

Distance Perception Between Majors

KINE 3325 – Undergraduate Research Methods – Research Project

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ABSTRACT

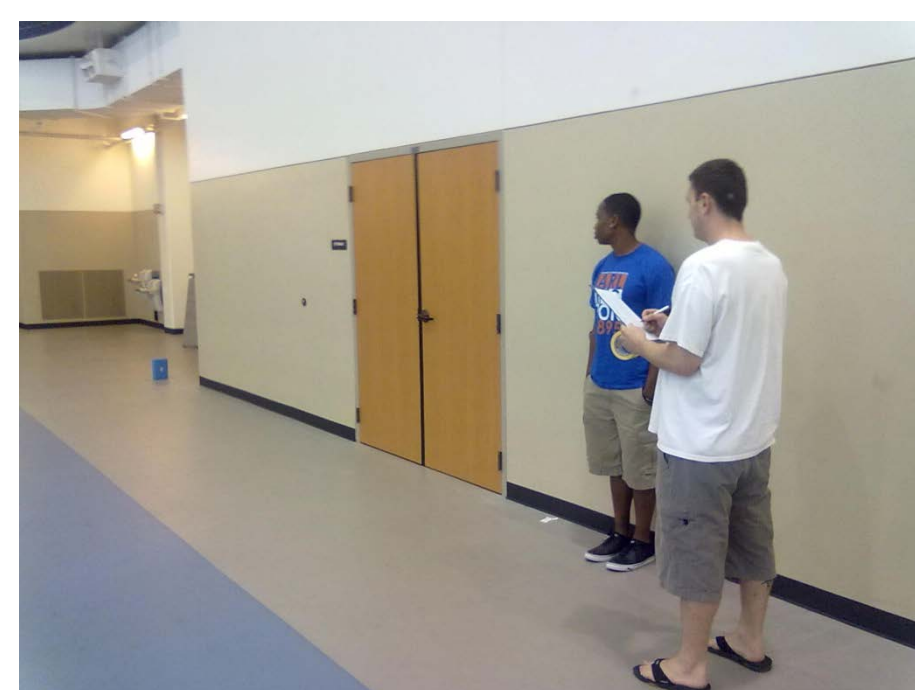
BACKGROUND: Distance perception results from the mind converting visual input by using the environment or prior knowledge to judge distances between objects. Two theories used to explain distance perception are bottom up and top down.

PURPOSE: To determine if there is a difference in distance perception ability between freshmen and senior architecture and kinesiology students.

METHODS: 32 subjects participated in this study. The study consisted of six tasks: two blind walking tasks, three horizontal tasks and a vertical distance task.

RESULTS: Significant differences between senior kinesiology and freshmen architecture groups. Senior kinesiology did statistically significantly better in HDC (0.03) and freshmen kinesiology did statistically significantly better in HDL (0.03) and HDR (0.01).

CONCLUSIONS: Senior kinesiology students utilize top down processing. Freshmen architecture students utilize bottom up processing. With further research, this can potentially be used to help students choose majors or careers.



