The Roles of Altitude and Fear in the Perception of Height

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Abstract

While the perception of distance on the ground has been extensively studied, the perception of vertical extents (or heights) is a relatively understudied aspect of spatial layout. In a series of experiments, we show that the perception of vertical extents are slightly overestimated when viewed from the ground, but largely overestimated when viewed from the top. The following three measures were used to assess the perception of vertical extents: 1) visually matched estimates of apparent distance, 2) visually matched estimates of apparent size, and 3) a triangulation by walking estimate. When viewing from the top, participants overestimated the distance to the ground by as much as 60%, the size of targets on the ground by 22%, and triangulated walking estimates by 13%. When looking up, participants only overestimated the distance by 23%, but size and triangulated walking estimates for targets viewed from below were accurate. Results obtained from both the real world and virtual reality will be discussed. Furthermore, a non-optical variable — fear — was positively correlated with participants’ overestimation of height. We suggest that the overestimation of height that occurs when looking down from a high place is due to both the altitude and a fear of falling.

Introduction

“Whenever [the phobic] felt extremely fearful, the bridges appeared to be longer and far higher than he knew them to be.”
- Rachman & Cuk (1992, pp. 583)

Experiment 1: Distance Measure

If distance is overestimated, size should be overestimated.

Fear Measures & Results

State-level Measure of Fear of Heights:
SUBJECTIVE UNITS of DISTRESS SCALE
0-100 rating of anxiety

r = 0.33, p = 0.03

Conclusions

Heights are grossly overestimated when viewed from the top.

Perception of the environment is influenced by the emotional state of the observer.

References


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