

FEATURE INTEGRATION

Project Guide: Prof. Amitabha Mukerjee



FEATURE INTEGRATION THEORY

Treisman, Sykes, & Gelade, 1977

Features are registered early, automatically, and in parallel across the visual field, while objects are identified separately and only at a later stage, which requires focused attention.



REGIONS FOR VIEWING INFORMATION

People have a visual field of about 120 degrees in front of them, which contains three regions for viewing information:

The **foveal** region of greatest visual acuity, extending only 2 degrees on either side of fixation; in terms of reading, that would be about 6 to 8 letters.

Beyond the foveal is the **parafoveal**, extending up to 5 degrees, or 15 to 20 letters.

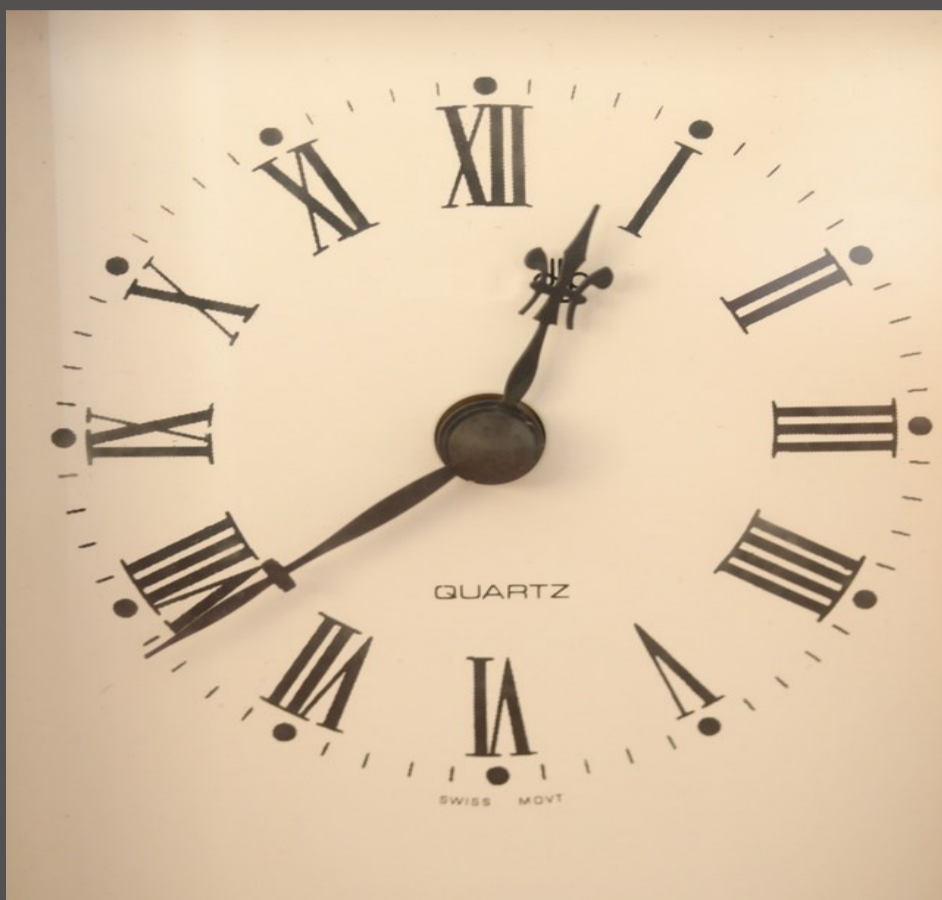
Everything else is considered to be in the **peripheral** region.

Primarily we take in visual data through the fovea, which is connected with processing detail. Anything seen visually beyond the fovea is significantly less sharp, and no significant data is considered to be acquired from those regions.



The Experiment

Cohort of collage students => Random numbers flashed
Accuracy of judgment noted => Take a standard reading speed test

