Introduction

Sequential learning refers to the process of acquiring knowledge or skills in a sequential or ordered manner, where new information builds upon previously learned information. This method of learning involves mastering a set of concepts or operations one after the other, regularly in a step-by-step manner. It differs from parallel learning or studying unrelated topics at the same time (Biro & Matsuzawa, 2001; Conway, 2012).

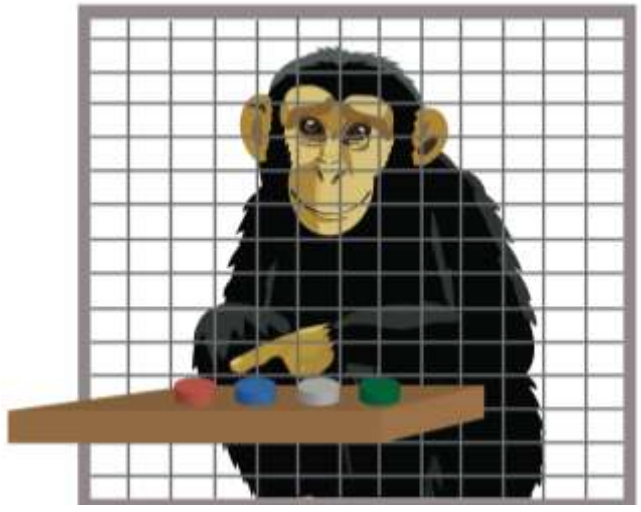
Chimpanzee, which are among our closest living relatives in the animal kingdom, possess a range of superior cognitive skills compared to its peer. Some of the skills are cognitive mapping, memorization, future planning, and causal understanding. Chimpanzees are known to have memory processing abilities equivalent to 4 or 5-years old child (preschool). Various studies testing the ability of primates to carry out sequence order processes indicate that primates have the cognitive capacity needed (Inoue & Matsuzawa, 2009; Völter & Call, 2014). Notable example: https://www.nature.com/articles/315057a0

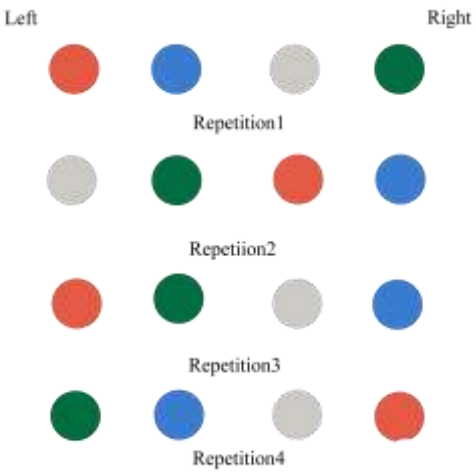
Methods

Monica

The learning process consists of two parts:

1. Pre-training (stimulation): Small introductory session of colored objects; 10 repetitions and not counted. Given fruits at the end of session.
2. Training: Chimpanzee has to pick the colored objects in right sequence. 20 repetitions and not counted. Every correct repetition will be given fruits. Minimum 80% accuracy of two consecutive sessions to pass to the next stage (addition of new colored object).



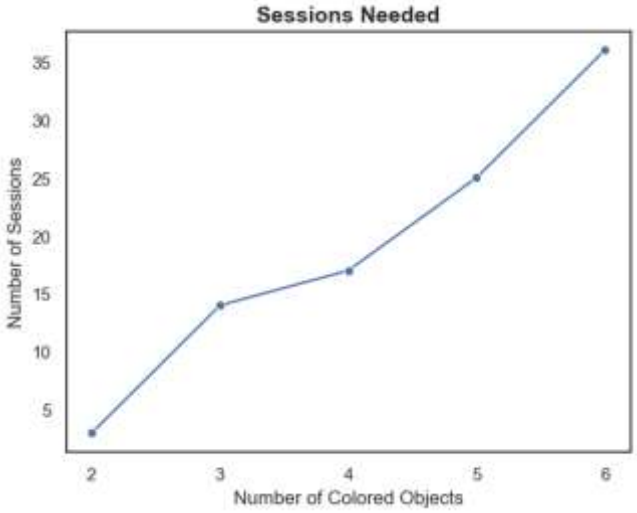


Data

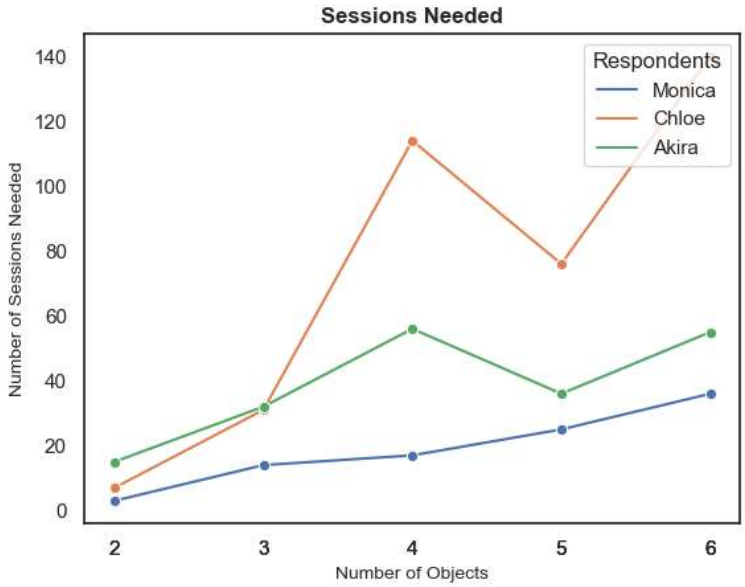
Table 1. Performance of chimpanzee subject during each stage of training where the objects were gradually increased.

Subject	Number of colored objects				
	2	3	4	5	6
Monica	80%	85%	82,5%	82,5%	80%
	3	14	17	25	36
CL	50	25	14	9	6

The upper set of data is the average percentage of right answers from the past two consecutive sessions. The lower set of numbers for shows the number of sessions required for each session.
CL (Chance Level): The chance of correctly predicting the sequence



Comparison with other chimpanzees using conventional/not colored object



Total session needed:

Monica: 95; Chloe: 368, Akira: 194

References

Biro, D., & Matsuzawa, T. 2001. Use of numerical symbols by the chimpanzee (Pan troglodytes): cardinals, ordinals, and the introduction of zero. Animal Cognition 4:193–199

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Inoue, S., & Matsuzawa, T. 2009. Acquisition and memory of sequence order in young and adult chimpanzees (Pan troglodytes). Animal Cognition 12(1): S59-S69

Matsuzawa, T. 1985. Use of numbers by a chimpanzee. Nature 315: 57-59

Völter, C. J., & Call, J. 2014. Younger apes dan human children plan their move in a maze task. Cognition 130:186-203