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Health Children's

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

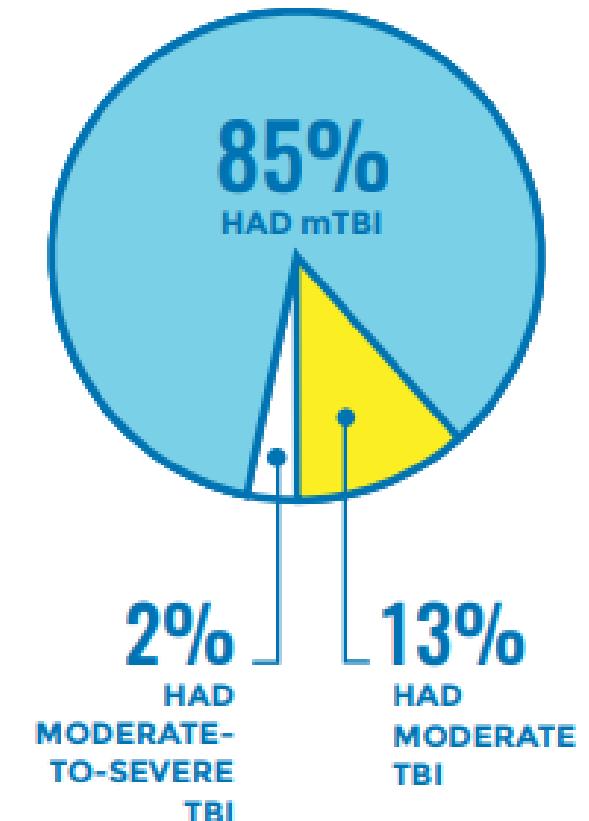
Pediatric TBI Basics

- 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

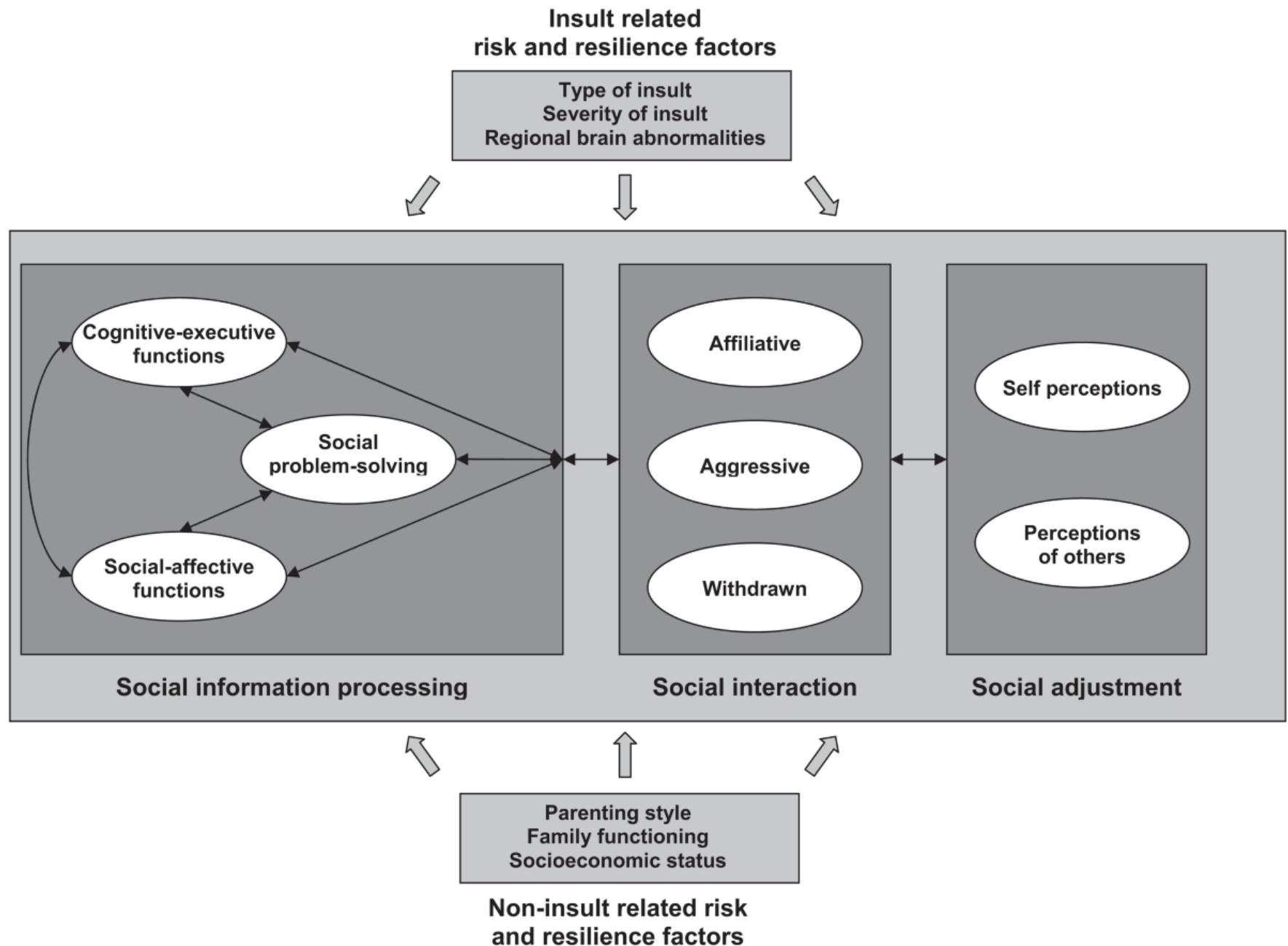


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1990, Vol. 19, No. 2, 111-122

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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 } **Most impaired**
 - Frontal lobe injury }
 - 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



