

Would Drawing Boost Testing Effect?



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Background

- Previous research has shown that, as compared to rereading, self-testing leads to better retention/learning; a phenomenon known as retrieval practice (Roediger & Butler, 2011).
- Less is known about whether the format of self-testing would make a difference since previous research has mainly focused on written/verbal materials.
- A potential benefit of drawing on memory was first suggested by the dual-coding hypothesis by Paivio and Csapo (1973).
- Hence, it stands to reason that the act of drawing to-be-learned information may lead to superior long-term retention relative to note-taking strategies.
- Surprisingly, the research testing this hypothesis is sparse.
- Therefore, the goal of the study was to test the effect of drawing, as opposed to recalling the information verbally, on memory improvement.

Methods

- Participants included 36 University of Houston students who were in a psychology class.
- Participants were verbally given a word with instructions to either draw it (n=17) or write it (repeatedly; n=17) for 20 seconds.
- After the 20 seconds, another word was given until a total of 17 words were met.
- A recognition test was administered shortly afterwards to determine how many words the participant was able to recognize among a list of 100 words.
- The study lasted roughly 20 minutes.
- Each subject was awarded with one SONA credit for their participation in the study.

Variables and Hypotheses

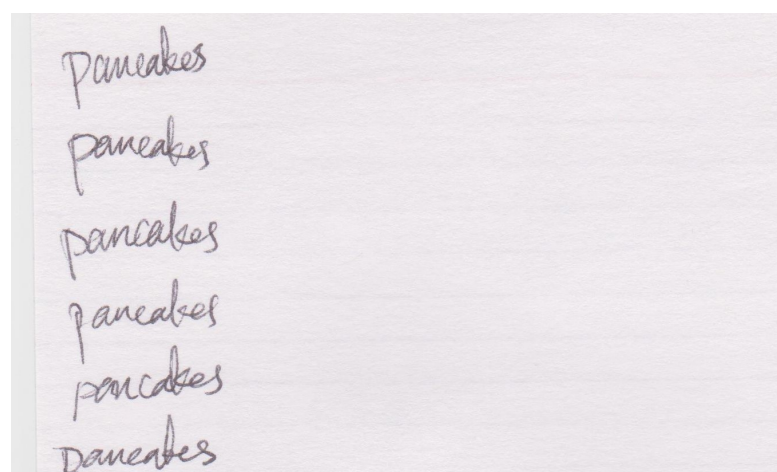
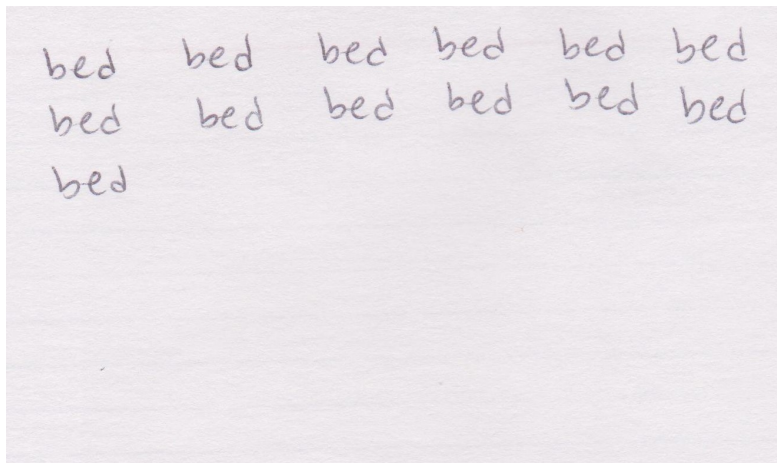
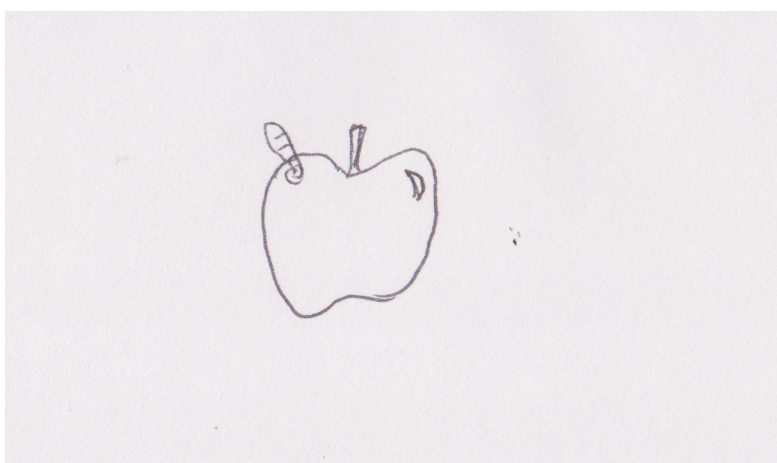
- DV = Number of words correctly recognized in the final test
- IV = Encoding/study strategy (drawing or writing)
- Ho = There will be no difference in DV between the drawing and writing groups.
- H1 = Participants in the drawing group will recognize more words than participants in the writing group.