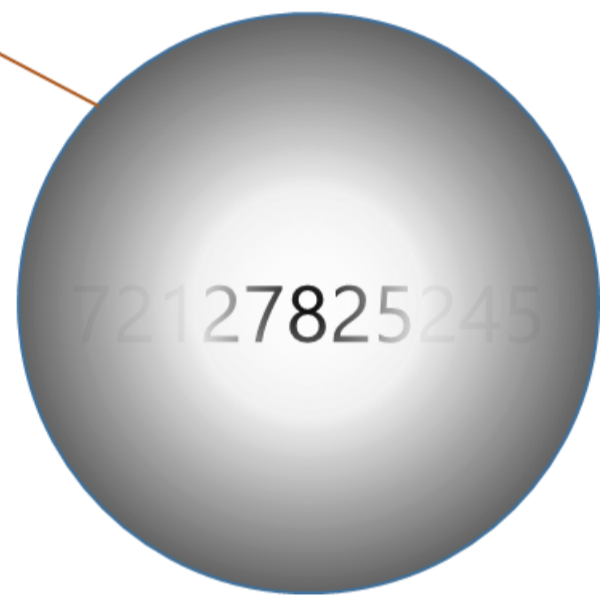


FEATURES

IN EXPERIMENT

- Horizontal and Vertical **Eccentricity**
- **Noise** in the form of Background color
- Numbers flashed for 1000ms.

