

HealthPartners
Institute for Education and Research

**Healthy eating and physical activity:
Implications for brain structure and function**

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Healthy Eating & Physical Activity

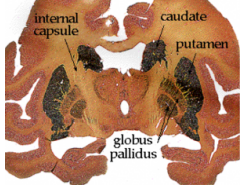
- Children are becoming more sedentary
- Increasing access to and reliance on sugared snacks and beverages, and fast/convenience foods
- Greater prevalence of overweight and unfit
- Eating and activity patterns established during childhood often continue into adulthood

Physical Activity

- **Other benefits beyond the body**
 - Promotes cognition
 - Enhances mood
 - Promotes endorphin release
 - Slows brain atrophy
 - Mitigates effects of disease/injury

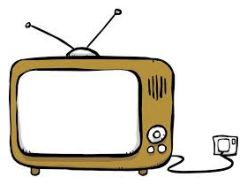
Physical Activity & Cognition

- **Cross-sectional studies**
 - Higher fit and more physically active children perform better on:
 - executive function (Hillman, 2007)
 - memory (Chaddock, 2011)
 - school performance or grades (e.g., Chomitz, 2009; Fox, 2010)
- Differences in brain structure
 - Larger hippocampal and basal ganglia volumes



Screen time/TV watching

- **Conflicting findings related to impact on cognition**
 - Heavy exposure to TV at ages 1 and 3 years predicted attention problems at age 7 (Christakis, 2004)
 - No relationship between kindergarteners' TV viewing and ADHD at first grade (Stevens, 2006)

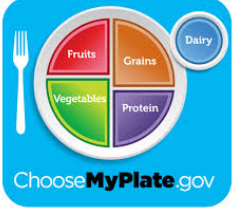


Screen time/TV watching

- **Type of TV exposure**
 - Child-directed programming vs. adult-directed programming
- **Age of exposure**
 - Less than 2 years of age, preschool, school age
- **Amount of exposure**
 - Within or exceeding recommended guidelines
- **Other media**
 - Increases the total time "screen time" exposure

Dietary Intake

- Connection between nutrition and optimal brain functioning
- Nutrients are the building blocks that play a role in:
 - Cell proliferation
 - DNA synthesis
 - Neurotransmitter and hormone metabolism
 - Enzyme systems in the brain



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Breakfast

- Regular meals and continuous glucose supply is important for young children
- Children are more prone to adverse effects of overnight fasting and breakfast.
- Having breakfast is beneficial for cognitive function and development

Bellisle, 2004; Hovland, 2009

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Dietary Intake

- Fruit & vegetable consumption between 6-12 months of age
 - Positively associated with higher IQ scores at 4 years of age after adjusting for SES, maternal IQ, and maternal education
- “Health conscious dietary” pattern at age 3 years
 - Positively associated with higher IQ scores at age 8 compared to children with “processed” dietary eating pattern (high fat and sugar content)

Gale, 2009; Northstone, 2011

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Dietary Intake

- Children with executive function difficulties may also have a harder time developing and maintaining a healthy diet
 - Children with more executive function difficulties tended to consume more snacks
 - Executive functioning may act as a “gatekeeper” for food intake and selection

Riggs, 2010

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Take-home messages for families

- Being active and eating a healthy well-balanced diet is good for the body and the brain
 - Limit media usage/non-academic screen time to < 2 hours/day
 - Help your child be active 60 minutes/day everyday
 - Be active together as a family
 - Eat breakfast everyday
 - Make fruits & vegetables available
 - Limit availability of sugar-sweetened beverages

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Resources for families

- <http://www.letsmove.gov>
 - Ideas for ways to get active and eat healthy as a family
- <http://www.cdc.gov/healthyyouth/npao/index.htm>
 - Physical activity and nutrition facts
- <http://www.healthpartners.com/yumpower/kids/index.html>
 - Recipes and activities to help children build healthy eating habits

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