A Cup of Placebo Effect

Project by Felix Levandovsky and Benny Girvitz

Our team

Felix Levandovsky

Benny Girvitz

01 Brief Project Description

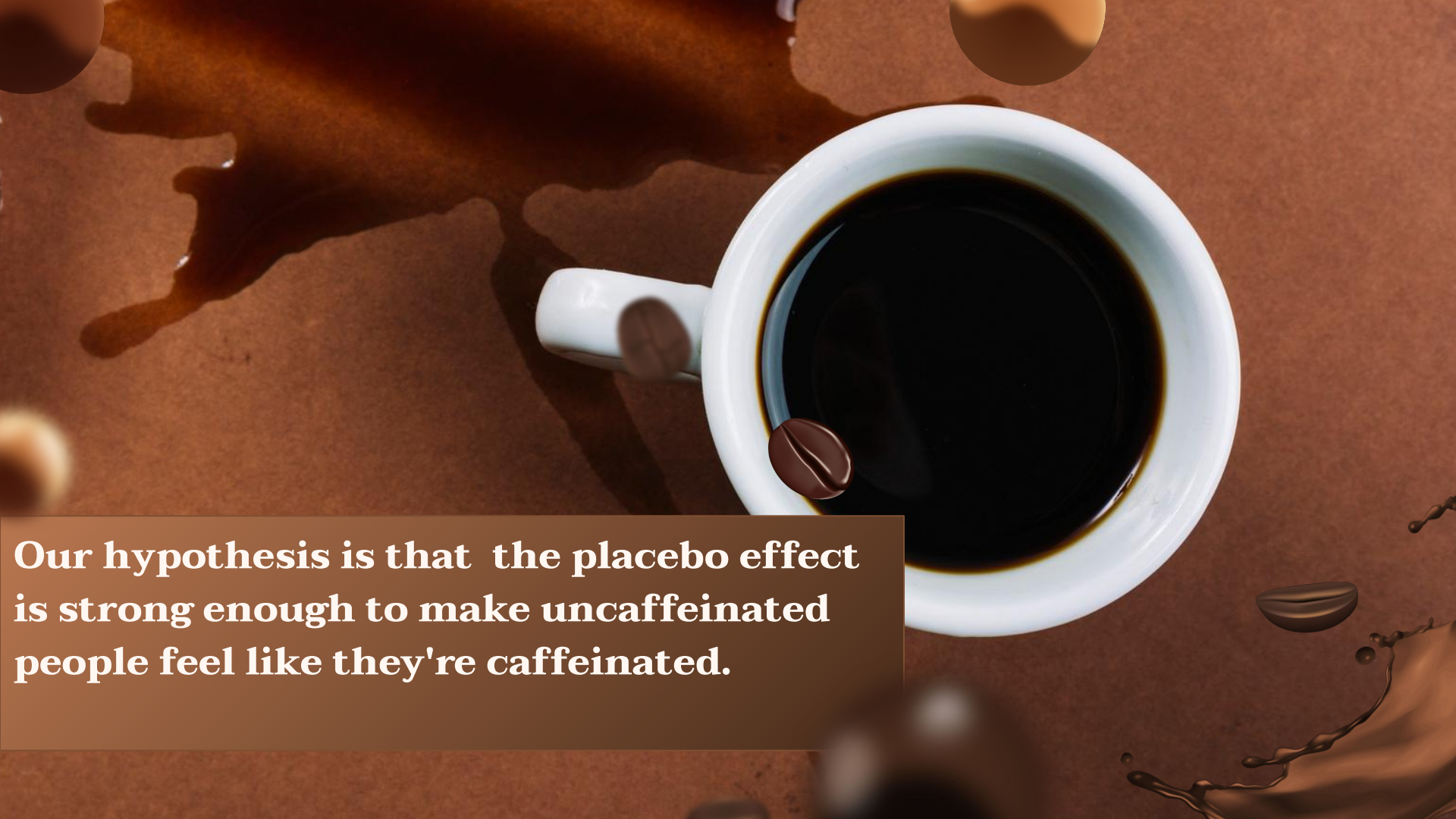
-We will get two groups of 20 adults each. One group of adults will have caffeinated coffee, and the other group will have decaf. Then we will give each participant a survey to measure their mood. We will be using Fortado Nespresso coffee pods as they come in both regular and decaf.