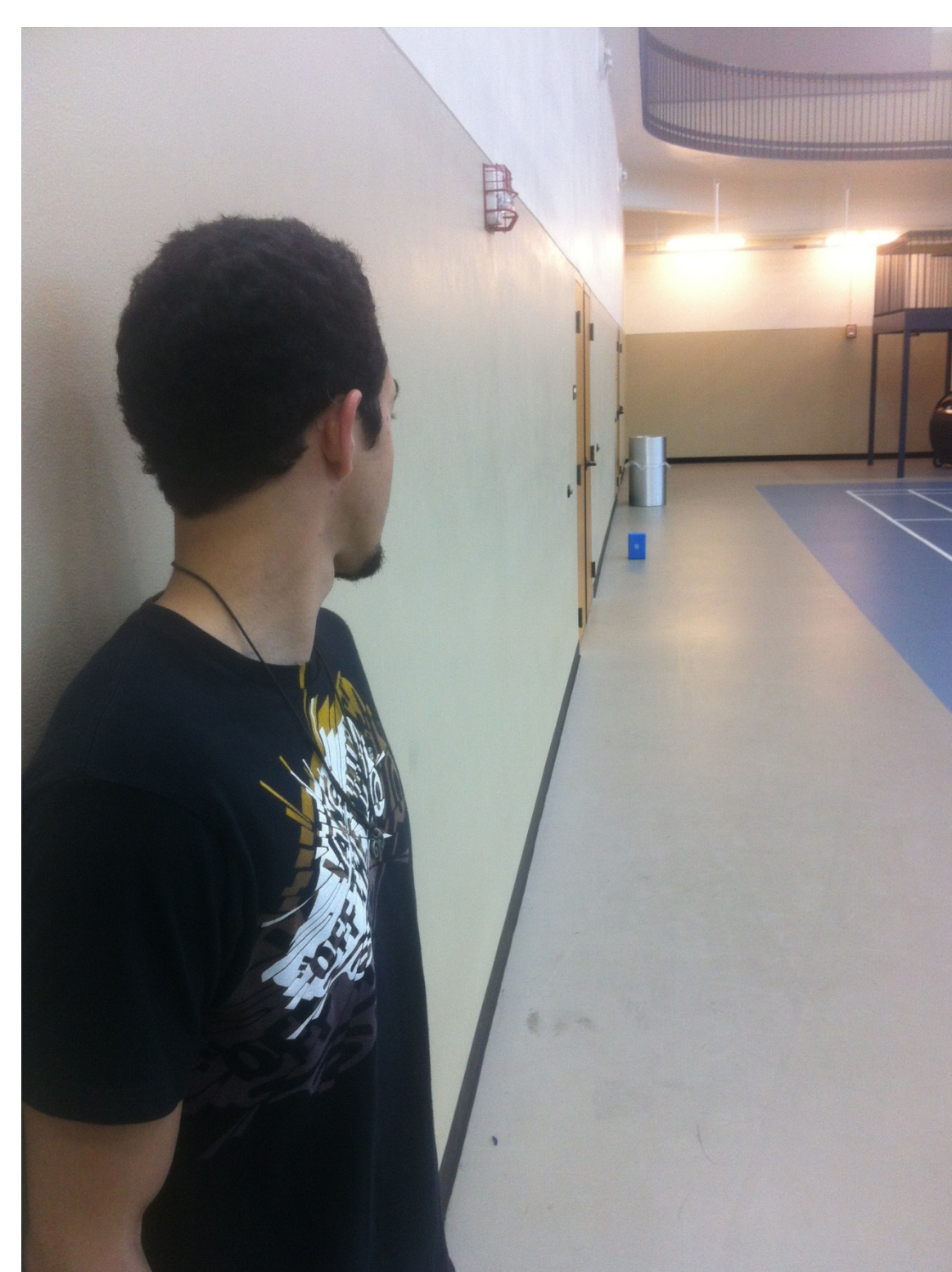
PURPOSE

The purpose of this study is to determine if there is a difference in distance perception ability between freshmen and senior architecture and kinesiology students at UTA.



INTRODUCTION

- Perception is how the mind processes the sensory input of the five senses to create the body's reality.
- Distance perception is the result of the mind converting visual input by using prior knowledge to judge distances between objects, including ourselves.
- Two major theories that explain how perception is formed are:
 - Bottom up uses stimuli from the retinal image and processes the data as it travels through the brain for more complex analysis (Proffitt 2006).
 - Top down uses prior knowledge to make a perceptual hypothesis, or big picture (Folk & Remington 2006).
- Few studies have been done comparing the distance perception ability between subjects of different school majors or professions.
- Students may have had a predisposition to choose a major that they already had a skill in. It is also possible that the work done in the major could have fine tuned their distance perception skills.
- It is hypothesized that seniors in each major will perform better and that architecture students will perform better than kinesiology students. We believe that senior students utilize a top down approach, giving them an advantage.



METHODS

University of Texas at Arlington IRB# 2012-0457

Participants

- 32 male Subjects: 8 freshmen kinesiology, 8 freshmen architecture, 8 senior kinesiology, 8 senior architecture
- Classification
 - Senior- Allocate 90+ Undergraduate Hours
 - Freshmen- Enrolled in the intro level courses
- Height= 1.76±.07 m/ Weight= 78.90±15.88 kg

Tasks

- Blind Walk 1- Subjects were blindfolded then instructed to walk 15 m.
- Blind Walk 2- Subjects were given a visual cue before they were blindfolded. Once blindfolded, the subject was instructed to walk until they believed they reached the visual cue.
- Horizontal Distance- Three visual cues were placed at 90° to the subject to the left, right, and in front. The subject was asked to give a verbal response on how far the visual cues were from them. The distances were 10m to the left, 8m to the center, and 7.5m to the right.
- Vertical Distance- The subject stood 15m horizontally away from the visual cue, which was placed 5.56m vertically. The subject was asked to verbally respond how high the visual cue was above the ground.

