

Playing Well Together: Executive Functions and Self-Regulation in Childhood



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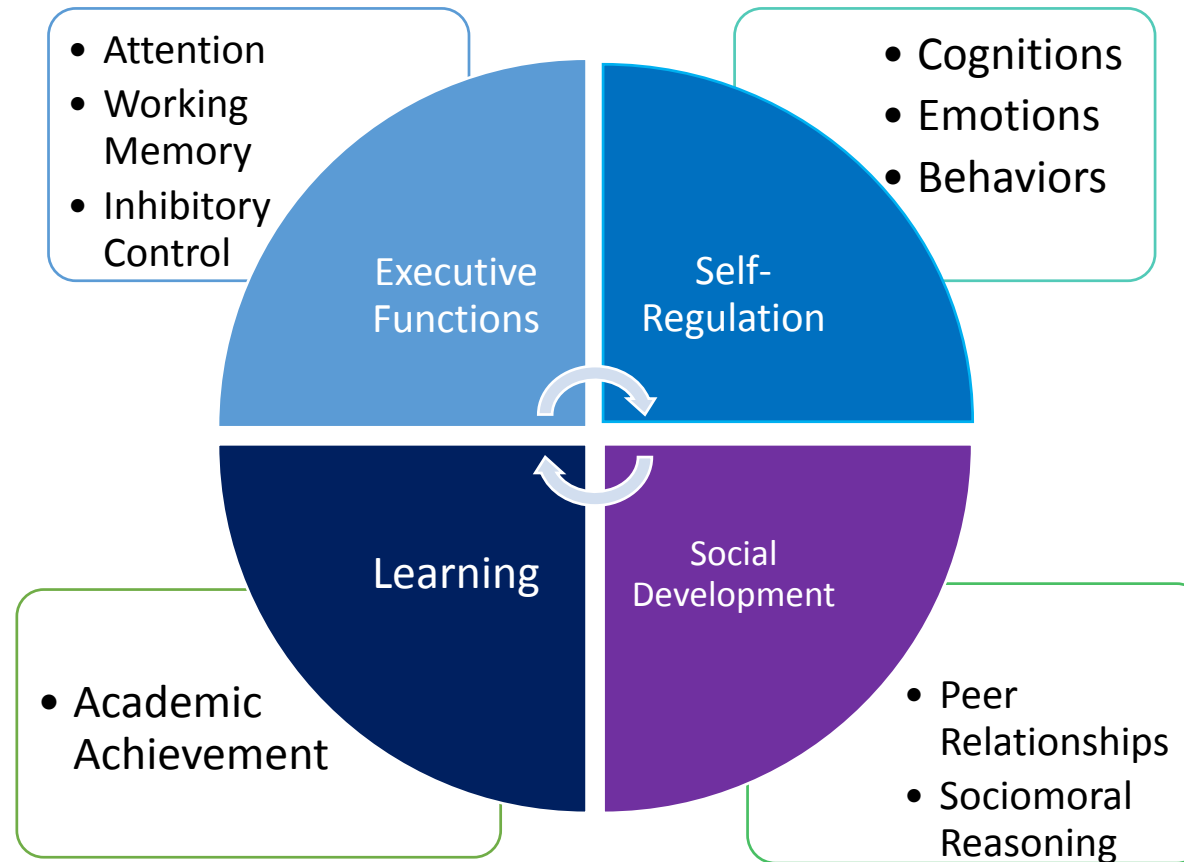


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Overview

- Why Executive Functions (EF) and Self-Regulation (SR) are important
- Specific descriptions of EF
- Specific descriptions of SR
- How EF & SR work (play) together
- The role of relationships in nurturing development of EF & SR

Why are Executive Functions Important?



