

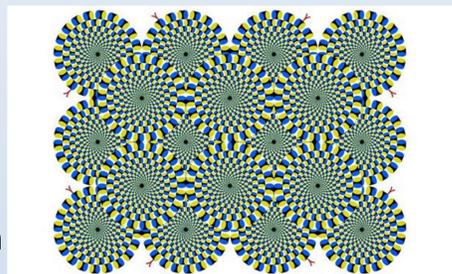
Illusory Motion Perception in Pigeons

Dina T. Bedri

Principal Investigator: Robert G. Cook

Background

- Optical Illusions are a revealing means of analyzing the visual system and its cooperation with the rest of the brain



- The Rotating Snakes Illusion (Kitaoka, 2003) results in the perception of rotating motion in a static image

- Previous research on this Illusion in humans and other animals reported illusory motion

- However, previous research in pigeons has analyzed other optical illusions, with inconsistent results

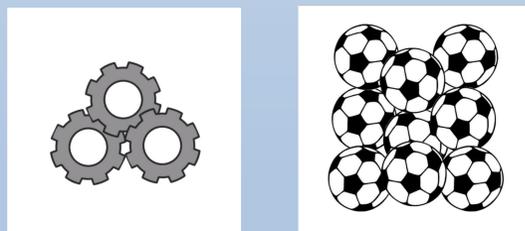
- Given these results, can pigeons perceive optical motion illusions?

- If they can, what factors influence the strength and perception of the illusion?

Methods and Procedures

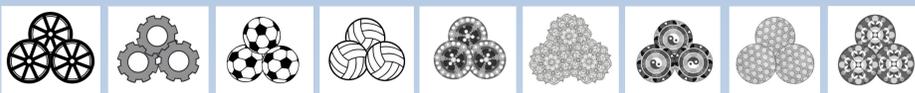
We trained and tested 4 pigeons

Pigeons were trained with groups of stimuli rotating at 0 (static), 0.104, or 0.41 rotations per second.



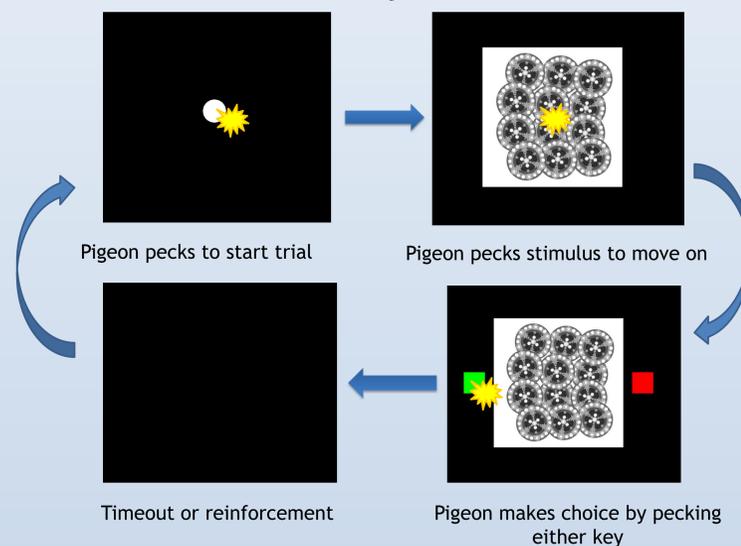
examples of stimuli

Pigeons reported whether stimuli were moving or static



3 count versions of each object

Anatomy of a Trial



Results

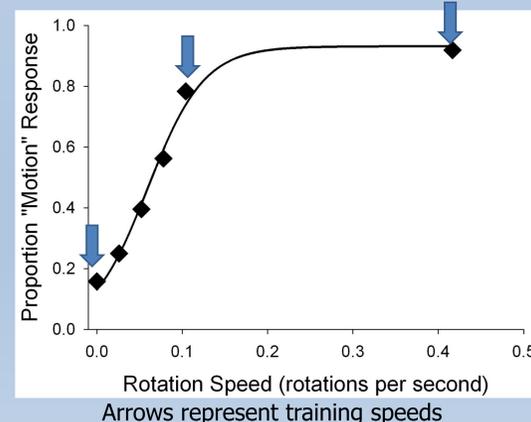
Before testing the critical illusory motion displays, we evaluated performance on novel displays with novel speeds to verify:

- pigeons will report any non-zero speeds as motion
- pigeons will apply this discrimination to any novel objects

With ultimate goal of ascertaining they will report any motion in the illusion itself

Control Test 1

Pigeons were presented with slower speeds between 0 and 0.104 rotations per second



Arrows represent training speeds

Pigeons successfully reported motion with the novel objects. They were more likely to report motion at faster speeds.

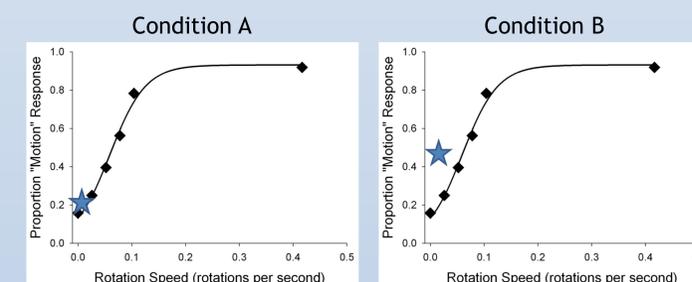
Conclusions

Results show that pigeons can discriminate between moving and static versions of a variety of stimuli

Tests with novel objects show that pigeons can discriminate a wide range of speeds of moving stimuli

Given this learned discrimination, we plan to introduce the Rotating Snakes Illusion to assess if and how much motion the pigeons report.

Hypothetical Results



Stars represent expected data points

We would expect pigeons to report the Rotating Snakes illusion as in motion (Condition B), while reporting a visually similar control (non-illusory) stimulus as non-moving (Condition A)

If the pigeons report no motion, we would expect results resembling Condition A

References

- Agrillo, C., Gori, S., & Beran, M. J. (2015). Do rhesus monkeys (*Macaca mulatta*) perceive illusory motion? *Animal Cognition*, 18(4), 895-910.
- Kitaoka, A. (2003). Rotating Snakes [Online Image]. Retrieved from <http://www.ritsumei.ac.jp/~akitaoka/index-e.html>
- Qadri, M. A., & Cook, R. G. (2015). Experimental Divergences in the Visual Cognition of Birds and Mammals. *Comparative Cognition & Behavior Reviews CCB*, 10, 73-105.

Acknowledgements

I would like to thank Robert Cook as well as Muhammad Qadri for their guidance throughout the process of this experiment. I would also like to thank Anne Moore and the Summer Scholars Program for their support and resources.