



# The Observance of the Visual Reaction Time of Non-Athletes Compared to Athletes

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## Abstract

Visual reaction time (VRT) is the time that elapses from the initiation of a stimulus until a response is achieved<sup>1</sup>. Having a quick reaction time can influence the success of one's athletic ability. Improving reaction time develops one's ability to respond faster to different stimuli that are present throughout a sport. This study tested the VRT of male and female athletes and non-athletes ages 18-23. This experiment included athletes' VRT, the control group, and non-athletes' VRT, the subjects. The athletes consisted of individuals who participate in collegiate level baseball and softball, and the non-athletes consisted of individuals who have never participated in a collegiate level sport. The hypothesis of this experiment was that non-athletes VRT will improve over time with practice. VRT was assessed via a computer software program developed by Human Resources Media (HRM). Participants were asked to respond to a stimulus as soon as it appeared on the computer screen and the mean VRT was recorded. The athletes' VRT was tested once. The non-athletes' VRT was tested twice per week over a three week period for a total of six tests. In this study, it was observed that males had a faster VRT than females. In addition, athletes had faster VRT than non-athletes. The study illustrated that male and female non-athletes' VRT decreased over a three week period when comparing their initial mean VRT to their final mean VRT. Therefore, this study demonstrated that with practice, individuals VRT can improve over time.

## Introduction

Athletes are required to make many decisions while engaged in their sport of choice. Specifically, baseball and softball players must decide whether or not to swing the bat, how to react to a ball that is coming off the bat when playing the field, and several other stimulus that occur while playing the game. The players' VRT is crucial in a variety of sports. The average VRT is 250 milliseconds for the average person<sup>3</sup>. However, someone who does not play a sport may not be acclimated to reacting as quickly to visual stimuli. Therefore, it was observed that athletes have faster reaction times compared to those who do not play a sport<sup>3</sup>. In addition, reaction times among different sports vary<sup>3</sup>. This study focused particularly on athletes who play either baseball or softball. Those who were athletes had their reaction time tested once, while those who were non-athletes had their reaction time tested twice a week over a three week period. The athletes' mean VRTs were compared to the non-athletes' mean VRTs. It was observed that the athletes displayed a faster VRT than the non-athletes according to their initial test.

The hypothesis of this experiment was that the VRT of the non-athlete participants will improve over time with repeated practice. The participants were also required to fill out a survey before they participated in the study in order to assess different aspects that could affect their reaction time.

## Material & Methods

- This research was approved by the IRB protocol # 2011.11.01.01
- Participants consisted of athletes: baseball players ( $n=9$ ) and softball players ( $n=10$ ), and non-athletes: males ( $n=4$ ) and females ( $n=7$ ).
- A survey was administered to participants before the VRT test was implemented.
- VRT was tested using the HRM computer software program.
- Protocol: A simple reaction time test was administered. Athletes had their VRT tested once, and non-athletes had their VRT tested twice a week over a period of three weeks. When the VRT was examined it was referred to as a trial, three trials make up one test. In addition, there was a rehearsal trial used to familiarize the participant with the VRT software. Each trial consisted of a series of ten stimuli. At the end of the trial, the HRM Software computed the minimum, maximum and mean responses in milliseconds (ms). The participant was subjected to four trials; the initial trial was considered the rehearsal trial. The second through fourth trials were used as data for the experiment. The mean from trials two through four were averaged together to find the total mean of each test. There was a total of one test for the baseball and softball players and a total of six tests for the male and female non-athletes.

## Results

Figure 1

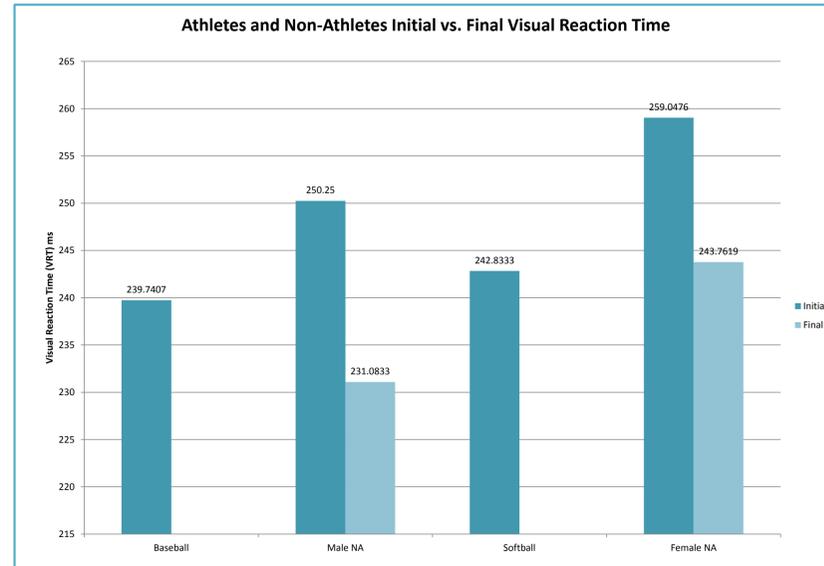


Figure 1 displays the athletes, baseball players mean VRT 239.74 ms and softball players mean VRT 242.83 ms was faster than non-athletes, males initial mean VRT 250.25 ms and females initial mean VRT 259.05 ms. It was observed that male athletes had faster mean VRTs compared to female athletes, and male non-athletes had faster mean VRTs compared to female non-athletes.

