Brain on Brew

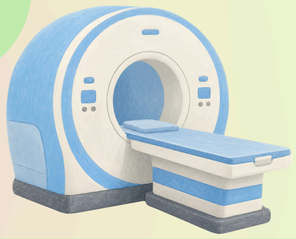
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Introduction

- Caffeine is a daily necessity for many people.
- Caffeine is the most widely consumed psychoactive substances in the world.
- It is consumed in ways such as coffee, energy drinks, soda, and chocolate.
- Coffee is the most prevalent caffeinated drink- 85% of the US population consumes at least one caffeinated beverage per day.

MRI Usage

- Diagnose caffeine overdose.
- Visualizes changes in brain structrue and blood flood.
- Fluid-attenuated inversion recovery is used to measure cortical thickness and white matter hyperintensity load.



Factors

- Coffee affects the central nervous system (CNS), which manages conscious movements, sensation, and regulates involuntary functions.
- The average adult should only intake below 400 mg per day.
- A person's height, weight, and natural tolerance effects the body's reaction to caffeine.
- Can lead to seizures and death

Symptoms

- Jitters, headaches, insomnia, increased heart rate, anxiety, and overstimulation
- Caffeine takes 3-10 hours to break down in our body.
- Overstimulation is due to blocking adenosine receptors in the brain and increasing adrenaline.
- Caffeine is a methylxanthine compound that acts a competitive antagonist against the depressant effects of adenosine which regulate sleep, memory, and learning.
- If adenosine receptors are blocked, CNS may expereience altered functioning.

Risks

- 1-2 cups/day= benefits the peak width of skeletonized mean diffusivity (PSMD)
- 3-4 cups/day= thicker cortex
- > 6 cups/day= PSMD damage

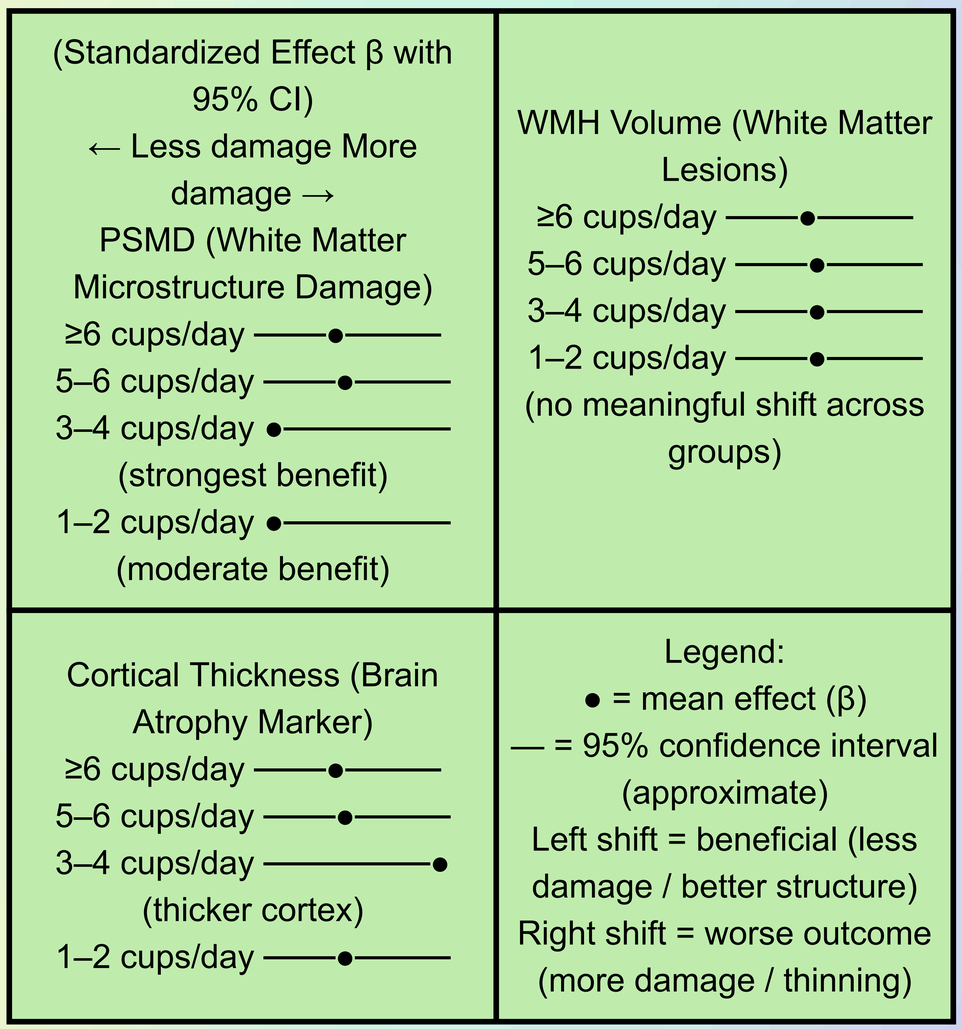
Benefits

- 2.5-5 cups/day= lower risk of dementia and metabolic syndrome
- 1-3 cups/day= reduced risk for strokes, cardiovascular diseases, coronary heart disease, Parkinson's diease

Tested Study

- 2,316 participants were examined in the Hamburg City Health Study with vascular brain damage, neurodegeneration, and microstructural integrity.
- Age, body mass index (BMI), smoking, diabetes, hypertension, education, sex, and alcohol were considered.
- 4 different groups were studied ranging from 1 cup of coffee/day to greater than 6 cups.
- The study was concluded that more caffeinated coffee was consumed by younger, male individuals of higher education and higher BMI.

Statistics



Conclusion

- Caffeine has both beneficial and harmful effects on the brain.
- Excessive intake can negatively impact the CNS.
- Consuming more than 400 milligrams of caffeine/day leads to changes in the brain function.
- If caffeine overdose is suspected, a brain MRI is performed.

References

- https://my.clevelandclinic.org
- https://www.fda.gov
- https://pmc.ncbi.nlm.nih.gov/articles
- https://www.ncbi.nlm.nih.gov/books
- https://pmc.ncbi.nlm.nih.gov/figure