CHILDHOOD NUTRITION AND BRAIN HEALTH

Corinne Cannavale, B.S.
Nutrition, Wellness, and the Brain
Week 3
# COGNITIVE FUNCTION

<table>
<thead>
<tr>
<th>Memory</th>
<th>Mental Flexibility</th>
<th>Attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How well our brain can hold onto information</td>
<td>• How well can our brain accomplish multiple tasks</td>
<td>• How well can our brain ignore irrelevant information and focus on important information</td>
</tr>
<tr>
<td>• Multiple types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Short-term</td>
<td></td>
<td></td>
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<tr>
<td>• Long-term</td>
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</tbody>
</table>
Cheese consumption causes more women with PhDs?

https://www.tylervigen.com/spurious-correlations
Biomarkers

- Blood/Serum/Plasma
- Macular Pigmentation
- Skin carotenoid assessment

Self Report

- 7-day diet records
- Dietary history recall
  - 6 months
  - 1 year

Diet Assessment in Nutrition Research
NUTRITION IS RELATED TO COGNITIVE FUNCTION

- Carotenoids
- Omega-3 Fatty Acids
- Fiber
- Saturated Fats
- Added Sugars
CAROTENOIDs

- Plant pigments which our bodies cannot produce on their own
- Some carotenoids help our bodies create Vitamin A
- Have antioxidant properties in some regions of our body (eyes)
- Deposit in brain tissue

Carotenoids in Infant Hippocampus

<table>
<thead>
<tr>
<th>Carotenoid</th>
<th>Micrograms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutein</td>
<td>50</td>
</tr>
<tr>
<td>Zeaxanthin</td>
<td>15</td>
</tr>
<tr>
<td>Cryptoxanthin</td>
<td>5</td>
</tr>
<tr>
<td>Beta-Carotene</td>
<td>10</td>
</tr>
</tbody>
</table>
CAROTENOIDs AND COGNITIVE FUNCTION

- Carotenoids in the eye are related to…
- Better memory function\(^3\)
- Faster processing speed\(^4\)
- Improved executive functioning\(^4\)
- Better academic achievement\(^2\)
OMEGA-3 FATTY ACIDS

- Omega-3 are healthy fats found in foods like fish, eggs, and oil.
- Omega-3 fatty acids are building blocks for the insulation (myelin) of neurons in the brain.
  - Better insulation of neurons leads to faster processing speeds.
Saturated fats are primarily solid fats found in butter, red and preserved meats, and lard.

Saturated fats can impact how fluid cell membranes in our body are, because of how rigidly they can stack next to each other.
FAT CONSUMPTION AND MEMORY FUNCTION\textsuperscript{5}
FIBER

• Carbohydrate which cannot be broken down by the body
• Helps regulate blood sugar and keeps us full longer
• Studies have found that fiber is related to improved attention and cognitive control abilities\(^6\)

![Graph showing correlation between fiber intake and cognitive performance.](image)

• Higher fiber consumption is found to be associated with better creative thinking abilities\(^7\)
ADDED SUGAR

- Added sugars are prevalent in a variety of processed foods which may or may not contain naturally occurring sugars.
- Added sugar refers to sugar being added to a food product, and does not have to do with whether or not the sugar is "natural."
  - Corn Syrup is a commonly used added sugar and is created from starches found in corn.
- Added sugars have been related to poorer creative thinking abilities.\(^8\)
Systematic Reviews
Randomized Controlled Trials
Non-Randomized Controlled Trials
Observational Studies with Comparison Groups
Case Series and Case Reports
Correlational Analyses
• Water is an essential nutrient needed for normal body functioning
• It is estimated that about 50% of US children are not properly hydrated\textsuperscript{9}
WATER INTAKE STUDY

- **Normal Intake**
- **High Intake** 2.5L/day
- **Low Intake** 0.5L/day

Drinking more water improves multitasking ability in children, study finds.

Drinking water not only keeps children hydrated, but also increases mental flexibility.

OCT 28, 2019 9:30 AM
BREAKFAST IS THE MOST IMPORTANT MEAL OF THE DAY?
EVIDENCE FOR BREAKFAST AND BRAIN HEALTH

- There is evidence that children who consume breakfast perform better on academic skills\(^{10}\) and cognitive functions\(^{11}\).
- Breakfasts containing whole grains and were preferred to those high in sugars\(^{10}\).
KEY TAKEAWAYS

Nutrition Associations
- Healthy brain functioning in childhood is related to more consumption of...
  - Carotenoids
  - Omega-3 Fatty Acids
  - Fiber
- Poorer brain functioning in childhood is related to higher consumption of...
  - Saturated Fats
  - Added Sugars

Water and Cognition
- Increased water consumption leads to better mental flexibility functioning of the brain

Breakfast Consumption
- The idea that breakfast is the most important meal of the day was started as a food advertising strategy
- There is some evidence that shows breakfast may benefit children's academic abilities
REFERENCES


QUESTIONS?