Executive Functions Are:

Higher-order cognitive capacities that are interdependent:

- Working memory
- Attention
 - Alerting and orienting – relatively fast
 - Executive attention (“top-down”)
- Inhibitory control

Planning and goal-directed behavior

Problem-solving

Blue

Green

Red

Orange

Purple

Blue

Green

Red

Orange

Purple

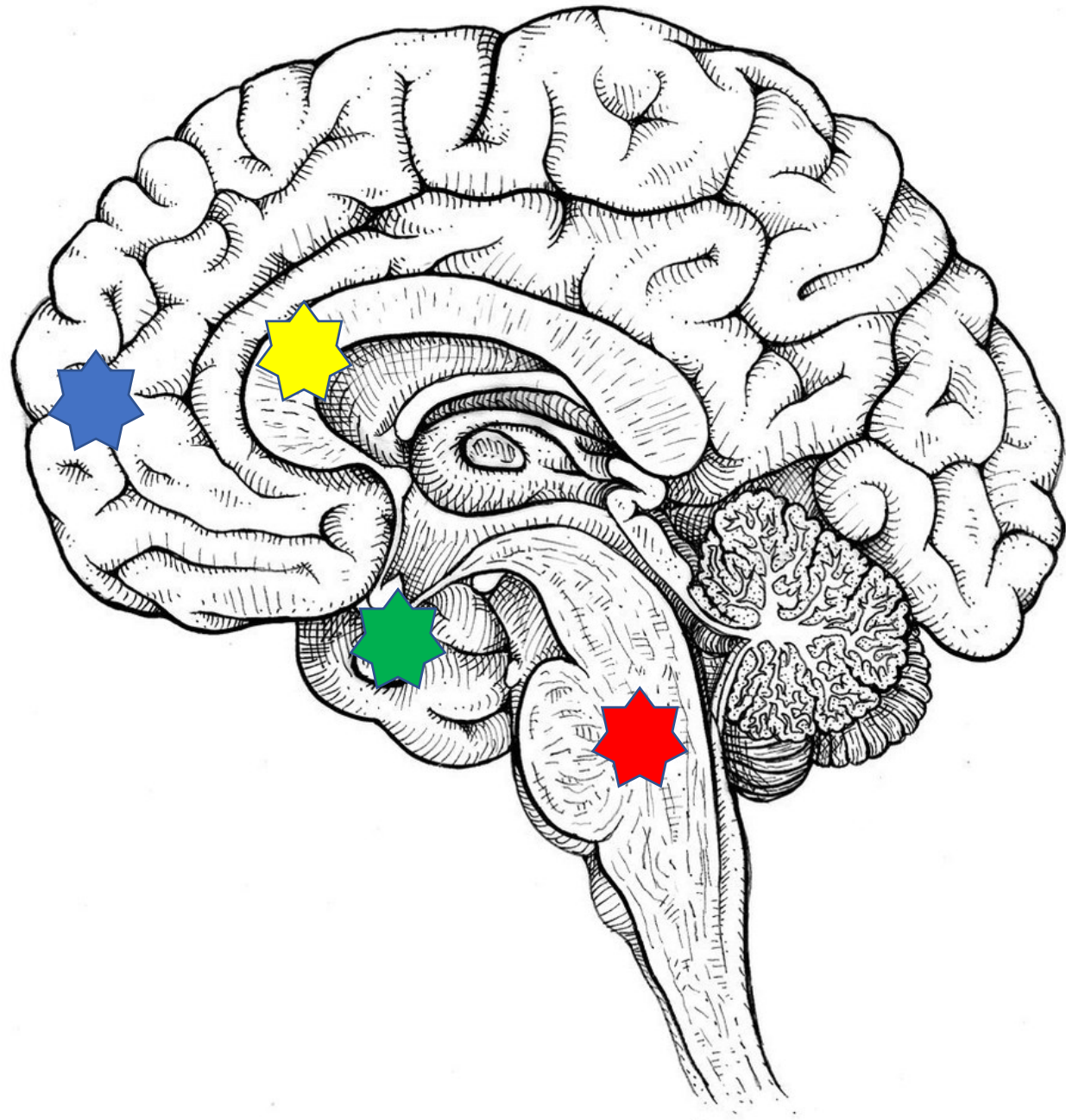
Executive Functions involve Coordination of “Top-down” and “Bottom-up” Processes

“Top-down”

- Executive control
- Organize & direct attention
- Effortful control of emotions

“Bottom-up”

- Attentional alerting and orienting
- Arousal influences attention
- Motivation to act



How do EFs Develop?