Words list used in the study

1) Dog	11) Cat	21) Bird	31) Fish	41) Bear
2) Car	12) Plane	22) Boat	32) Subway	42) Bus
3) Burger	13) Hot Dog	23) Spaghetti	33) Taco	43) Pizza
4) Paper	14) Pencil	24) Pen	34) Desk	44) Notebook
5) Planet	15) Star	25) Moon	35) Solar System	45) Comet
6) Flower	16) Tree	26) Grass	36) Mushroom	46) Weed
7) Hat	17) Sun-Glasses	27) Glasses	37) Ear-Rings	47) Necklace
8) Lamp	18) Sofa	28) Television	38) Dresser	48) Bed
9) Oven	19) Fridge	29) Microwave	39) Stove	49) Blender
10) Steak	20) Apple	30) Banana	40) Salad	50) Chocolate

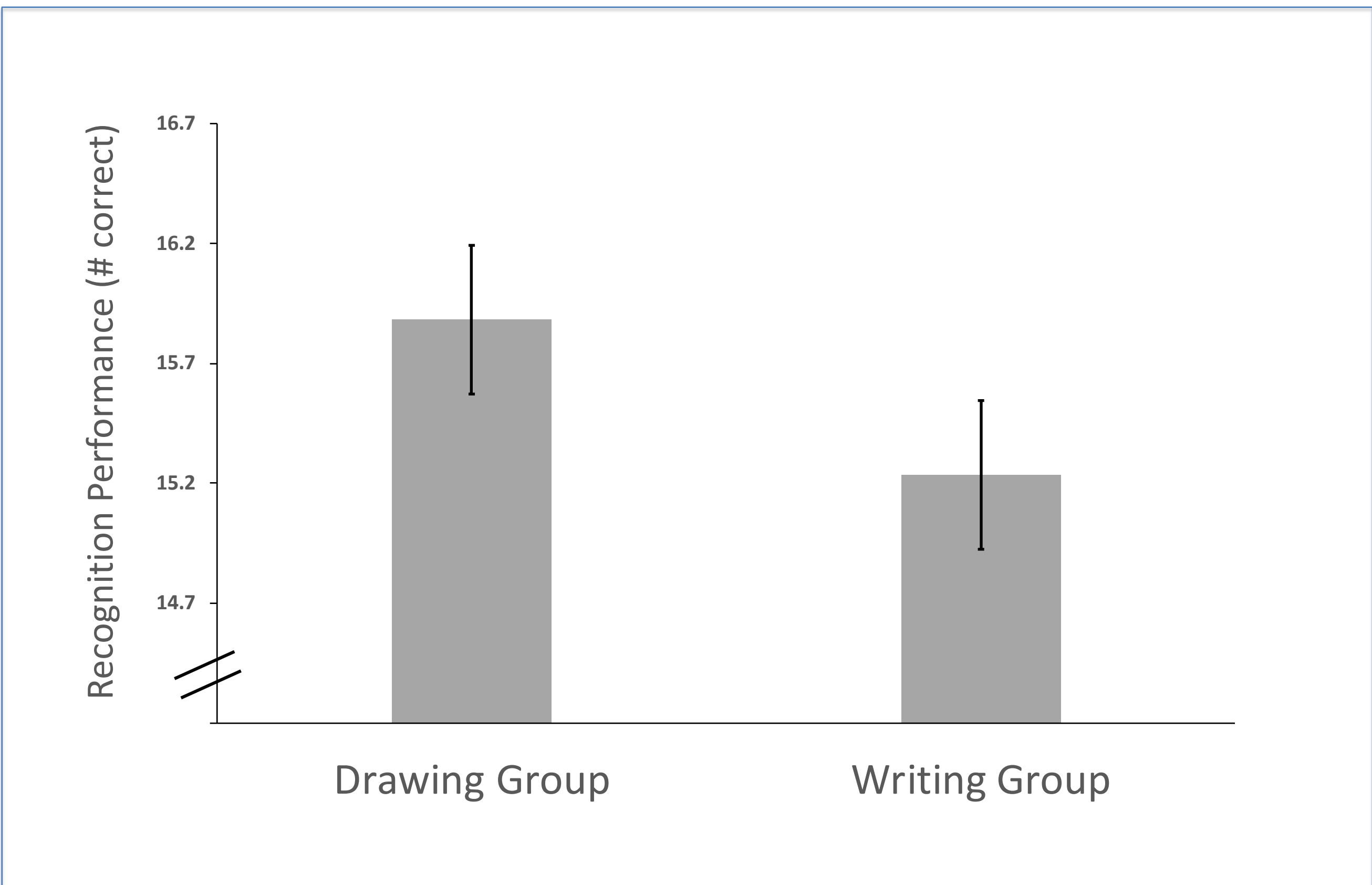
51) Bat	61) Turtle	71) Snake	81) Bunny	91) Lion
52) Limo	62) Helicopter	72) Bicycle	82) Scooter	92) Train
53) Pancakes	63) Waffles	73) Cereal	83) Avocado	93) Water
54) Laptop	64) Keyboard	74) Mouse	84) Desktop	94) Cell-Phone
55) Watch	65) Shoes	75) Dress	85) Suit	95) Tie
56) Rose	66) Poison Ivy	76) Sponge	86) Cactus	96) Seaweed
57) Basketball	67) Soccer ball	77) Football	87) Tennis Ball	97) Baseball
58) Eye	68) Mouth	78) Ear	88) Hand	98) Foot
59) Lightning	69) Cloud	79) Rainbow	89) Sun	99) Rain
60) Cow	70) Goat	80) Pig	90) Duck	100) Chicken

Drawing samples from the study participants



Results

- Two outliers, one from each group, were detected and removed from the analyses.
- An independent sample t-test was employed to investigate the group differences.