RESULTS

- One subject from the freshmen architecture group was excluded because he was an outlier.
- A one-way ANOVA was used to find significant differences between groups. Once significance was found, a Tukey post hoc analysis showed statistically significant ($p < 0.05$) difference between tasks.
- Horizontal Tasks were Significant
 - HDL- FA closer than SK ($F(3,27)=3.342, p=0.03$)
 - HDC- SK closer than FA ($F(3,27)=3.201, p=0.03$)
 - HDR- FA closer than SK ($F(3,27)=4.089, p=0.01$)



RESULTS

Table 1: Comparison of Average Differences of Distances for all Groups and Tasks

ADA= Average Distance from Actual

| | Senior Kinesiology | | Senior Architecture | | Freshmen Kinesiology | | Freshmen Architecture | |
|-----|---------------------|------------|---------------------|------------|----------------------|------------|-----------------------|-------------|
| | Actual Distance (m) | ADA (m) | Actual Distance (m) | ADA (m) | Actual Distance (m) | ADA (m) | Actual Distance (m) | ADA (m) |
| BW1 | 15 | 0.13±4.76 | 15 | 2.75±4.65 | 15 | 1.00±6.21 | 15 | 3.86±6.20 |
| BW2 | 15 | -1.88±3.76 | 15 | -1.5±1.07 | 15 | -0.13±3.94 | 15 | -1.43±2.30 |
| HDL | 10 | *3.38±3.83 | 10 | -0.5±1.85 | 10 | 0.13±3.31 | 10 | *-1.86±4.10 |
| HDC | 8 | *0.75±2.49 | 8 | -1.63±1.06 | 8 | -0.63±2.56 | 8 | *-2.71±2.63 |
| HDR | 7.5 | *2.25±2.61 | 7.5 | -0.63±.92 | 7.5 | -0.25±1.91 | 7.5 | *-1.29±2.69 |
| VD | 5.56 | 1.13±3.10 | 5.56 | 1.63±.92 | 5.56 | 3.13±4.05 | 5.56 | 0.29±1.70 |

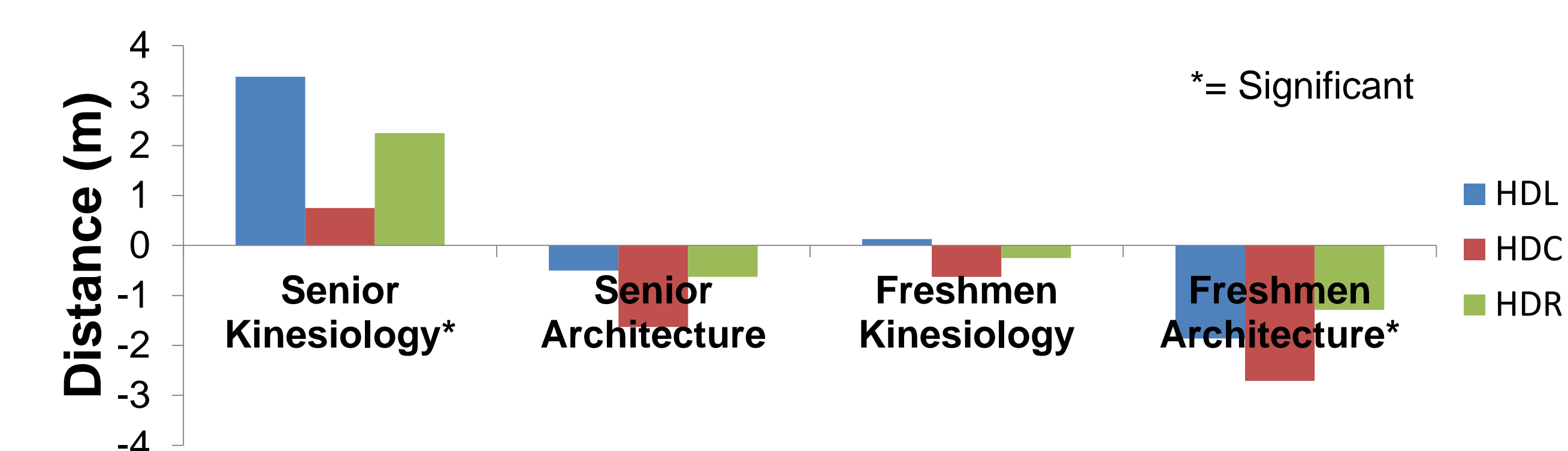


Figure 1: Comparison of Average Differences of Distance for Each Group.

DISCUSSION

- We rejected the null hypothesis for horizontal distance right and horizontal distance left.
- We partially rejected the null hypothesis for horizontal distance center.
- We failed to reject the null hypothesis for blind walks 1 and 2 and vertical distance.
- Seniors appear to utilize top down processing and freshmen appear to use bottom up processing.
- A limitation of the study was not utilizing a post test survey to ask subjects which methods they utilized to determine distance.
- Future studies could test female subjects and subjects of different majors.
- This and future studies could be used to help individuals decide on majors or careers that suit their perception ability.