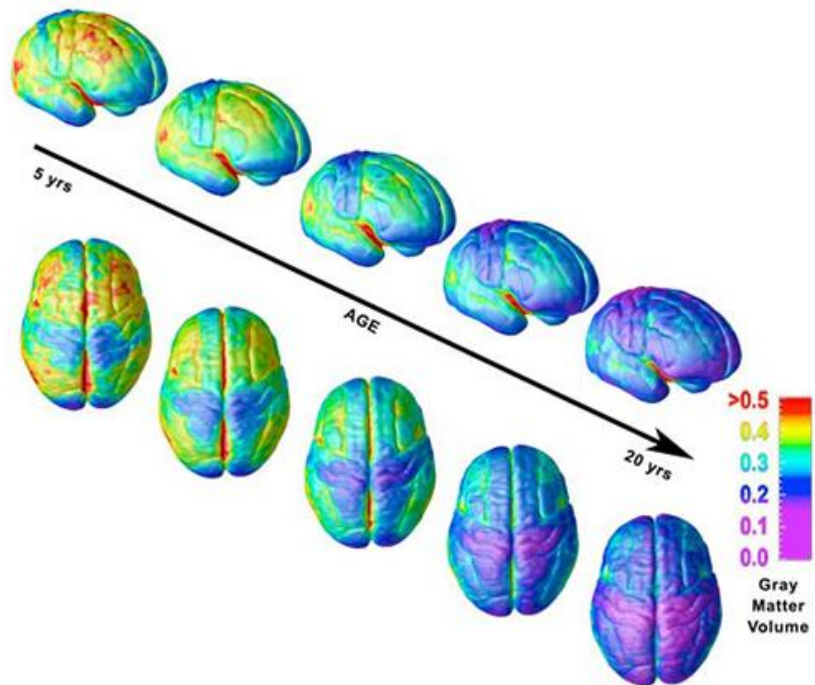
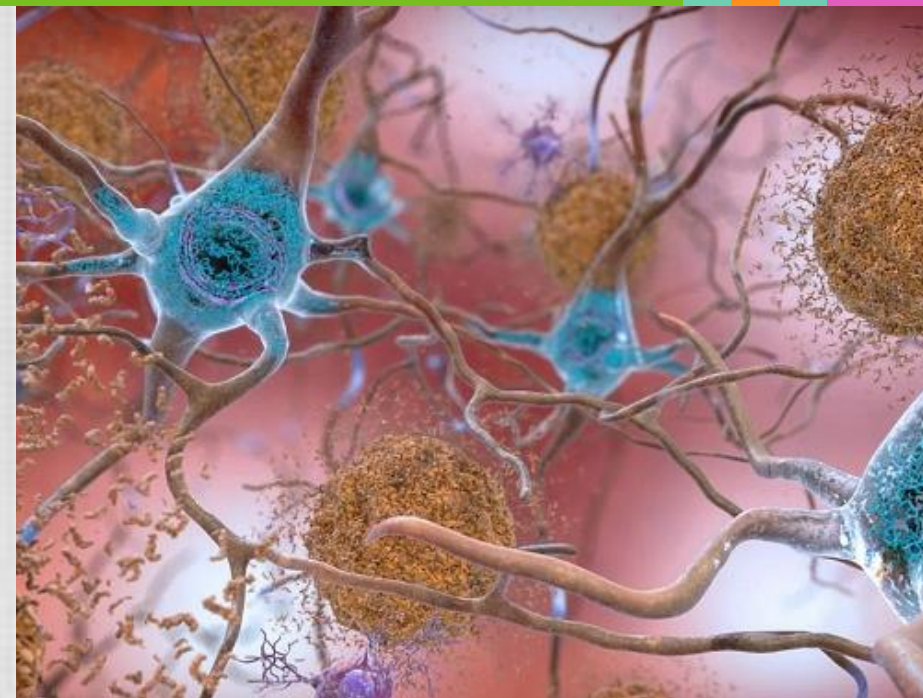


## Overlap of Risk Factors

- Kids from lower SES → more likely to suffer TBI
- Parent distress early predicts behavior problems later
- Early behavior problems predicts parent distress later



# Age at Time of Brain Injury





## “Growing into their deficits”

- Problems may emerge “late”
- The intersection of ability and environmental demands
- Evidence of disruption to developing systems