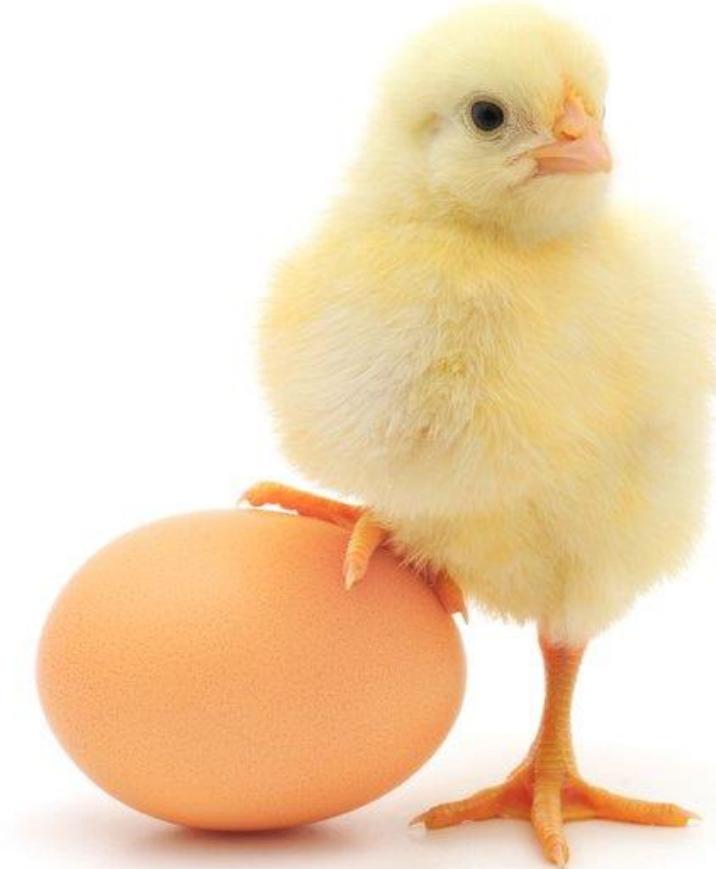
Parenting Styles

- 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

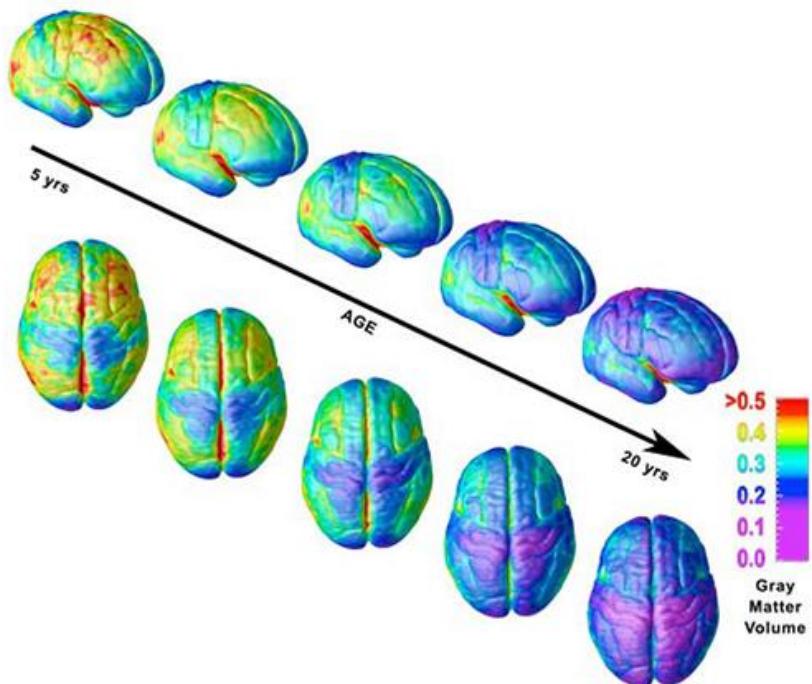


Overlap of Risk Factors

- 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



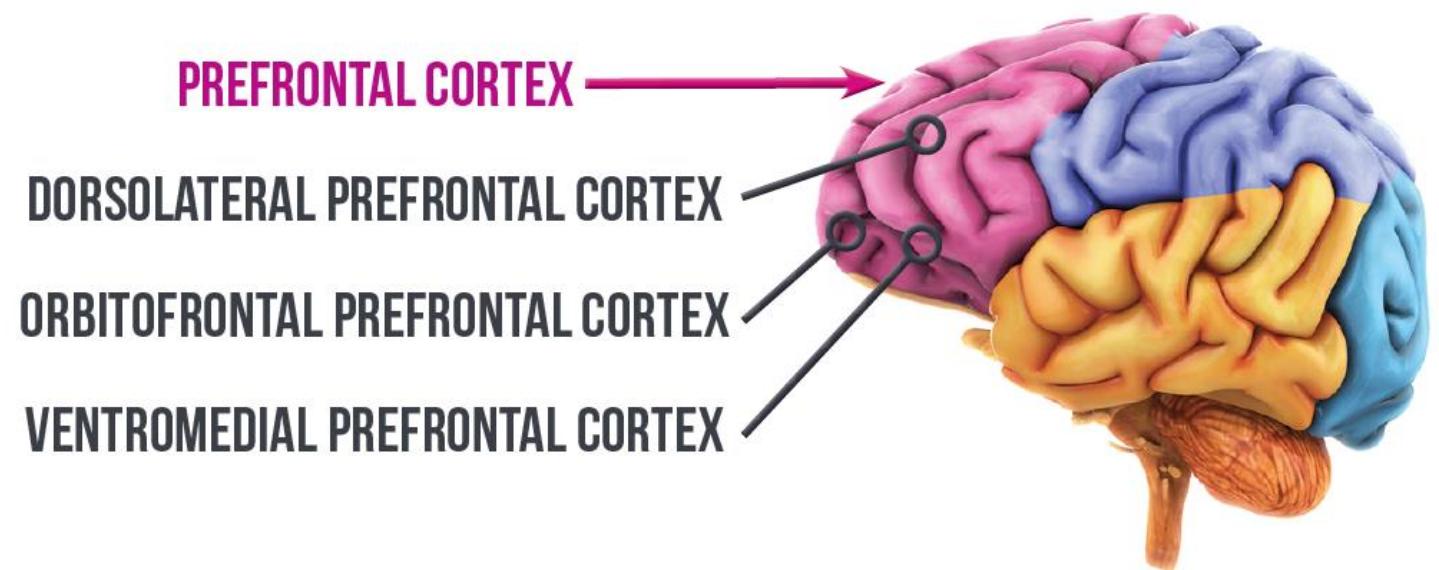
Injury Age and Behavior in Childhood TBI