-In this project we will explain how caffeine works and we will test what happens when adults get decaf coffee instead of caffeinated coffee.

-The individuals we tested on did not know if they were receiving decaf or caffeinated coffee.

02

Hypothesis



Our hypothesis is that the placebo effect is strong enough to make uncaffeinated people feel like they're caffeinated.

03

Research

The Placebo Effect

The placebo effect occurs when a person receives a substance or treatment that should not have any actual effect on the person. However, due to the person's expectations for the substance or treatment to have a particular effect, then they experience that effect. An example of this would be a person receiving a sugar pill that they believe is going to relieve their symptoms. When they take the sugar pill they will experience some relief of their symptoms.

Effects of Caffeine

The effects of caffeine include: less tiredness(usually), more alertness(usually), faster heartbeat(usually), less grumpiness(usually), improves coordination(usually), irritability(sometimes), nausea(sometimes), vomiting(sometimes), upset stomach(sometimes), and headaches(sometimes).

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Variables

Variables

Manipulated

- The type of coffee participants receive (caffeinated or decaf)

Responding

- Heart rate
- Self assessed survey responses of alertness, energy, and grumpiness
- If participant feels different after drinking their coffee

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Procedure

- Set up coffee machine and other supplies (oximeter, milk, cups, and coffee pods) in the location where the experiment takes place
- Ask participants to fill out informed consent forms
- Measure participant's heart rate then record the heart rate
- Ask participants if they want milk in their coffee and record if the participant has milk in their coffee or not
- Select a coffee pod at random and put coffee pod in coffee machine. Make sure that the participant doesn't see which kind of coffee they're getting

- Provide coffee to participants with instructions to return 15 minutes after finishing their drink
- Record the type of coffee the participant had (caffeinated or decaf)
- Once participant has returned, measure and record their heart rate
- Ask the participant to fill out the experiment survey
- Collect participant's survey when they're done
- Input survey data

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Observations

Observations:

We observed that people who had **milk in their coffee showed a general trend of their heart rates going up less than people who had no milk in their coffee.** This is because milk slows the absorption of caffeine and reduces the amount of caffeine absorbed into the bloodstream.

We also observed **that most people did not feel very grumpy.** This could be because the participants were happy to get a free cup of coffee which could have boosted their overall moods.