- The results showed that the drawing group recognized more words than did the writing group: the difference was marginally significant ($t(32) = -1.44, p = .07$).
- Moreover, supplementary analyses showed that the drawing group committed fewer omission errors (i.e., failure to recognize, AKA forgetting) than the writing group: the difference was marginally significant ($t(32) = 1.37, p = .09$).
- There was no difference in rates of commission errors (i.e., inaccurate recognition decisions, AKA false memory), $p < .05$.



Conclusions

- The results suggest that the act of drawing out words can marginally increase the long-term retention relative to note-taking strategies.
- Common teaching and studying techniques could be improved by using a mixture of drawing throughout the encoding stage or as an accompaniment to self-testing.
- A limitation being that abstract ideas are more difficult to draw.
- The small sample size (n=36), could also explain the marginal significance. Additional studies with larger sample sizes could favor a stronger effect.

References

- Roediger, H. L., & Butler, A. C. (2011). The critical role of retrieval practice in long-term retention. *Trends in Cognitive Science*, 15(1), 20-7
- Paivio, A. & Csapo, K. (1973). Picture superiority in free recall: Imagery or dual coding? *Cognitive Psychology*, 5, 176–206.

Acknowledgements

We would like to thank Dr. Steven Woods and the Cognitive Neuropsychology of Daily Life (CNDL).