- Brain plasticity: development of synapses and circuits in response to experience
- Prefrontal cortex development and coordination with wider networks
- Supportive relationships
- Dramatic play
- Open-ended creative play; Time spent in less-structured activities (Barker et al. 2014)
- Practice is important
 - Games (make it fun): Simon says; red light green light; reverse hopscotch; memory games
 - Physical activity, yoga, mindfulness practices

Self-Regulation is:

The ability to flexibly adapt **behavior**, **attention**, **emotions**, and **cognitive strategies** in constructive ways in response to situational demands

Management of attention and arousal in the service of goal-directed behavior

Self-regulation includes behaviors that are:

Fairly automatic

- Neural processes related to emotions
- Rapid detection of environmental stimuli (threat)
- Stress & motor response systems
- Attention – alerting and orienting; ready to respond

More effortful

- Suppress a more automatic response in favor of expected behavior
- Persist on an unpleasant task
- Effortful regulation of emotion
- “Effortful control” of attention; “Executive attention”

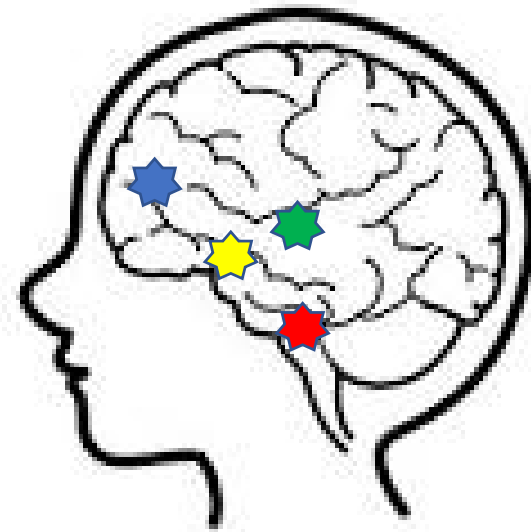
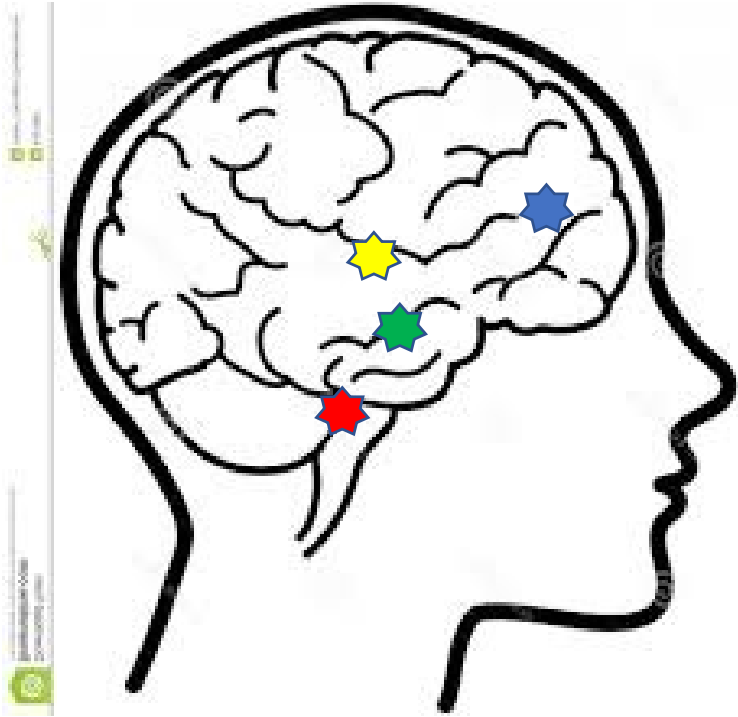
Individual differences