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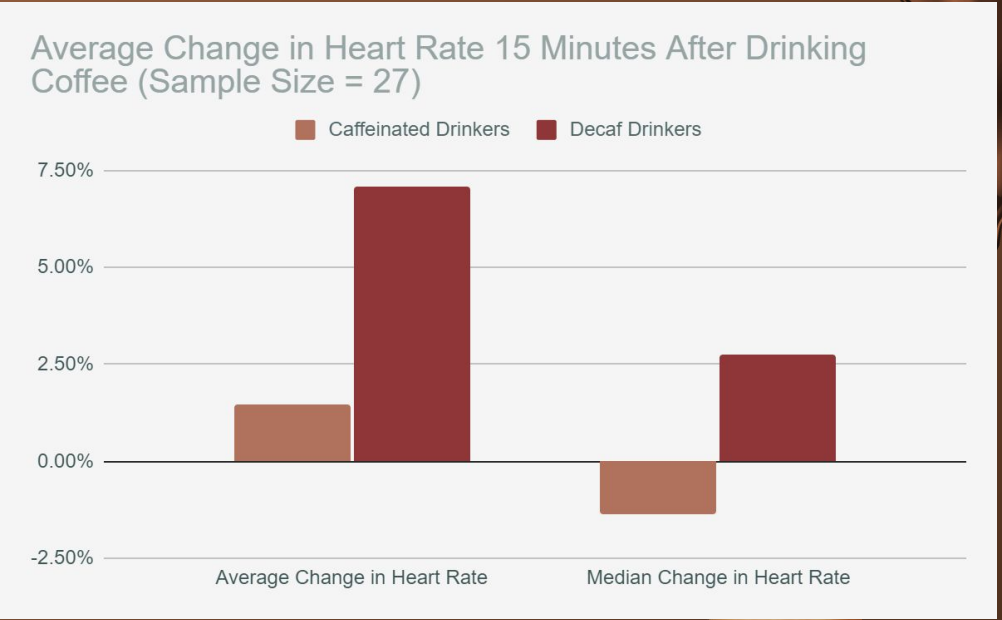
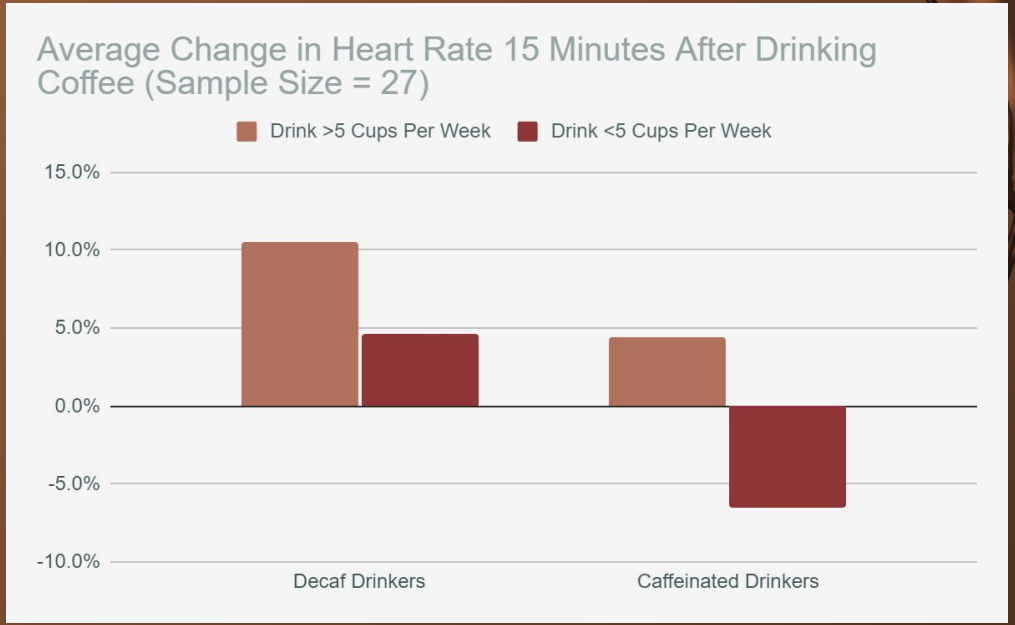
Analysis

