



Observing the Effect of Caffeine on the Reaction Time of Humans



SUBJECT: Science | LEVEL: Middle/High School | TYPE: Human Experiment | SETTINGS: Homeschool

QUESTION

Does caffeine affect the reaction time of humans?

HYPOTHESIS

If a person consumes caffeine, then their reaction time will _____ because _____.

MATERIALS

- Caffeine source (coffee, tea, or caffeine tablet)
– consistent amount (e.g., ~100 mg caffeine)
- Reaction time tester
(online tool or smartphone app)
- Timer or clock
- Water
- Notebook or data sheet
- Pen/pencil
- Quiet space with minimal distractions

VARIABLES

- Independent Variable:**
Caffeine intake (absence vs. presence of ~100 mg caffeine)
- Dependent Variable:**
Reaction time (seconds)
- Controlled Variables:**
- Time of day
 - Environment (same room, lighting, noise level)
 - Reaction time test used
 - Instructions followed
 - No other stimulants (e.g., energy drinks)
 - Similar rest, food, and hydration

PROCEDURE

1. Get a full night of sleep and avoid caffeine for at least 12 hours before starting.
2. Sit in a quiet space and relax for 5 minutes.
3. Complete 5 practice trials on the reaction time tester to become familiar with the test.
4. Take your baseline reaction time:
 - Complete 5 reaction time trials.
 - Record each time and calculate the average.
5. Consume your caffeine source (aim for ~100 mg caffeine). Record the time.
6. Wait 30 minutes for the caffeine to take effect.
7. Complete 5 reaction time trials again.
8. Record each time and calculate the average.
9. (Optional) Repeat steps 5–8 after 60 minutes to see if the effect changes.



A reaction time test measures how quickly you respond to a visual stimulus. Lower times (in seconds) mean faster reactions.

DATA TABLE

Trial	BEFORE CAFFEINE (Baseline)	AFTER CAFFEINE (30 min)	AFTER CAFFEINE (60 min)
	Reaction Time (s)	Reaction Time (s)	Reaction Time (s)
1			
2			
3			
4			
5			
AVERAGE			

ANALYSIS & CONCLUSION

1. What were your average reaction times before caffeine? _____

2. What were your average reaction times after 30 minutes? _____

3. What were your average reaction times after 60 minutes? _____
4. Did caffeine improve (lower), worsen (higher), or have no effect on your reaction time?

5. What might explain your results?



SAFETY NOTE: Do not exceed moderate caffeine intake (generally up to 200 mg/day for teens). Do not use if you have a medical condition that caffeine could affect. Stop if you feel unwell.