- Thresholds of activation
- Different resting states
- HOW effortful

Development of Self-Regulation

- Proceeds from co-regulation to self-regulation
- Naming emotions and “feeling felt”
- Alternating periods of activity, demands, and rest
- Clear guidelines for behavior
 - KSS: be safe with yourself, with others, with your things
- Help children to reflect on their own behavior (but help regulate emotions first)

Within-brain connections play with other brains

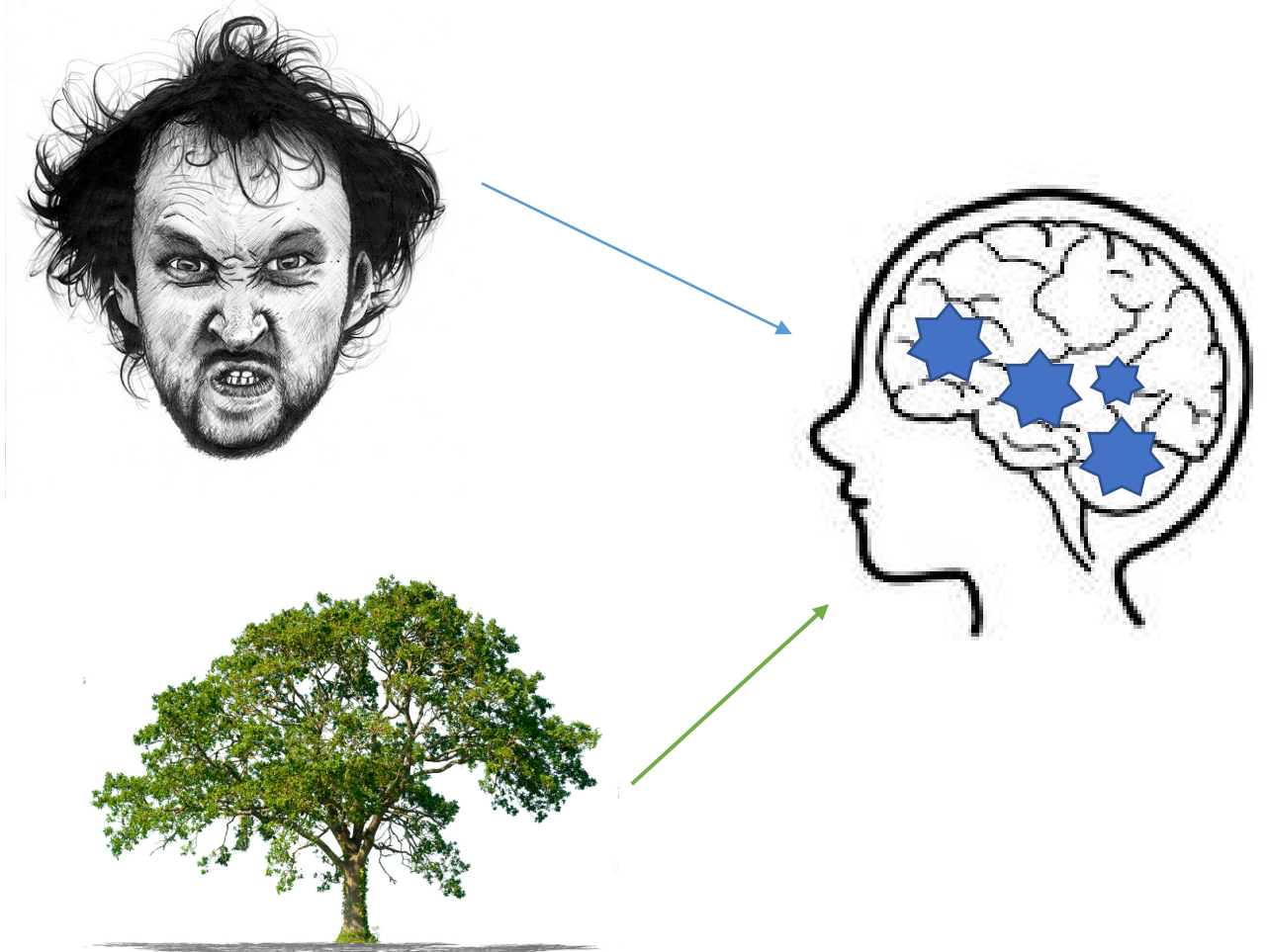


How do
Executive
Functions
and Self-
Regulation
Play
Together?

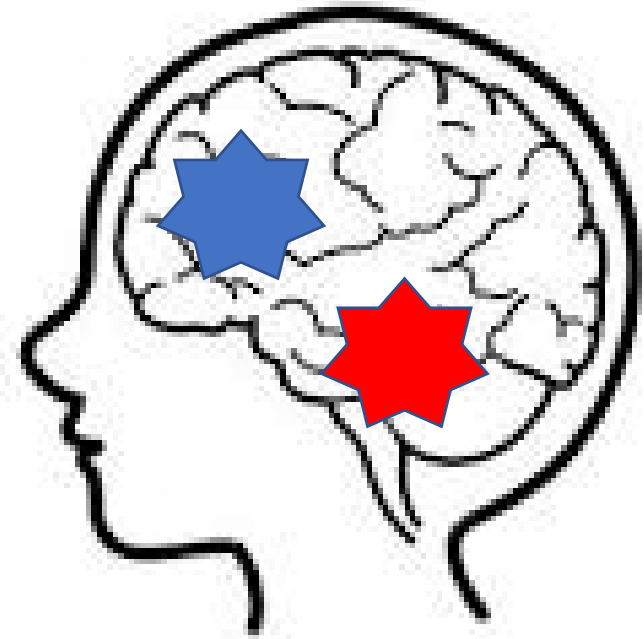
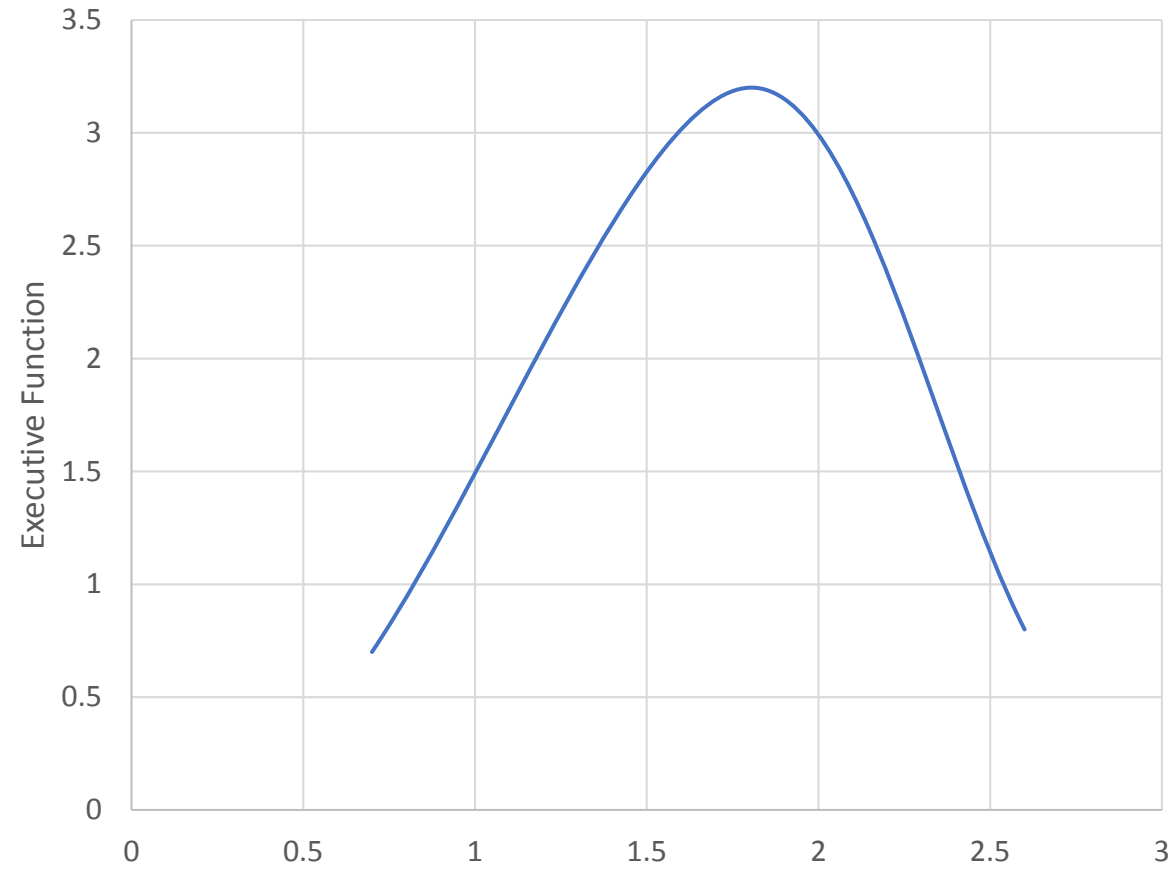