Figure 2

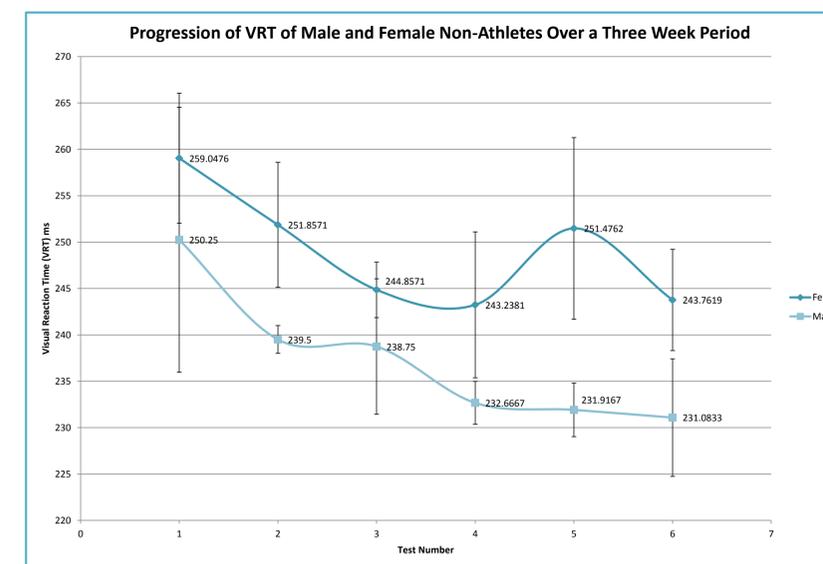


Figure 2 illustrates the change in mean VRT throughout the three week time period among the male and female non-athletes, with standard error of the mean bars that represent variation between participants. In the male non-athletes, a steady decrease in mean VRT occurred throughout the six tests. The female non-athletes' mean VRT drastically decreased in tests one through four and at test five occurred an increase, however at test six the mean VRT decreased again.

Figure 3

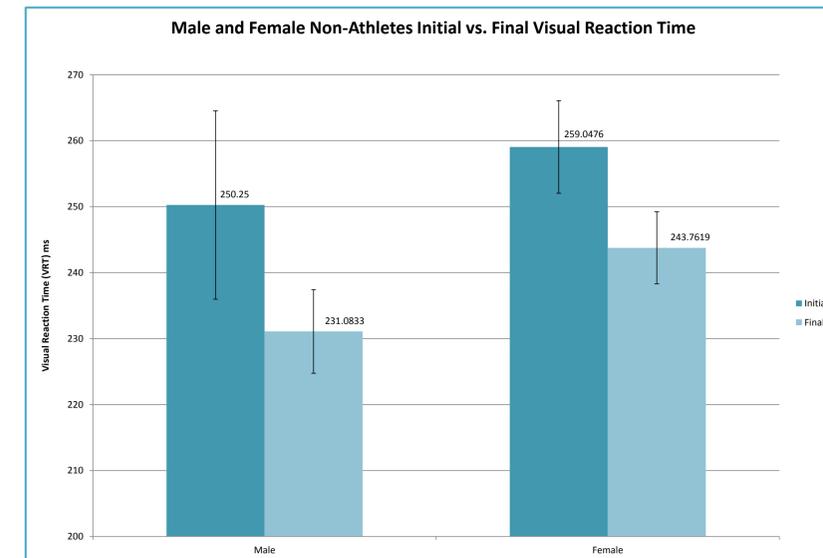


Figure 3 demonstrates the male and female non-athletes decrease in mean VRT from the initial VRT test compared to the final VRT test. Standard error of the mean bars represent variation between participants.

- A t-test compared the non-athletes initial and final VRT for significance ( $p < 0.05$ ). A comparison was found among the female non-athletes to be  $p = 0.011489$ , which displays a significance in the decrease of mean VRT. The t-test compared the male non-athletes mean initial and final VRT ( $p < 0.05$ ) and the comparison was found to be  $p = 0.137966$  which does not display a significance in the decrease of mean VRT.

## Discussion

- Improvement in VRT over a period of time with practice was displayed in this study and supported the hypothesis. Statistically significant improvement between the mean initial and final tests in the female non-athletes was found. Significant statistical improvement was not found in the male non-athletes which might be attributed to the low number of volunteers.
- This knowledge can change the way athletes practice and prepare for their games. Reaction time training is beginning to be implemented into athletes' practices, and training is different according to the demands of the sport. Reaction time training is the communication between the brain, spinal cord, and musculoskeletal system and includes both cognitive and physical training<sup>2</sup>. Cognitive techniques that are used are imagining and visualizing the game, and physical techniques that are used in training are resistance, stability, and plyometric power-building exercises<sup>2</sup>.
- VRT may also affect daily tasks. A quickened VRT may aid in driving and child care due to the ability to react in a timely manner to an assortment of stimuli.

## References

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