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Spatial Orientation of Anagrams and Solution Performance

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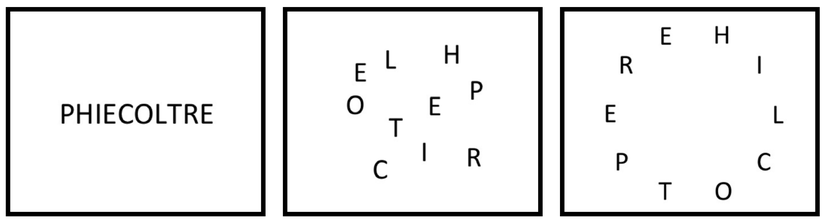
Introduction

Cognitive science research has long utilized anagrams to examine many aspects of problem solving, like the effects of incubation, priming, word frequency, and letter order. But no research has examined the impact of the physical organization of anagram letters on solution performance. If scrambled letters are presented such that they cannot be read from left to right, does the puzzle become easier to solve? We hypothesized that letters presented in circle or scrambled orientations, as opposed to in a line, would allow the brain to more quickly assess different random letter combinations until the puzzle is solved, resulting in improved performance.

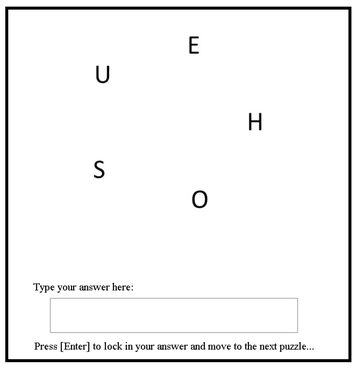
Experiment 1

Methods

Three between-subject conditions:

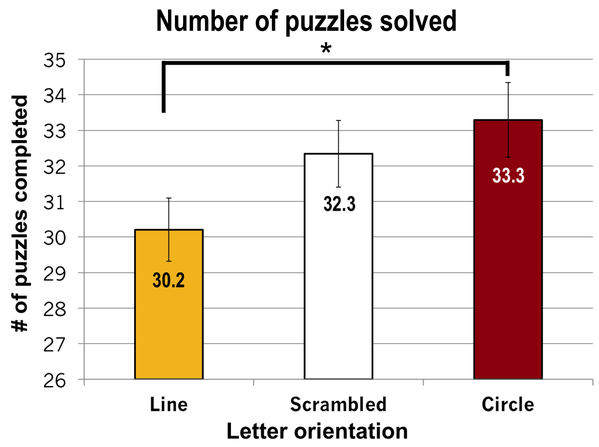


- In the line condition, you are constrained to moving from left to right and from right to left as you covertly rearrange the letters in your head. In the scrambled condition, there is a bit of constraint, and in the circle condition there is no constraint.

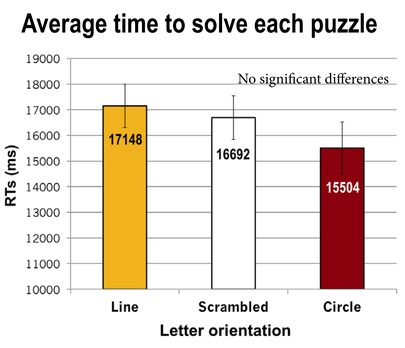


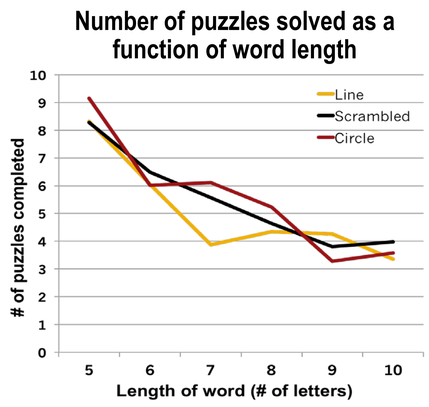
- Free-response task
- List of 60 words (5 to 10 letters in length) consistent across all conditions (presented in random order)
- All words were high frequency (SUBTLEXUS corpus, Brysbaert & New, 2009)
- Continuous feedback, and performance-based prizes given for motivation

Exp. 1 Results

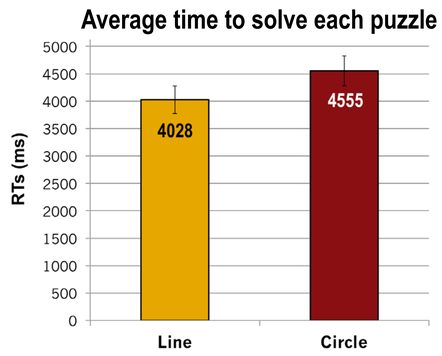


- n_{Line} = 57
- $n_{Scrambled}$ = 56
- n_{Circle} = 59
- S's who solved fewer than 20 puzzles in one hour were excluded from analysis (resulting n's = 55, 55, 53, respectively)

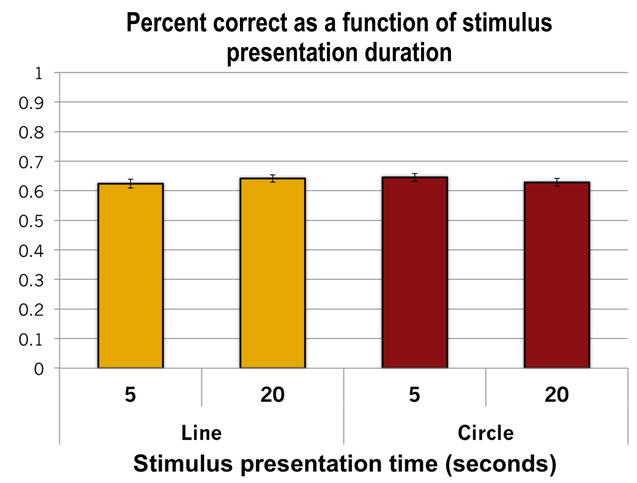




Exp. 2 Results



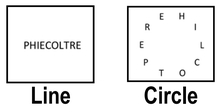
- n = 42
- Only 2 excluded as outliers (2.5 std. dev. from mean RTs or total number completed), n = 40



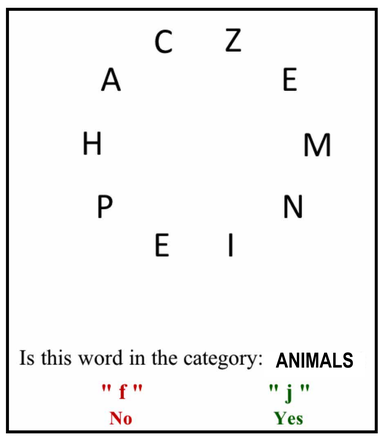
Experiment 2

Methods

Two within-subject conditions:



- Forced-choice task
- 210 trials (w/ randomized order)
- 105 target words, 105 distractor words
- 3 blocks, each w/ a different target category
- Stimulus appeared for 5s or 20s
- Feedback and prizes



Conclusions

- Free-response results (Exp. 1) showed that participants solved more puzzles on average in the circle condition than in the line condition.
  - Participants additionally solved each circle puzzle two seconds faster, though this difference was not statistically significant.
- We hoped that data from a within-subjects, forced-choice task would be cleaner, but results did not show any significant differences in performance between line and circle presentations in Experiment 2.