

Boost Your Reaction Time

By Jim Brown

Overview

Scientists have been studying reaction time for more than a hundred years, and they are still discovering new elements of the process and its effect on sports performance. In 2008, researchers at the University of Alberta found that Olympic sprinters closest to the starter's pistol reacted more quickly than those farther away.



Phil McElhinney / flickr

According to the study, the louder the noise (within reason), the shorter the reaction time. The difference in reaction time was measured in hundredths of seconds, but at the elite level hundredths of seconds can mean the difference between winning and losing, fame and relative obscurity, and first place money versus lower payouts.

How It Works

There are at two ways—some say three—to classify reaction time.

- Simple reaction time refers to a single stimulus (hearing a starting pistol) and a single response (running).
- Choice reaction time means reacting to more than one stimulus (in baseball, hearing the sound of the bat hitting the ball and visually gauging the speed and path of the ball after it is hit).

Reaction time itself is an inherent ability, but overall response time involves a variety of factors, including practice, experience, anticipation, strength and coordination. Each athlete has a built-in, limited time range to react, but within those boundaries is plenty of room for improvement.

“The process loop is very important for reaction time,” says Mark Verstegen, Founder of EXOS Athletes’ Performance. “We have to be sure the athlete can take the stimulus—whether it is verbal, visual, tactile or in some other form—and turn it into a response. A person can have great reaction time, but it doesn’t help if his or her body can’t do anything about the stimulus. You have to be able to take advantage of the process. That means being in the right body position (with all the right angles) to take advantage of the situation.”

By the Numbers

190 milliseconds (0.19 seconds)

The amount of time it takes a college-aged person to react a visual stimulus

140 - 160 milliseconds (0.16 seconds)

The amount of time it takes a college-aged person to react to a sound stimulus

0 - late 20s

The ages during which simple reaction time shortens (get faster)

Late 20s – 50s & 60s

The ages during which simple reaction time slowly increases (gets slower)

.375 seconds

The amount of time a baseball players has to react to a 90-mph fastball

Reaction Time Research

Hundreds of studies have been conducted over the past century, and each one reveals a little more about reaction time and sports performance. Here are some examples:

- French exercise scientists found that reaction time was progressively quicker as race length shortened from 400 meters to 60 meters. They also discovered that decreased, or shortened, reaction time was not observable in less experienced sprinters (18-19 years old). They observed that sprinters in 60-meter and 100-meter events tended to anticipate the starter’s gun, while those in longer races were content to respond to the sound of the shot.
- At the University of Alabama at Birmingham, sports scientists performed vision screening tests on 213 minor league baseball players, then matched test results with hitting ability. Age and race did not affect hitting performance, but an association was found between visual reaction time and batting skills. No association was found in fielding skills, although it could be assumed that catchers and third basemen need to have quicker response time than pitchers and outfielders to play well at their positions.
- Japanese researchers tested 22 baseball players, 22 tennis players and 38 non-athletes. There were no differences in simple reaction time between the two groups of athletes, but baseball players scored better on the GO/NOGO test, which involves pressing a button or not pressing a button as a result of a stimulus. The GO/NOGO reaction time of higher skill baseball players was significantly shorter than that of less skilled players. Professional baseball players had the shortest reaction time of all groups. The research team concluded that practice can improve GO/NOGO reaction time, but not simple reaction time.

- A study conducted at the University of Illinois found that highly-skilled tennis players used visual skills to react to balls hit by their opponents, something they were not able to do as effectively on balls projected by a machine.
- Based on a review of reaction time research, the authors of an article in *Perceptual Motor Skills* concluded that “reaction time must be considered a skill dependent upon experience and learning.”

Coaching Keys

There is plenty of evidence that strength training, aerobic and anaerobic development and sports skills should be practiced in a manner that simulates game or event conditions as much as possible. Movements that are practiced in game-like situations are the ones most likely to be used in competition.

Those non-specific, look-good, why-am-I-doing-these drills that still take up valuable practice time in every sport should be questioned—think quickness drills in football in which players, on command, rapidly move their hands from head to knees to shoulders to other parts of the body. While impressive looking, which positions require those patterns of movement?

Examples of sport-specific drills include the following:

- Wave drills and one-on-one drills in basketball
- Rapid fire volley drills in tennis
- Football drills in which linemen drop to the ground, then return to a starting position
- Starting drills in swimming and track
- Digging, sprawling, rolling, recovering, and blocking drills in volleyball
- One-on-one defensive drills and short-range goal-defending drills in hockey and soccer
- Face-off drills in hockey
- Smash-return drills in badminton

There is still a place in the training routine for less-than-sport-specific activities. Explains Verstegen, “If a football player doesn’t have basic motor abilities, he won’t pick them up just playing football. For example, if a running back just does position work, it won’t necessarily improve his speed, quickness, cutting ability or acceleration. That’s why we try to find exactly the right activity at Athletes’ Performance and Core Performance to develop those skills.”

Take-Away Messages

There are several take-home messages for coaches, athletes and parents of athletes regarding reaction time.

1. Although there are inherent limitations to reaction time, each athlete can improve—shorten—response time and offset some of the limitations that still exist through experience and anticipation.
2. Allow enough time to develop motor skills (running, stopping, changing directions, jumping and throwing, for example), as well as strength, speed, flexibility and endurance that are needed to play a sport.

3. Incorporate your improved reaction time, enhanced motor skills and better overall fitness into sport-specific training and competitive situations.

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