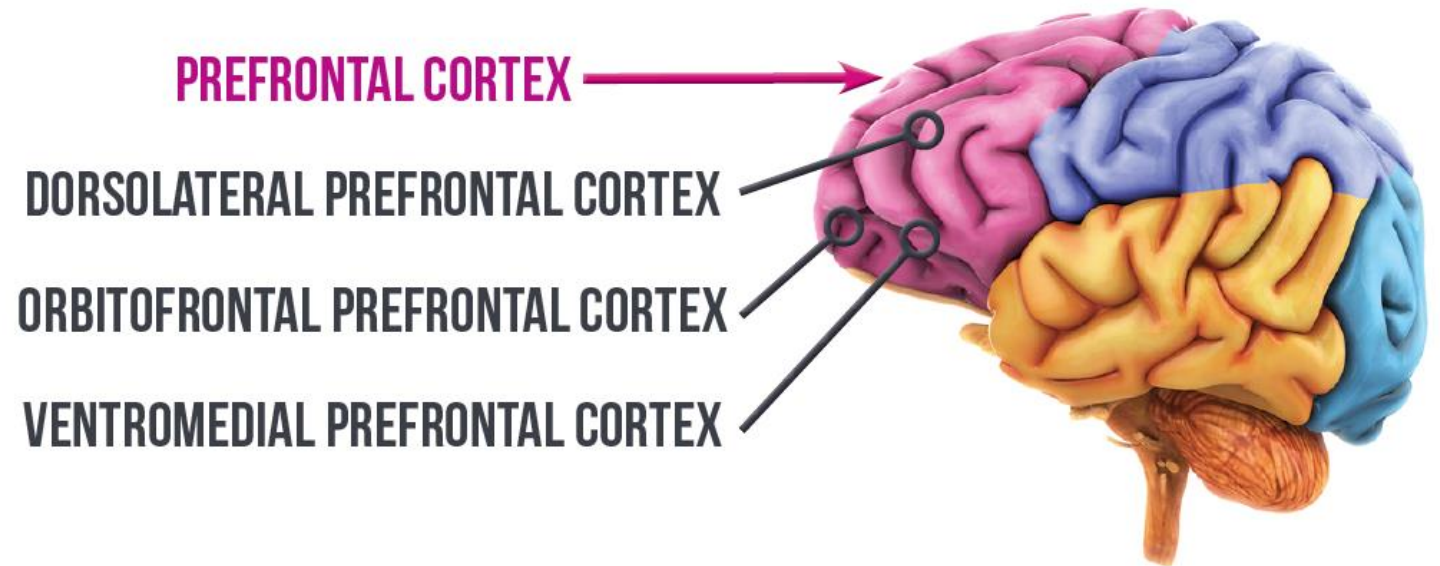
# Injury Age and Behavior in Childhood TBI

- Younger vs. Older
  - During adolescence, more affective problems
  - Earlier age, more behavioral problems later



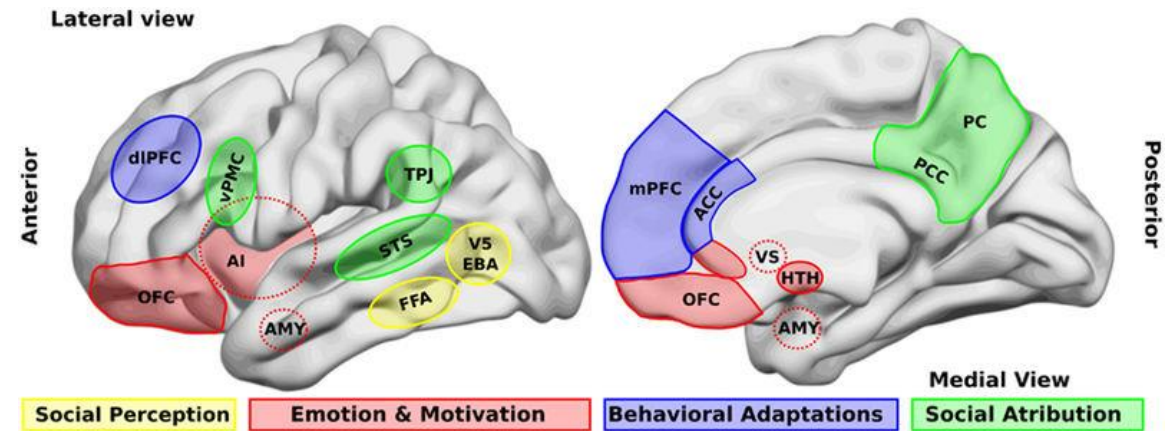
## Important Brain Networks Disrupted in Pediatric TBI

- Orbitofrontal cortex
  - Rule-breaking, errors
- Dorsolateral-frontal
  - Problem-solving
- Dorsolateral prefrontal circuit
  - Executive functions → planning, monitoring, goal selection, feedback incorporation