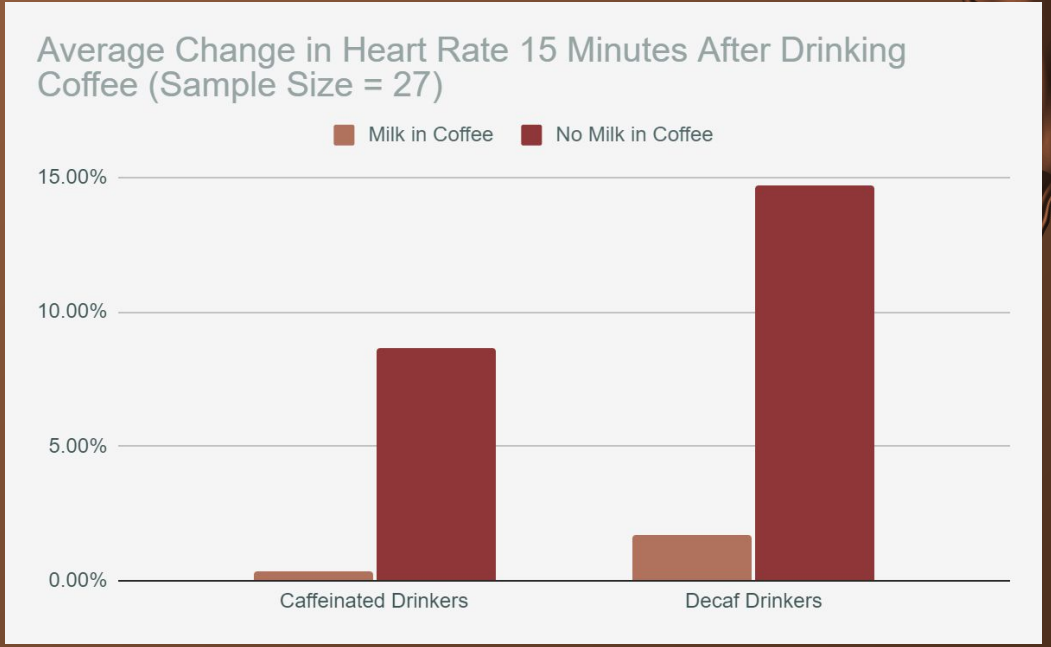
Of the 12 participants who drank decaf coffee, their average heart rate 15 minutes after drinking coffee increased by approximately 7% and their median heart rate increased by approximately 3%, compared with an average heart rate increase of approximately 1.5% (median decrease of approximately 1%) for 15 participants who had caffeinated coffee. **The heart rate increase for participants drinking decaf coffee supports our hypothesis that the placebo effect exists.**



We also tested if the amount of coffee participants drank per week had any impact on the results. For participants who drank more than 5 cups of coffee per week, their heart rate went up by an average of approximately 10% while the heart rate for participants who drank less than 5 cups of coffee per week went up by an average of approximately 5%. **This further supports our hypothesis and could also mean that participants who drink more than 5 cups of coffee per week have higher expectations that the coffee is caffeinated and will work.**



We also wanted to find out if having milk in your coffee affects the placebo effect. **The heart rate of participants who had decaf coffee with milk increased on average by approximately 1.7%, while the heart rate of participants who drank decaf coffee with no milk went up by approximately 15%.** This could be because milk can lower heart rate on its own.



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Conclusion

Based on our findings we have found that our hypothesis is correct. The placebo effect is strong enough to make uncaffeinated people feel like they are caffeinated.

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Applications

Medical application

- Developing better medicines by making sure that the effect of the medicine aren't caused by the placebo effect.

Educational application

- Understanding the placebo effect more to be more cautious around items like snake oil.

10 Sources of Error

#1: Milk in Coffee

This impedes the caffeine from working by not allowing the caffeine to absorb as fast or as much than without milk.

#2: Caffeine is a Stimulant

Stimulants calm people with ADHD down by stimulating dopamine receptors in the brain which works because ADHD is caused by a dopamine imbalance.

#3: Time

The time it takes for caffeine to kick in can be varied from 15-30 minutes and for our project we chose to give people their survey 15 minutes the participants drank their coffee so the caffeine might have not had enough time to kick in for certain participants.

#4: Sample size

Our sample size of participants was only 27 people which means that their could have been some problems in the calculations of our data due to the sample size.

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Sources

- The Placebo Effect
- Caffeine
- Caffeine: effects of
- Caffeine and ADHD
- Coffee Benefits Blocked by Adding Milk?
- The Impact of Milk in Your Coffee – The Good and the Bad
- Does Milk Neutralize Caffeine in Coffee?

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Thank you!

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- All our participant for taking the time to do our study.
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