The primacy of processing speed on episodic memory maintenance: A single-blind randomized trial assessing the effects of caffeine

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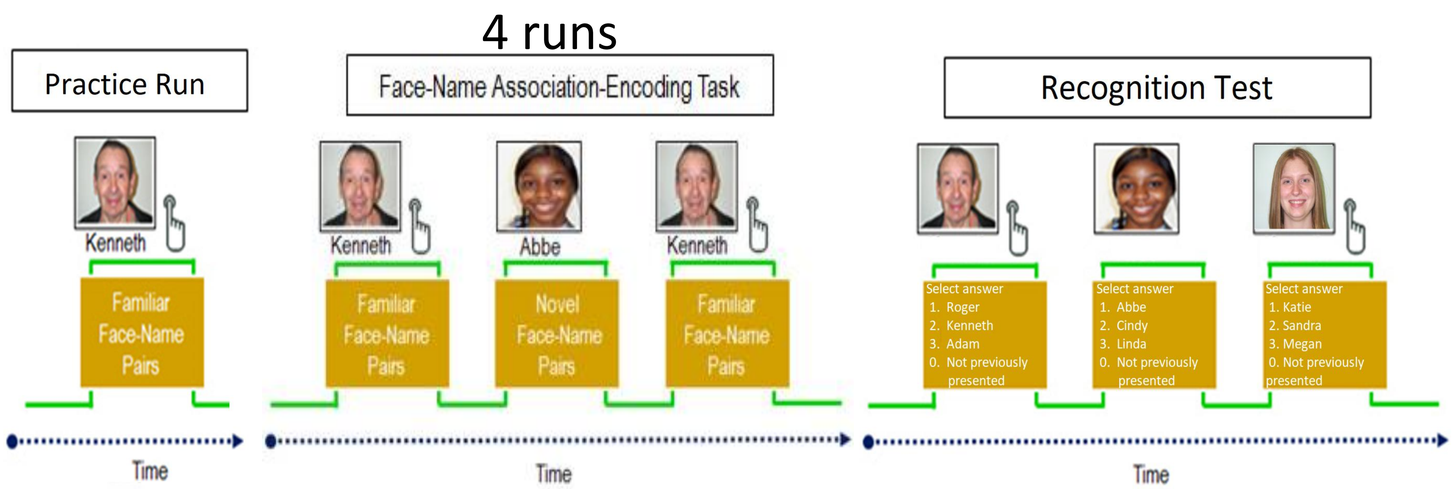
Introduction

- Caffeine is known to increase alertness, and is often used for memory enhancement
- Facial recognition is an essential cognitive skill mediated by memory processes
- Caffeine has been shown to improve reaction time in memory tasks
- Caffeine's effects on facial recognition remain unknown

Task



70 face-name pairs total

3 types of face-name pairs

- Familiar (56) – shown in practice run and more than once in each of the 4 runs
- Novel (4)– shown once in only one of the 4 runs
- Distractor (10)– not shown in any of the 4 runs, only in the recognition test

Methods

	Group 1: Caffeine-Placebo	Group 2: Placebo-Caffeine	Group 3: Placebo-Placebo
Session 1	caffeine pill	placebo pill	placebo pill
Session 2	placebo pill	caffeine pill	placebo pill
N	18	19	18
Average age (SD)	20.4 (2)	20 (1.6)	19.8 (2.3)
Sex (M/F)	9/9	9/10	8/10
Daily avg caffeine consumption	93.9 mg	92.2 mg	127.0 mg

Recruitment

- 55 UT Dallas students
- R-handed
- Native English speakers
- No history of psych/neuro issues or drug use

Session 1
caffeine (250mg) or placebo administered
30 minutes (complete demographic and CC questionnaires)*
Practice run of encoding task
Encoding task (4 runs)
Retrieval Test

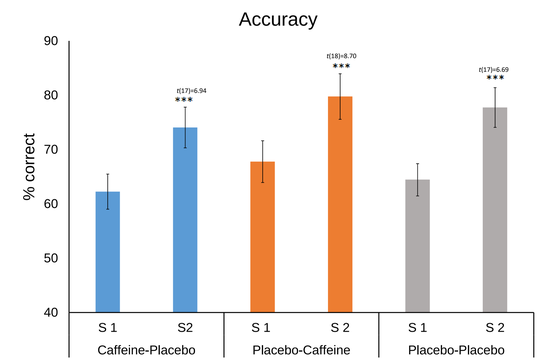
1 week

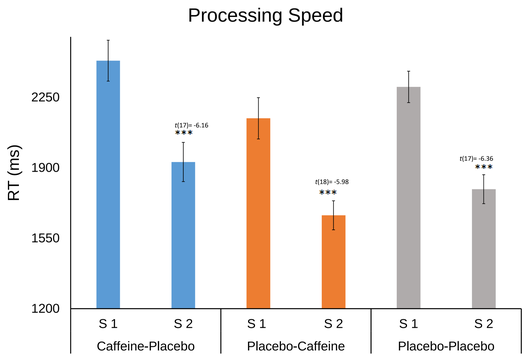
Session 2
placebo or caffeine (250mg) administered
30 minutes (complete demographic and CC questionnaires)*
Practice run of encoding task
Encoding task (4 runs)
Retrieval Test

*CC=caffeine consumption

Results

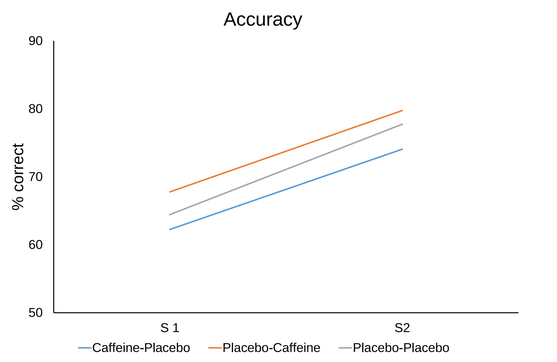
1. Both accuracy and processing speed significantly improved during the second session in all three groups.



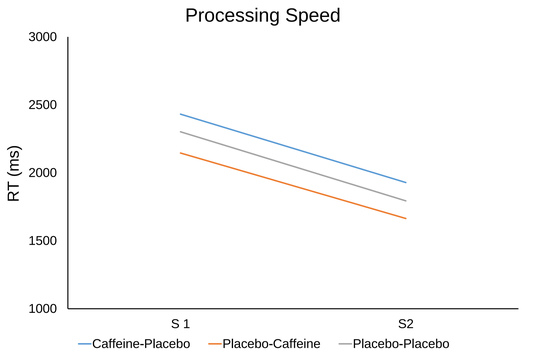


***, p<.0005

2. There were no significant group differences between sessions in accuracy or processing speed.



There was a main effect of session, F(1,17)= 48.2 The group by session effect was not significant.



There was a main effect of session, F(1,17)= 40.4 The group by session effect was not significant.

Conclusion

- Humans can recall 70 faces a week after seeing them briefly over a span of ~6 min (5s/face).
- Caffeine has no effect on this ability.
- Evidence of how daily caffeine consumption affects facial recognition requires subsequent studies.
- Further studies should be conducted to explore the effects of caffeine withdrawal on performance and processing speed.
- More research is needed to study the differences in facial recognition and caffeine in normal aging.

References

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