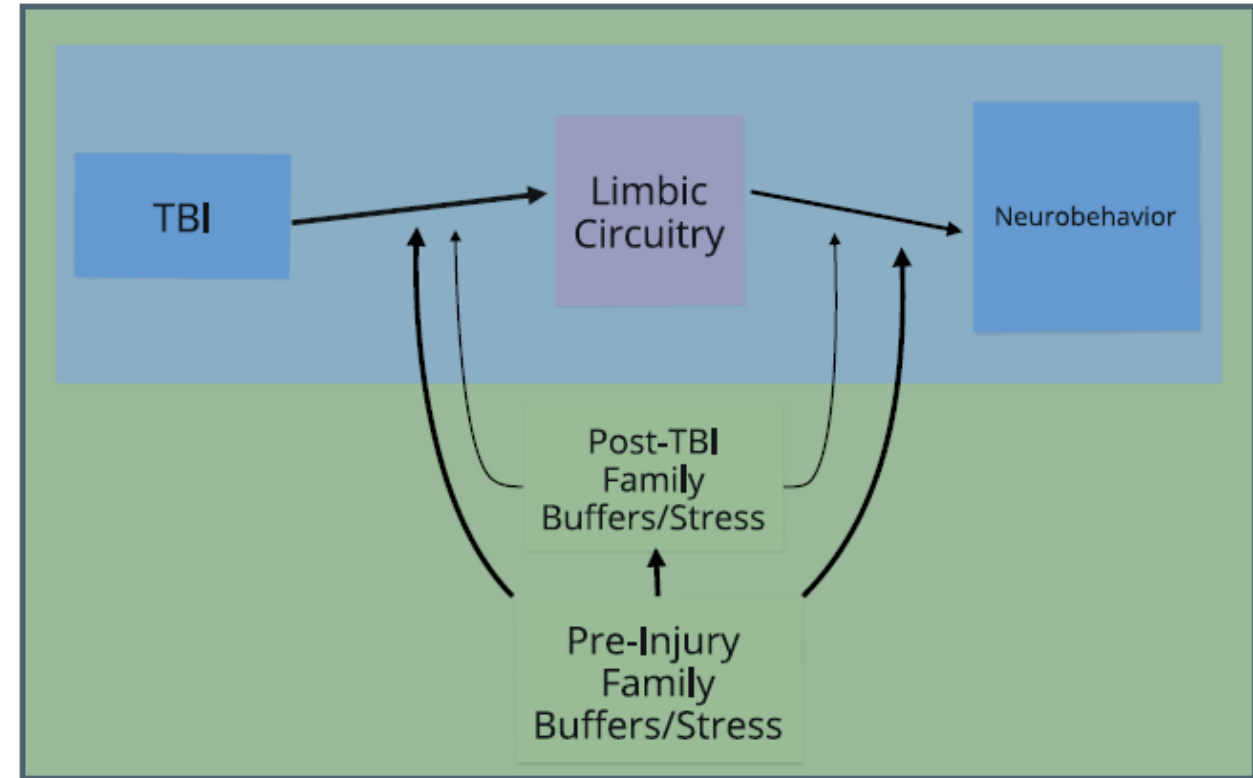
## Cognitive and Social Networks

- Lots of overlap
- Diffuse frontotemporal and limbic injury
  - Both cognitive and affective aspects of social behavior
- Dorsolateral-frontal
  - Cognitive, executive function deficits without social problems
- Orbital and ventromedial prefrontal
  - Deficits in self-regulation, emotion, social behavior