Executive Functions & Self-Regulation are Integrated, Open Systems

- Embodied & active development
- Brain & stress-response systems are open
- Adapt to child's living conditions
- “Experience expectant”
- “Experience dependent”



Arousal/Demand



EFs Support Self-regulation

- Inhibit an undesirable behavior (inhibitory control)
- Remember a rule or expectation (working memory)
- Shift behavior according to context (working memory, inhibitory control, attention)
- Notice others' emotions or reactions to your behavior (attention)
- Make a plan and carry it out (working memory, attention, inhibitory control)



The Role of
Relationships in
Nurturing
Development of
EF & SR

Attachment Shapes the Stress-Response System

- Attachment figures are critical for ensuring young children feel safe
- Comforting infants who are not yet able to comfort themselves
- Helping young children begin to calm themselves
- Supports development of neural and endocrine architecture that is critical for self-regulation of emotions
- Sympathetic (“gas”) and parasympathetic (“brake”) nervous system
- Emotion is the first language infants understand

Coaching EF to support Stress-Response System

- Caregivers re-directing attention to support self-regulation
- Support ability to shift attention and build neural networks undergirding flexibility in attention
- Recognizing challenging situations and conditions
- Helping children to name emotions and “feel felt”
- Helping children to calm down before problem-solving

Nurturing relationships support development of self-regulation, good mental health

- Many mental health challenges are instances of
 - Under-regulation: externalizing and conduct disorders
 - Over-regulation: internalizing and mood disorders
- It is critical for children to have relational experiences that help them to respond to and regulate arousal in adaptive ways

EFs & SR Work Together to Support Relationships

- Awareness of others' feelings and desires, ability to coordinate one's own goals with those of others
- Ability to inhibit behavior that may harm relationships or disrupt interactions or play
- Ability to remember past sequences of actions and anticipate future sequences of behavior and outcomes
- Need to understand how present actions can affect people or property in the present and future
- Need ability to anticipate consequences of actions for oneself and others
- Access to positive relationships provides context for further development of EF & SR