Spotlight



38

+

71

43

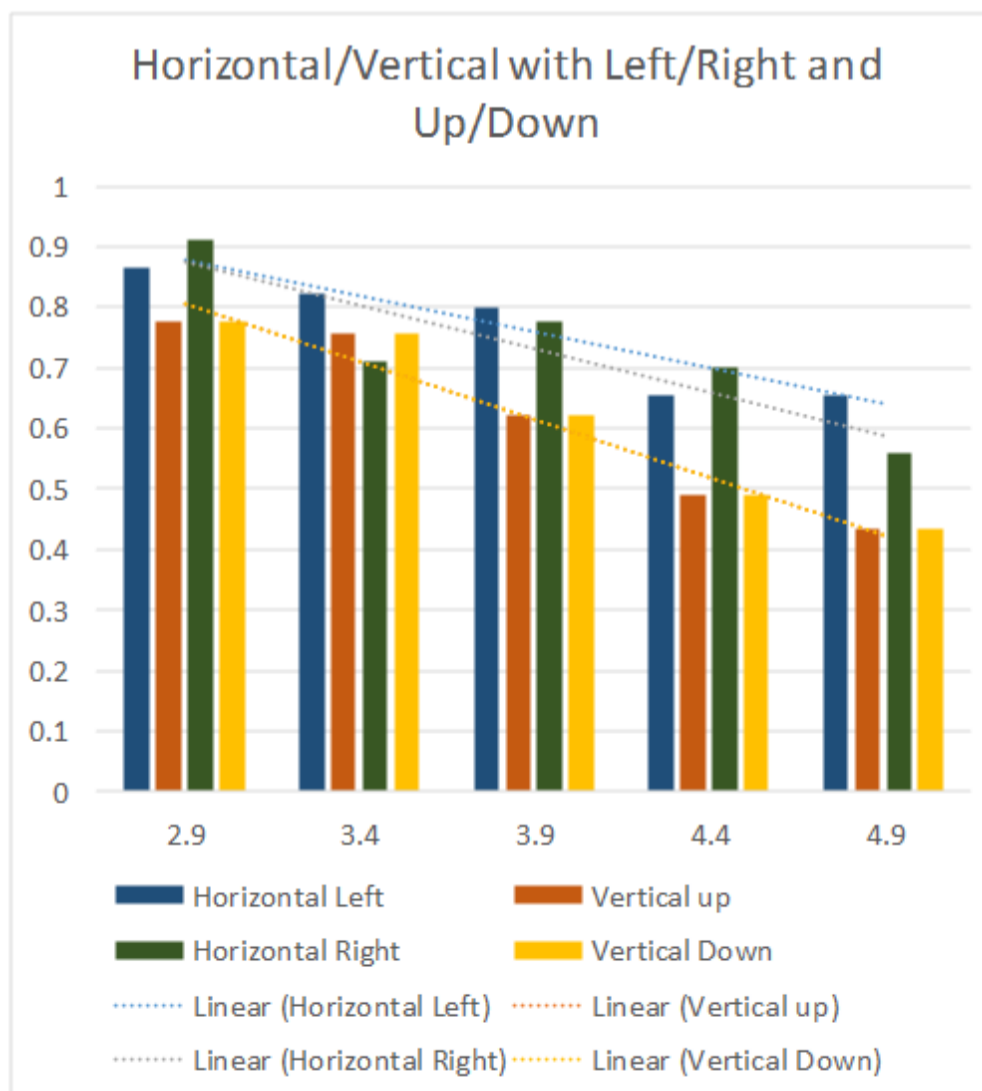
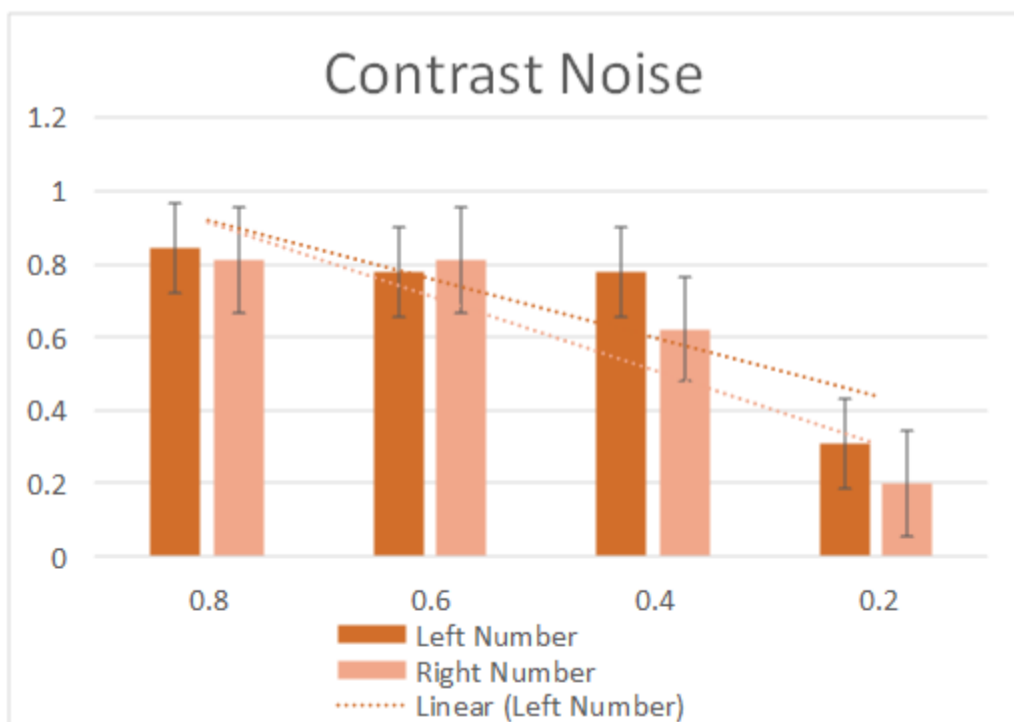
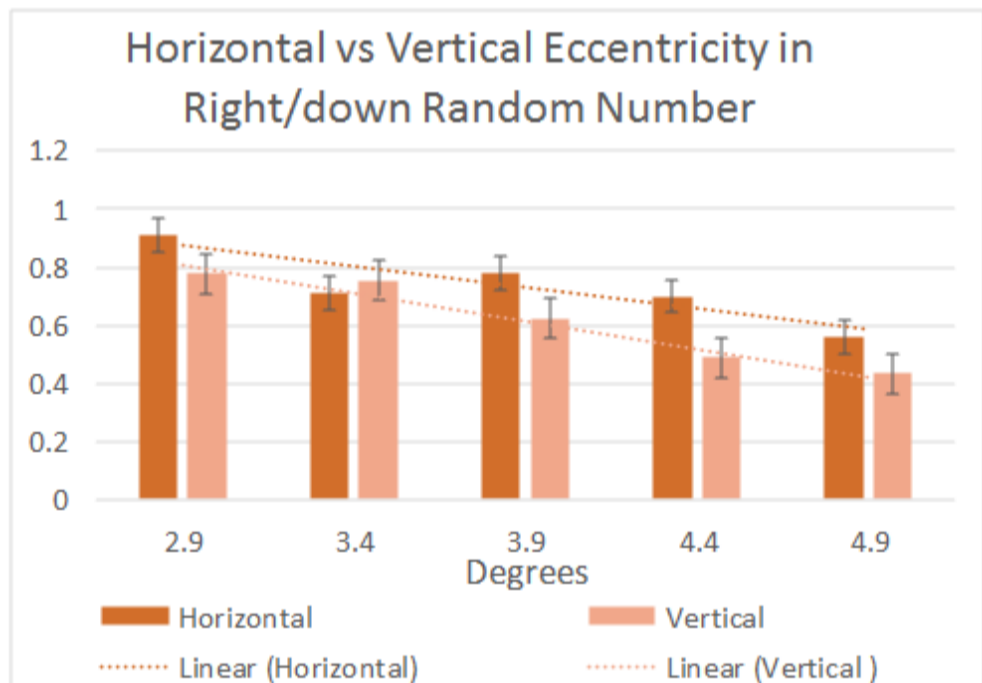