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



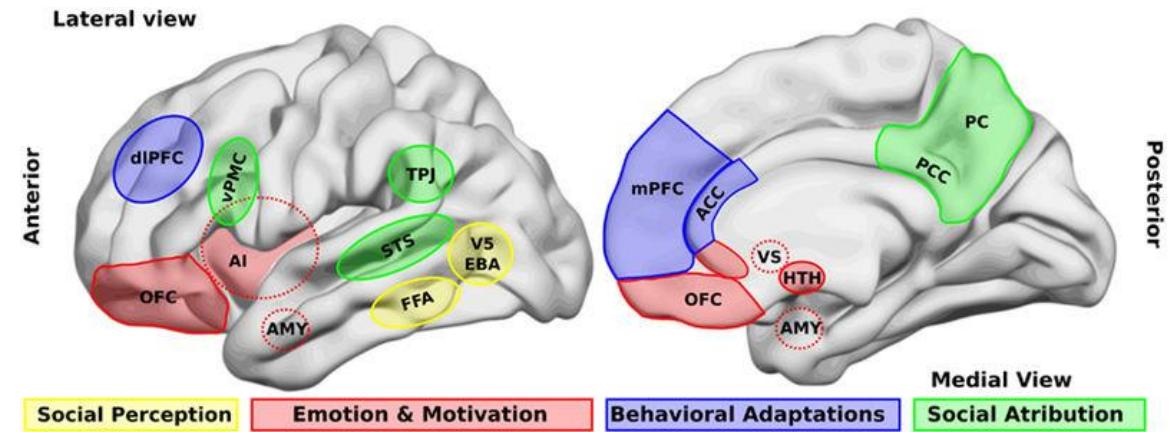
Important Brain Networks Disrupted in Pediatric TBI

