

Reaction Time

Reaction time is the interval time between the presentation of a stimulus and the muscular response initiation to that stimulus. A primary factor affecting a response is the number of possible stimuli, each requiring their response, that are presented.

If there is only one possible response (simple reaction time), it will only take a short time to react. If there are several possible responses (choice reaction time), it will take longer to determine which response to carry out.

Hick (1952) discovered that the reaction time increases proportionally to the number of possible responses until a point at which the response time remains constant despite the increases in possible responses (Hick's Law).

Improving Reaction Speed

Reaction Time

Coach and athletes need to analyse the type of skill and the requirements of their sport and decide where response gains can be made. Reaction time is an inherent ability, but overall response time can be improved by practice. Consider the following:

- Detecting the cue - in a sprint start, focusing on the starter's voice and the sound of the gun and separating this from background crowd noise and negative thoughts
- Detecting relevant cues - a goalkeeper learning to analyse body language at penalties
- Decision making - working on set pieces and game situations
- Change in attention focus - being able to switch quickly from concentration on the opponent to concentration on the field of play in invasion games
- Controlling anxiety - which slows reaction times by adding conflicting information
- Creating optimum levels of motivation - 'psyching up'
- Warm-up - to ensure the sense organs and nervous system are ready to transmit information and the muscles to act upon it

Anticipation

Anticipation is a strategy athletes use to reduce the time they take to respond to a stimulus, e.g. the tennis player who anticipates the serve the opponent will use (spatial or event anticipation). In this case, the player has learned to detect specific cues early in the serving sequence that predicts the potential serve. There are dangers for the tennis player in anticipating this way, but the advantages of getting it right are significant. It means the player can start to position themselves for the return earlier than usual and give themselves more time to play the shot when the ball arrives.

Factors influencing response time

Response time is the sum of reaction time plus movement time. Factors that may influence the performer's response are:

- Gender and age (see diagram - Davis (2000))

- Stage of learning
- Psychological state
- Level of fitness
- Number of possible responses
- Time available
- The intensity of the stimuli
- Anticipation
- Experience
- Health
- Body Temperature - colder the slower
- Personality - extroverts react quicker
- State of alertness
- Length of neural pathways

— MACKENZIE, B 1998, *Reaction Time*, Brainmac, viewed 20/08/22, <<https://www.brianmac.co.uk/reaction.htm>>.