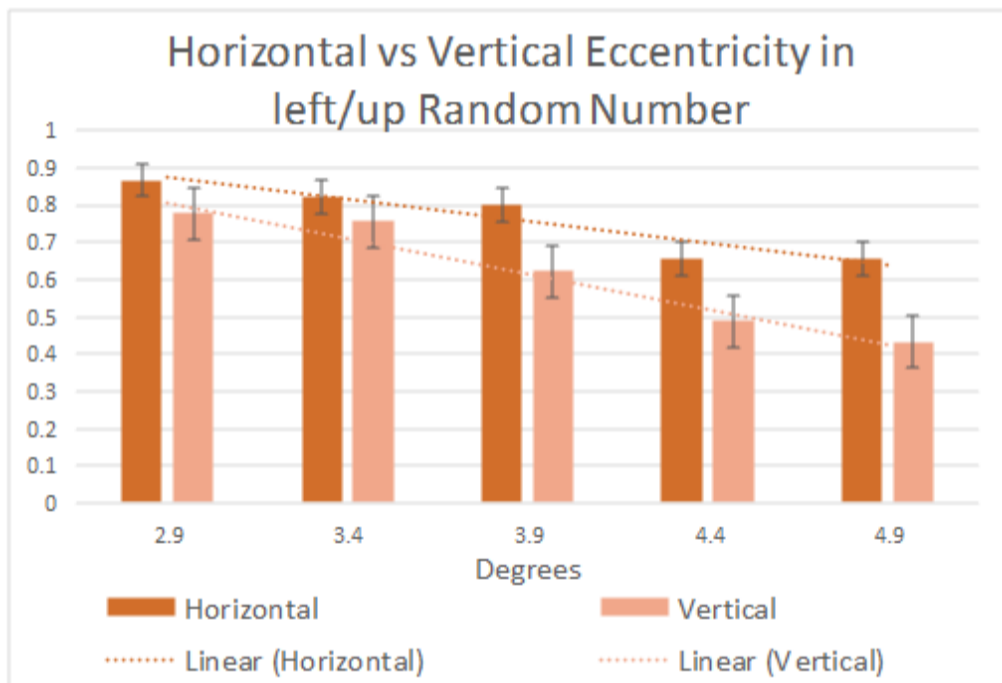
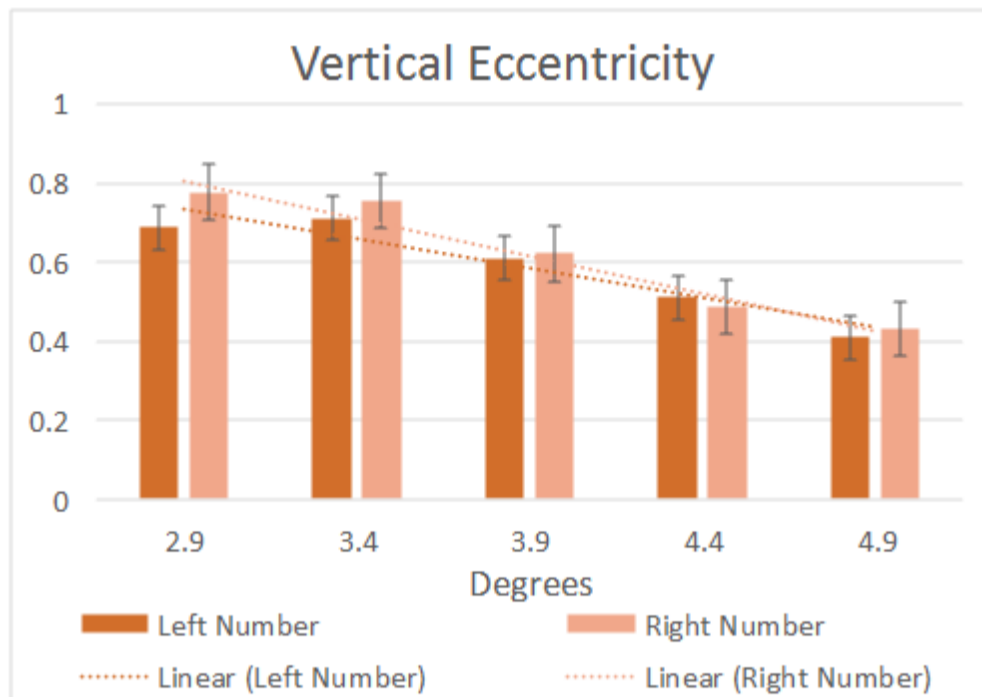
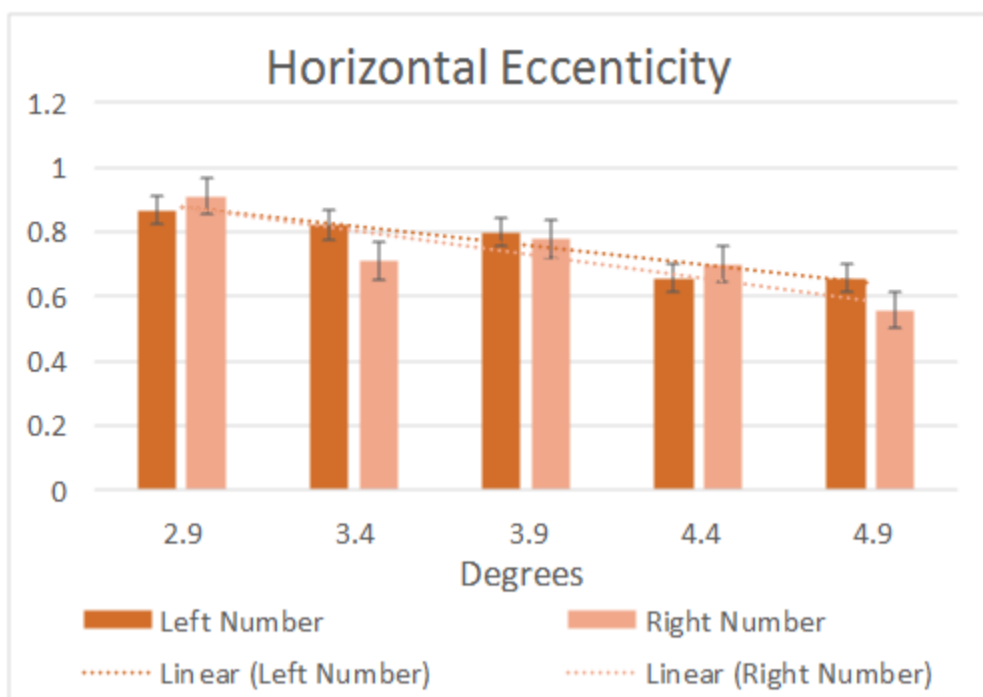
+

