Motor Sequence Experiment
PSY 310: Lab In Psychology
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Kareena Sahani
AU2220116

Introduction

A series of motions or activities carried out in a certain order to accomplish a given purpose is referred to as a motor sequence. This idea is fundamental to comprehending how humans pick up and use sophisticated motor abilities, including typing, playing an instrument, or engaging in physical activity. Learning a motor sequence requires repetition as well as procedural memory, which helps people automate and improve their actions over time. For instance, learning how to pedal, steer, balance, and brake a bike requires a complex series of motions. These may be uncoordinated movements at first, but with repetition they become automatic and performed as a single sequence. For the purpose of organizing, carrying out, and fine-tuning these sequences, the brain's motor cortex, basal ganglia, and cerebellum are essential. Learning the motor sequence is necessary for fluid, well-coordinated daily movement**.** Studying diseases that can affect motor control, such as Parkinson's disease and stroke, requires an understanding of motor sequences.

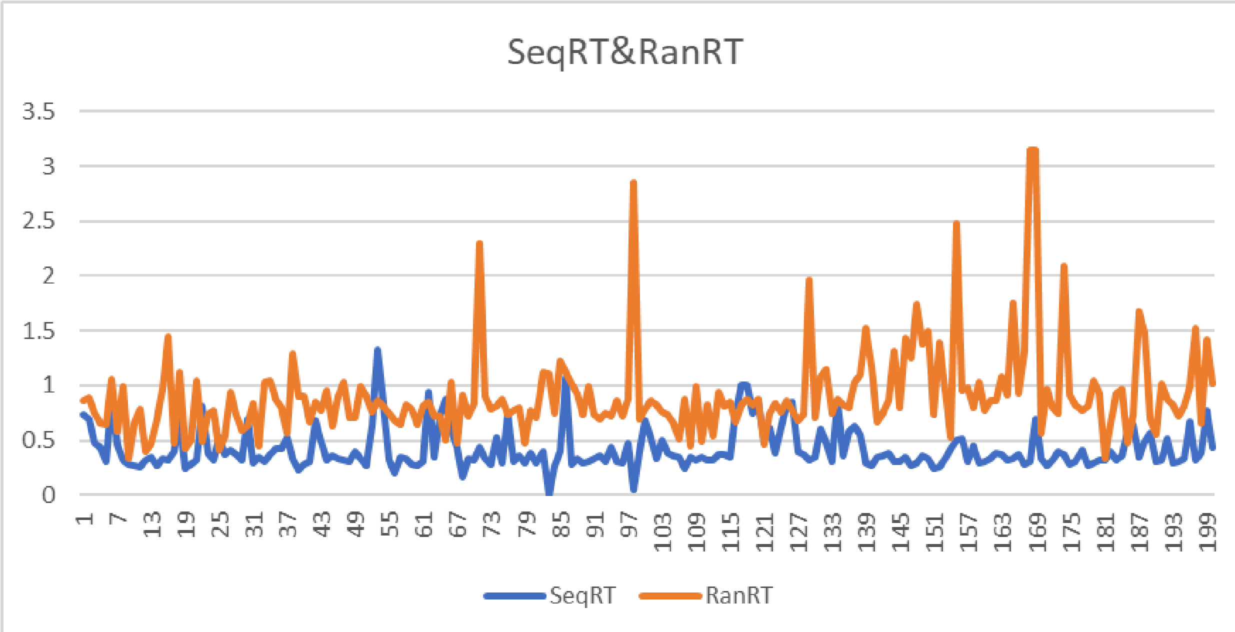
Method

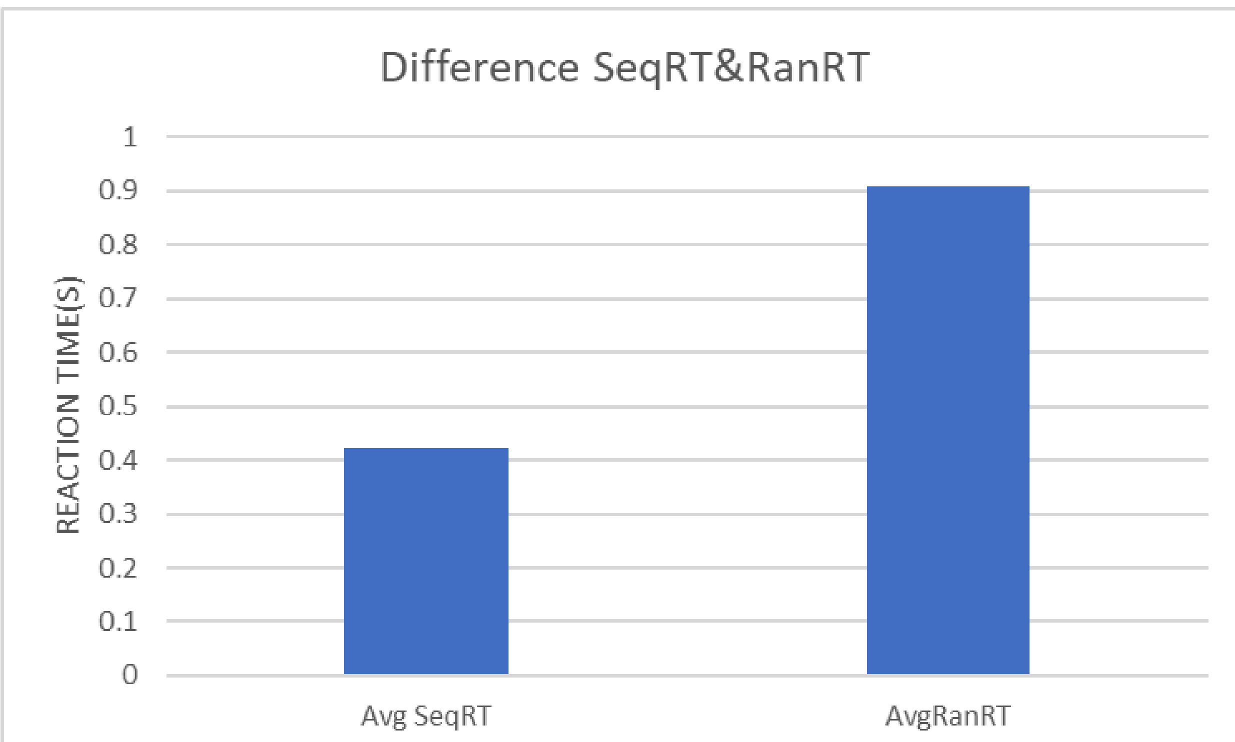
An undergraduate student from Ahmedabad University, majoring in Psychology participated in this experiment. A 19-year-old, Female. The participant was fully informed, with clear instructions and they participated with consent. The experiment was conducted using PsychoPy v2024 .1.5 (Peirce et al., 2019), with stimuli presented on a 15” monitor with a resolution 2500 x 1600 pixels. This task consisted of four rectangular line” and in each trial a triangle appeared on either of the four rectangle lines, the participant had to press the correct answer key allotted to the specific rectangle line.