Experiences that undermine development of neural networks involved in EF & SR

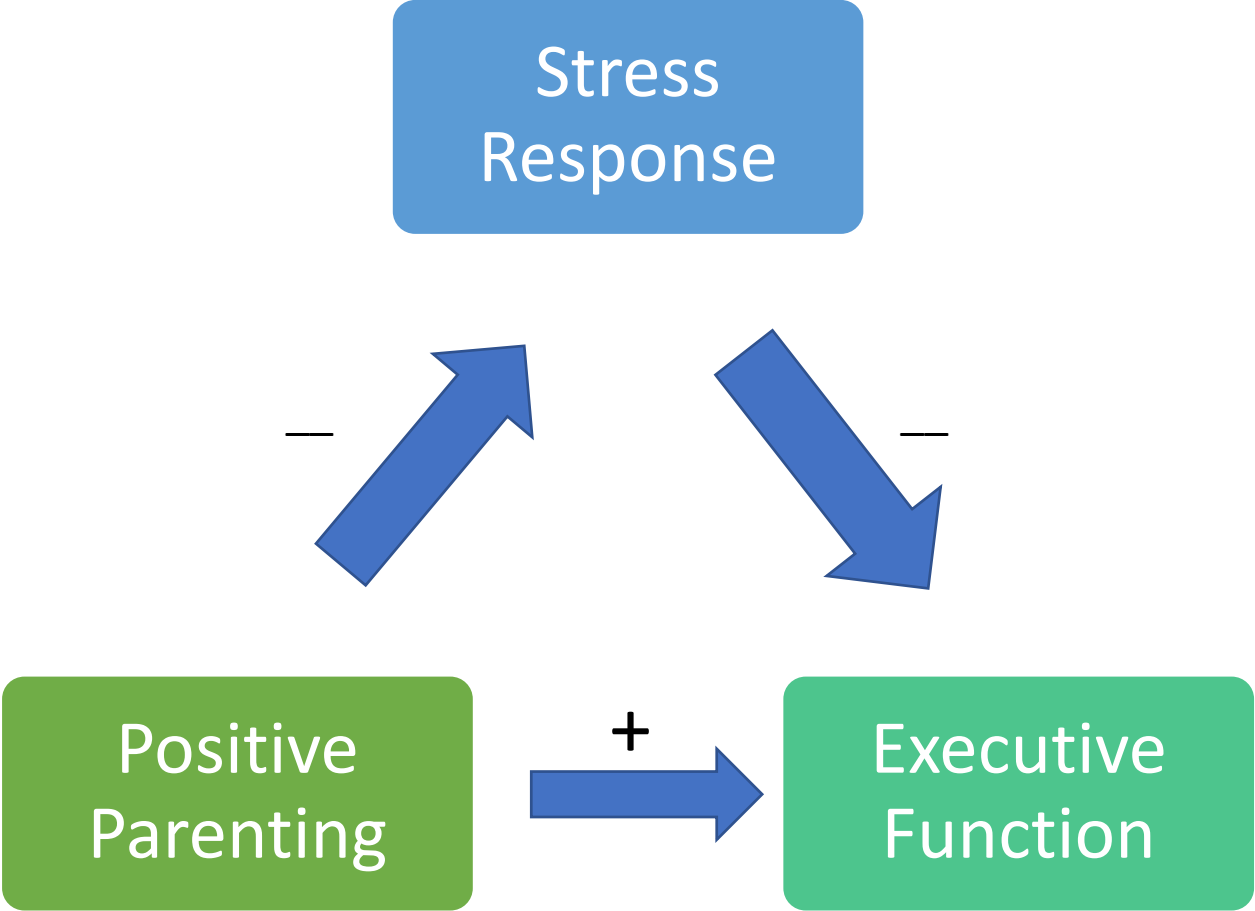
- Intrusive interactions undermine development of attention
- Low levels of sensitive and responsive caregiving – associated with elevated physiological stress
 - Interferes with development of prefrontal cortex, **connectivity** between brain regions
- Poverty

Poverty, Parenting, Stress Response, and Executive Functions At age 3:

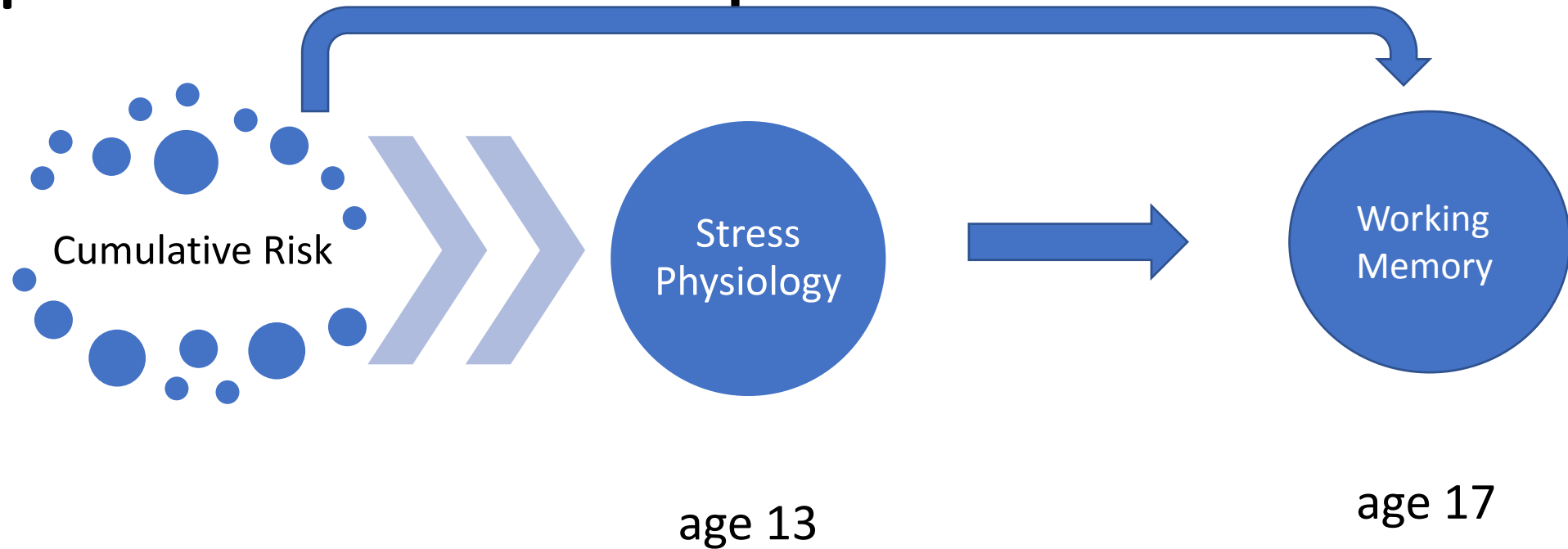


Blair et al. (2011)

Stress Response Mediated Effect of Positive Parenting on EF for Children in Poverty (Blair et al. 2011)



Stress-Buffering Potential of Caring, Responsive Relationships



But only for children whose mothers were low in responsive involvement

Evans et al. (2007)

Sensitivity to Environment and Experience

- Early intervention programs for children living in conditions of risk can have positive effects on EF and SR
- Sustained
- Second-generation effects of Perry Preschool Project were likely due to program effects on EF, SR
- Interventions that function through supporting EF, SR, and stress physiology – likely to be the most effective over the long term

Summary

- Ecological brain is sensitive to experience
- Development of EF and SR are largely dependent upon experiences
 - Warm, nurturing, consistent relationships
 - Help children regulate arousal
 - Coaching emotion
 - Unstructured play
 - Dramatic play
 - Physical activity, yoga, mindfulness
- Chronic stress (toxic) disrupts development of EF, BUT
- Supportive relationships can buffer effects of stress on EF



**You can support children's
development of Executive
Function and Self-Regulation**