98

← Eccentricity →



RESULTS



INFERENCES

And Limitations of the Experiment

EXPERIMENT RESULTS

Left-Right was nearly symmetric in horizontal direction.

Bottom number was better recognized in vertical eccentricities.

Accuracy in the horizontal direction was always more than that in the vertical direction: this mean that the spotlight is skewed by vertical-horizontal Asymmetry

NOTEBOOK COLOR
WATCHING VISUAL PLAYING MOTION
GAMES SPORTS
READING LOCOMOTION
FORM SEARCHING
MOVIES SPEED
ENVIRONMENT VELOCITY

Domain of applicability

Inspiration for the work.

The Puissant question of “How is the visual acuity salient for reading speed”

Van den Berg R et al. in studying eccentricity and noise in from of distracting flanker crowded near the target.

Freeman, J., & Pelli, D. G studied how crowding an cueing affect target recognition.

Endel Poder working with *color* and *form* of the target in differentiating between target and distracter.

Pelli D G et al. (2007) worked with numerous features like spacing, eccentricity, size of target and flanker, font, number of flankers, flanker contrast.

| Limitation | Minimized by |
|---|--|
| Subject may not faithfully look at the Fixation cross | Making a video of the subjects while they were giving the test and later viewing the video |
| Subject must maintain a constant distance form the screen | Subjects were asked to sit upright in the chair kept at constant distance from the laptop screen |
| Contrast varies with the viewing angle of the screen | Constant angle of the screen was maintained with respect to the persons eye elevation. |
| Resolution of the screen might decrease the eccentricity | Constant screen resolution of 1366X768 on 15.6 in screen ensured 100ppi |

Project by: Harmanjit Singh under Prof. Amitabha Mukerjee and M Seetha Ramaiah.

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