In this experiment, we have the keyboard response. If the triangle appears on the first line, then we need to press the key z. If the triangle appears on the second line, then we need to press the x key. Similarly, if the triangle appears above the third line, then we need to press the c key and if the triangle appears above the fourth line, then we need to press the v key. For this experiment, we had to run both sequential and random trials. We had to run 50 numbers of trials for both sequential and random trials, and as there are 4 rectangle lines it would give us a total of 400 trials (200 Sequential Trials and 200 Random Trials).

Results

The average reaction time for the sequential trials is 0.42 seconds. The average reaction time for the random trials is 0.90 seconds. The difference between the sequential trails and random trials was 0.48 seconds. The graph shows us the time and the number of trials of both the sequential trial and random trials. Whereas the other graph shows us the difference in the averages of sequential and random trials, which clearly shows that random trials took more of a reaction time.


SeqRT&RanRT
3.5
3
2.5
2
1.5
1
0.5
0
1
7
13
19
25
31
37
43
49
55
61
67
73
79
85
91
97
103
109
115
121
127
133
139
145
151
157
163
169
175
181
187
193
199
SeqRT
RanRT


Difference SeqRT&RanRT
REACTION TIME(S)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Avg SeqRT
AvgRanRT

Discussion

The individual became used to the pattern after a few attempts, which is why random and sequential trials differ from one another. Reaction time was longer in random trials than in sequential trials because the subject was unable to become used to the pattern in the former. In study designs where the same participants are repeatedly exposed to the same circumstances, treatments, or stimuli, counterbalancing is an approach that aids a researcher in controlling the impact of distracting elements. The technique of carefully rearranging the circumstances in a study design to improve the task's interval validity is known as counterbalancing.

References

Robertson, E., & Takács, Á. (2018). Motor sequence learning. *Scholarpedia*, *13*(5), 12319. https://doi.org/10.4249/scholarpedia.12319

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