## Pre-Injury Context Matters

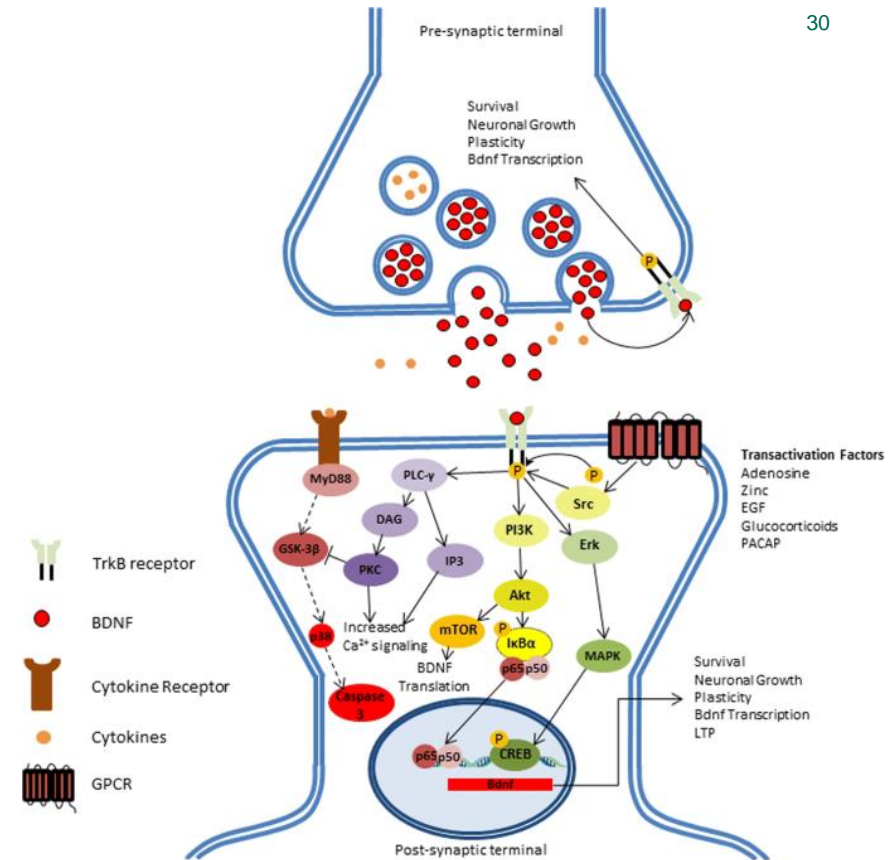
Environment primes the developing brain's  
response to injury  
for better or worse



Fisher et al., 2021  
*Biological Psychiatry*

## Genetic Differences?

- The role of BDNF Val66met polymorphism
- BDNF → naturally occurring neurotrophin in the brain
  - neuroplasticity, protective
- Val66Met polymorphism affects the activity-dependent release of BDNF





## Interventions: Child vs. Parent

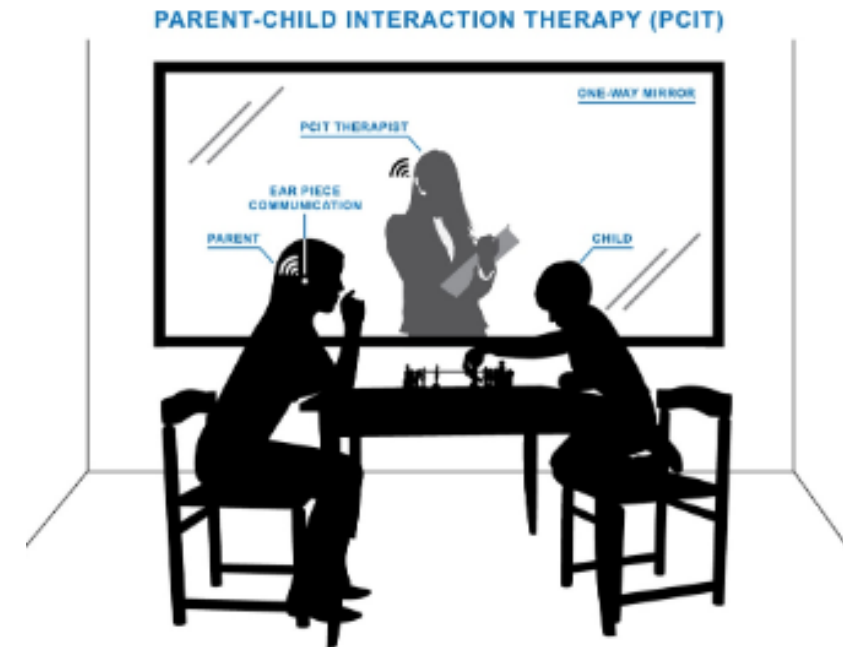
- Child-directed
  - CBT
  - Rehabilitation
- Parent-based
  - Parent-child relationships
  - Discipline strategies
  - Working through unresolved stressors





# Parent-based Interventions

- Parent-Child Interaction Therapies
  - PCIT
  - I-InTERACT



## Parent-based Interventions

- Problem-Solving Interventions
  - Family Problem Solving (FPS)
  - CAPS
- Combined parenting + cognitive-behavior therapy
  - Acceptance and Commitment Therapy (ACT)
  - Stepping Stones
  - Signposts

## This is Nice, but...

- Many barriers to accessing behavioral healthcare
  - Transportation, SES variables, insurance coverage, provider availability...
- Telehealth?
- Does treatment ever happen?

## School-to-Prison Pipeline

- TBI increases the risk of educational disengagement
- TBI increases the risk of committing violent crimes
  - Sweden Study
- UK Study



## Behavioral Problems in Adulthood

- Social and emotional deficits persist and maybe even increase into adulthood
- Accumulated failures → withdrawal → increased emotional problems
- May be related to executive problems, pragmatic language, and social-problem solving deficits

## SOCIAL COMPETENCE





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Thank you for your attention

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