Poster Presented at the April (2004) 32nd Annual Western
Pennsylvania Undergraduate Psychology Conference. Meadville, PA.

The Autokinetic Effect: Variables of Perception

Donya Bernier & Lana Horn
Robert Morris University

The autokinetic effect occurs when a stationary point of light in an otherwise darkened room is perceived as moving. This effect can be enhanced or guided through the power of suggestion (e.g., people can be primed to see the light move and trace out certain words). One goal of this study was to determine if the strength of the autokinetic effect was affected by the color of the stationary light. Another goal was to determine whether visual acuity (based on whether participants required corrected or uncorrected vision) was related to the likelihood that participants would report movement.

Background

The Autokinetic Effect is the illusory impression of motion created when a small stationary target is seen in a homogeneous dim field (Blake and Sekuler, 2002). This effect is believed to occur because of the lack of a frame of reference and the brain's perception of movement *across the retina* (caused by involuntary eye movements) as movement of the *stimulus.*

Methods

My research partners (Lanna Horn and Mandy Luther) and I constructed an opaque box with an observation cutout on one side and point of light on the other. The opaque box consisted of a simple cardboard box layered inside and out with thick paper. It was important that subjects could see the point of light throughout the duration of the experiment. The observation cutout was approximately 2 inches in diameter so most people would have little trouble finding the cutout – and many could look through it with both eyes. It was also important that the subjects' gaze remain steady. Therefore, the box was held stationary and a chin-rest was implemented. If people could rest their head on something then it was less likely that they would move their heads – and less likely that they might accidentally shift their gaze slightly while looking at the light.

In complete darkness, the subjects peered into the box through the cutout as we shined various colors of light (white, blue, and green) through one small, stationary hole at the back of the box. We discovered that the size and diffusion of the light was influenced the perception of the illusion. The light needed to be small – just a pinpoint. The original hole was too large and, consequently, the light too ambient within the box. This was remedied by placing several pieces of cardboard over the existing hole and poking a hole through those that was the diameter of a safety pin.

We took note of three variables during each experiment – light color, whether the subject was wearing corrective lenses, and the subject's gender. The perception of colored light was produced by placing one of two sheets of colored paper (blue or green) over the pinpoint hole and then shining the light through the paper, or by simply leaving a white light uncovered. Each light was shown for a set amount of time – 20 seconds per color – and compared in reported movement.

Results

Note: quantities and percentages contained herein will be referred to in numeric form. 28 people were involved in the study – with an equal number being male and female. Only 3 people [2 males and 1 female – approximately 1 percent (%) of subjects] stated that they did not detect any movement from any color of light. 12 people (42.9%) saw the white light move. 8 people (28.6%) saw the blue light move. 14 people (50%) saw the green light move. Note: please refer to graph 2 on page six for a graphic representation of this information.

Thirteen people wore corrective lenses during the experiment. Subjects with *uncorrected* vision detected light movement 15 out of 39 opportunities (or, 38.4% of the time). In comparison, subjects with *corrected* vision detected light movement in 19 out of the 45 opportunities (or, 42.2% of the time).

Overall, men detected movement in only 33.3% of the opportunities. Intriguingly, women

Correspondence concerning this research should be addressed to Stephen T. Paul, 311 Massey Hall, Robert Morris University, 6001 University Blvd., Moon Township, PA 15108-1189. E-mail: paul@rmu.edu.

detected movement in 47.6% of the opportunities – 14.3% more often than men (please refer to graph 1, page 6). Two men did not detect any movement in light of any color.

Discussion

I have several speculations of why I think we found what we did. I would like to address two findings – one, that men were less vulnerable to the Autokinetic Effect than women, and two, that people perceived more movement of a green light than of a white or blue light.

To attend to the first, the findings may have been due to the possibility that men possess better spatiotemporal abilities than women. If that is true, then men would be more accurate in perceiving (or, in this case, being accurate in *not* perceiving) motion of an object in space. It was difficult to find research on this subject but what little documentation there was confirmed this speculation. There is some indication that certain strategic differences – like men's better spaciotemporal abilities – may be traced to sex differences in specific brain areas used in performing such tasks, perhaps reflecting sex differences in hormone levels during development (Geary, 1989; Sandstrom, Kaufman, & Huettel (1998).