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



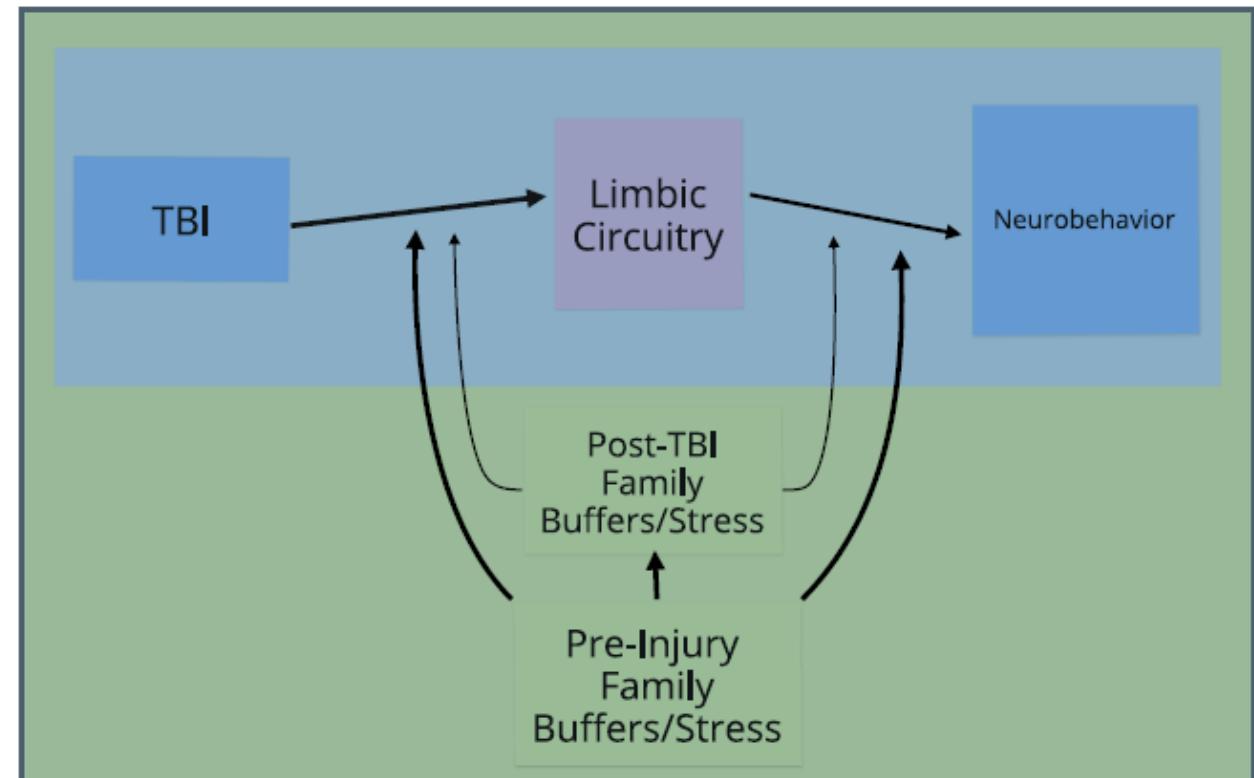
Cognitive and Social Networks

- 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

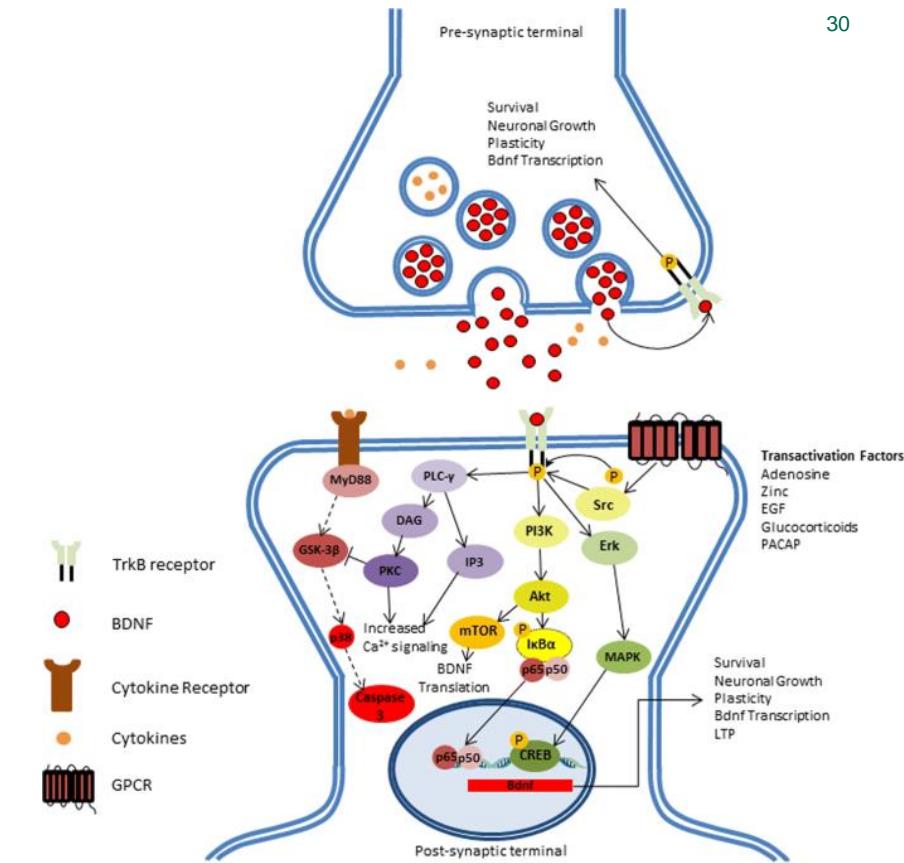
Environment primes the developing brain's response to injury
for better or worse



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





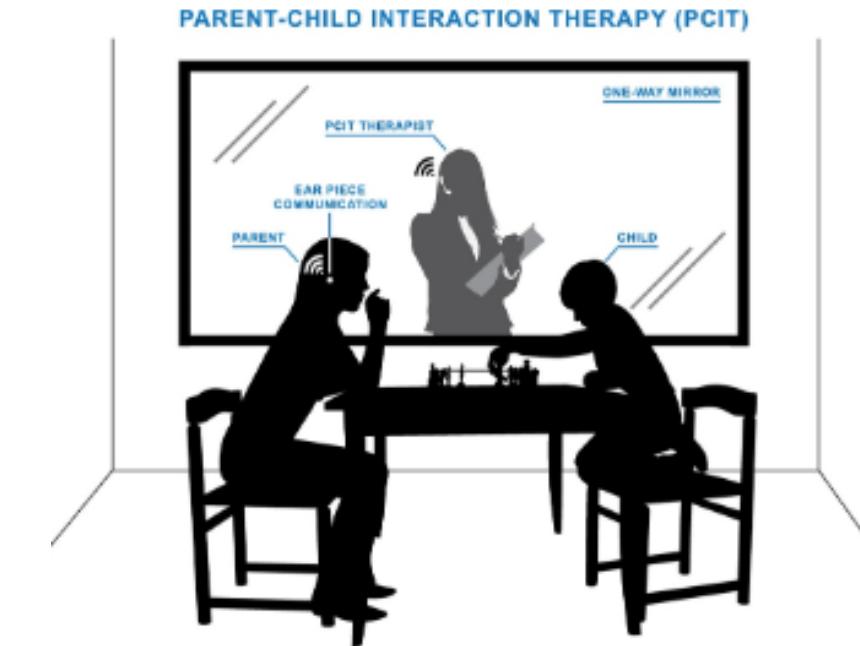
Interventions: Child vs. Parent

- 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

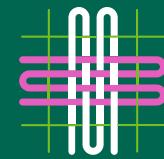


Behavioral Problems in Adulthood

- 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



Dartmouth
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Thank you for your attention

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