To address the second, the green light may have unconsciously been associated with the green means "go" (stoplight) idea that has been drilled into people's heads from an early age. Therefore, if green means "go," then it makes sense that the green light "went," (moved) more than the other colors. This conclusion was derived from research on other such influences on Autokinetic motion. For instance, right-left and up-down directional dynamics (such as arrows, i.e.→) have a significant effect on the perceived *direction* of Autokinetic motion (Comalli, Jr., Werner, & Wapner (1957). To me, it seems as though people generally seek some particular meaning in a stimulus that seems too simple or non-purposeful.

Conclusions

This experiment explored how the variation of several variables affected the perception of the Autokinetic Effect. The variables included light color, corrected vs. uncorrected vision, and gender. Green was the color of light perceived to move the most out of white, blue, and green; and gender affected individual vulnerability to the illusion. My speculations on the causes of these results should be interpreted as merely possible ideas to be explored in future research.

References

Blake, R., and Sekuler, R. (2002). *Perception* (4th ed.). New York: McGraw-Hill.

Comalli, P. E., Jr., Werner, H., & Wapner, S. (1957). Studies in physiognomic perception: III Effect of directional dynamics and meaning-induced sets on autokinetic motions. *The Journal of Psychology, 43,* 289-299.

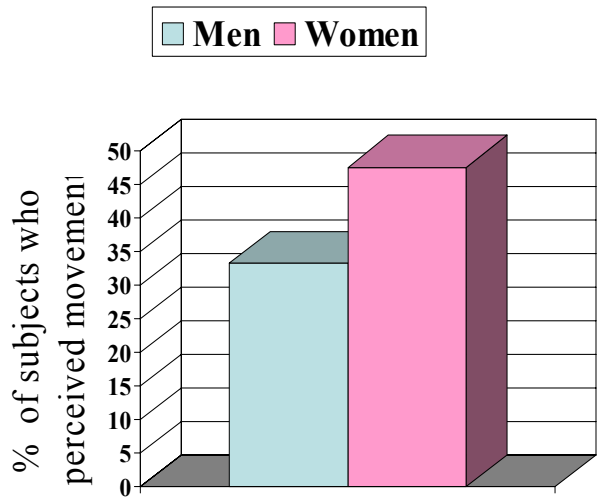
Geary, D. C. (1989). A model for representing gender differences in the pattern of cognitive abilities. *American Psychologist*, *44*, 1155-1156.

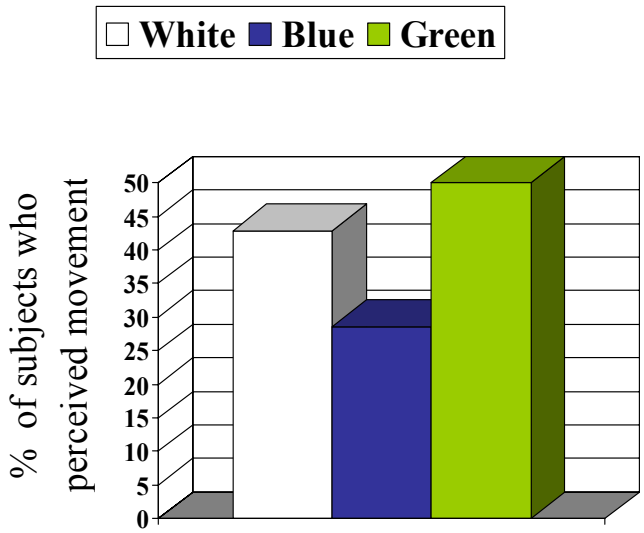
Sandstrom, N. J., Kaufman, J., & Huettel, S. A. (1998). Males and females use different distal cues in a virtual environment navigation task. *Cognitive Brain Research, 6,* 351-360.

Takahashi, K. (1990). Effects of target-background luminance ratios upon the autokinetic illusion. *Perceptual and Motor Skills, 71*, 435-445.

Graph 1:

Women detected light movement **14.3% more** often than men





Graph 2:

Subjects said the **green** light moved about **14% more** often than the other colors