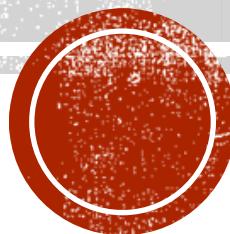


MOTOR LEARNING & COACHING



WHAT ARE SKILLS?

- Skills are the learned ability to bring about positive results with a maximum of certainty, with a minimum outlay of time or energy
- Skills can be categorised into 3 basic categories:
 - Cognitive skills: the mental processes of problem solving, remembering, decision making.
 - Perceptual skills: involving how an individual interprets stimuli. e.g. two players receive the same information from the environment but interpret it differently.
 - Motor skills: involving physical movement. e.g. catching, throwing, running.

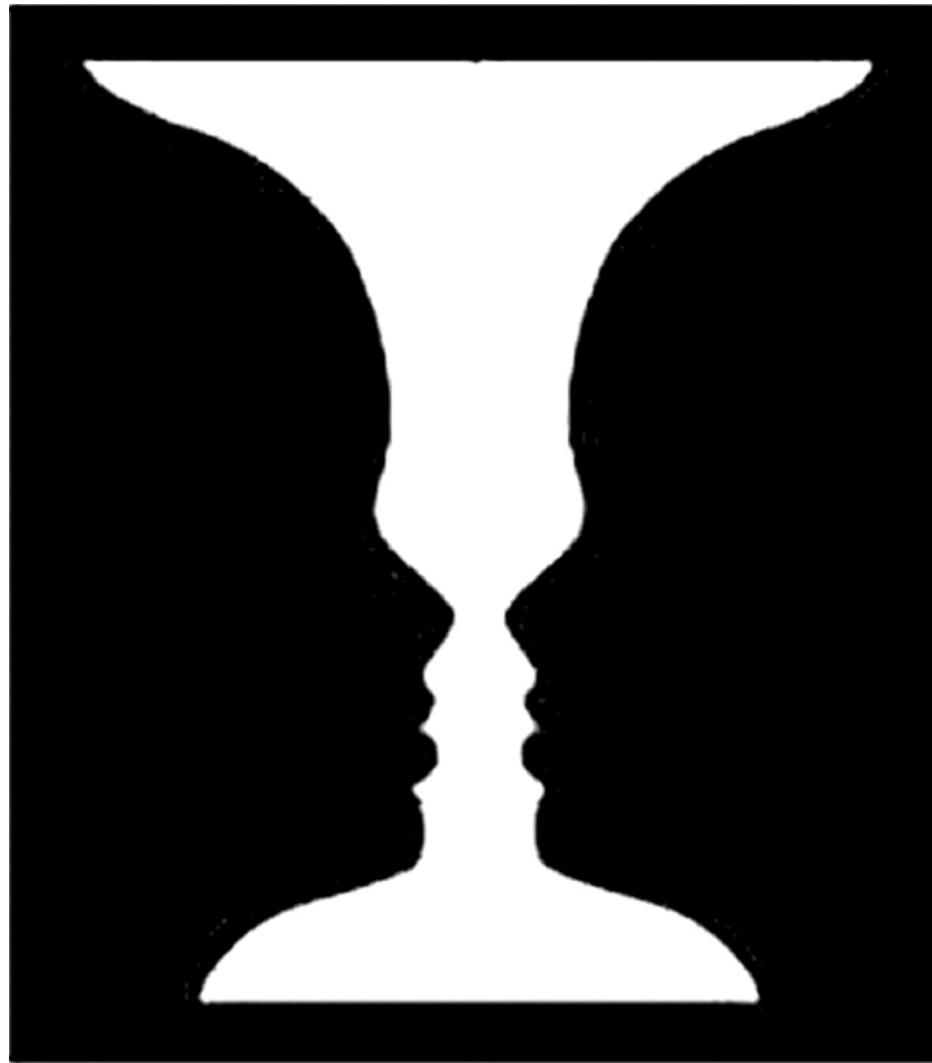


COGNITIVE SKILLS

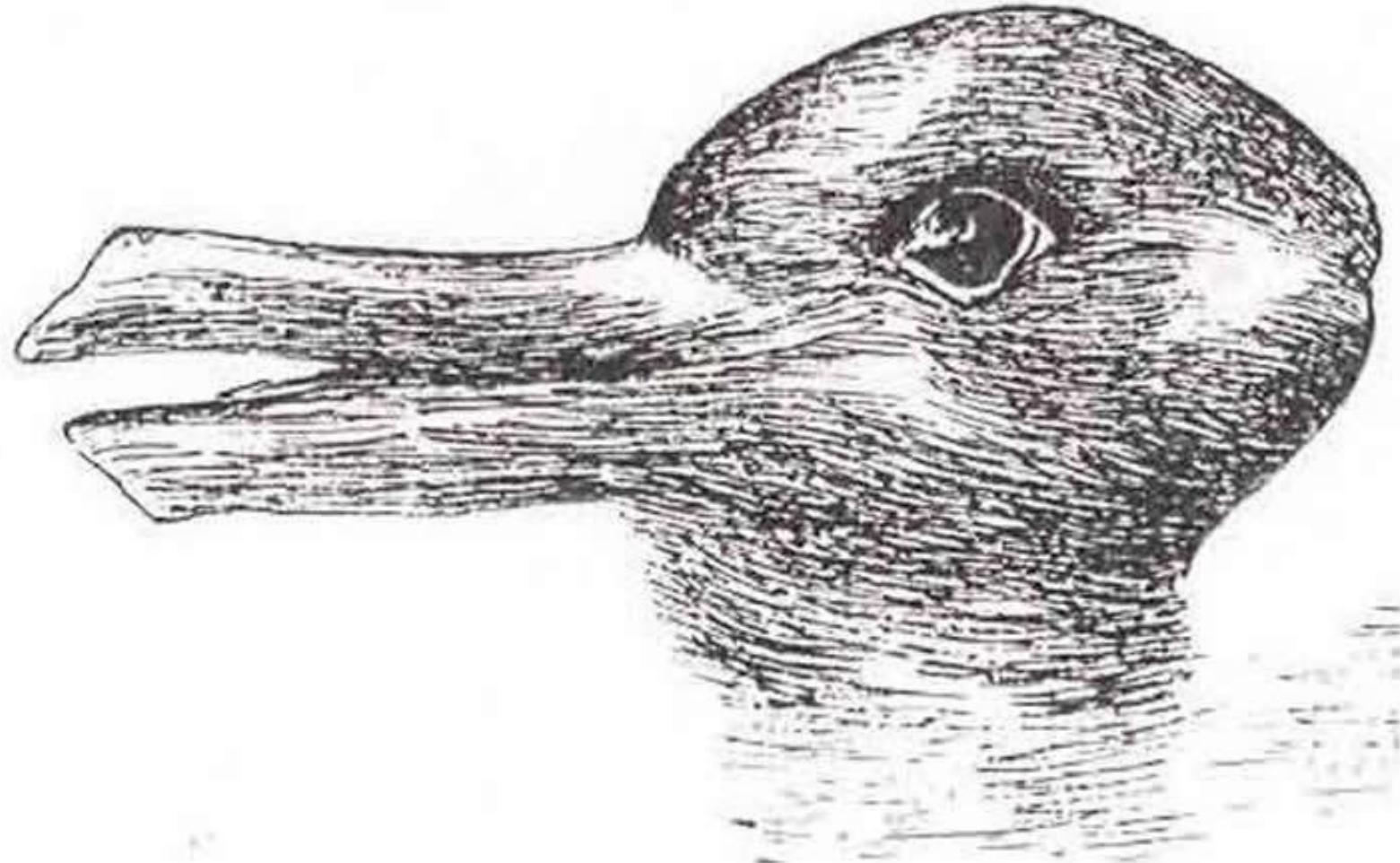
- Brothers and sisters I have none but this man's father is my father's son.
Who is the man?
- **The man is my Son**
- Who makes it, has no need of it.
Who buys it, has no use for it.
Who uses it can neither see nor feel it.
What is it?
- **A Coffin**



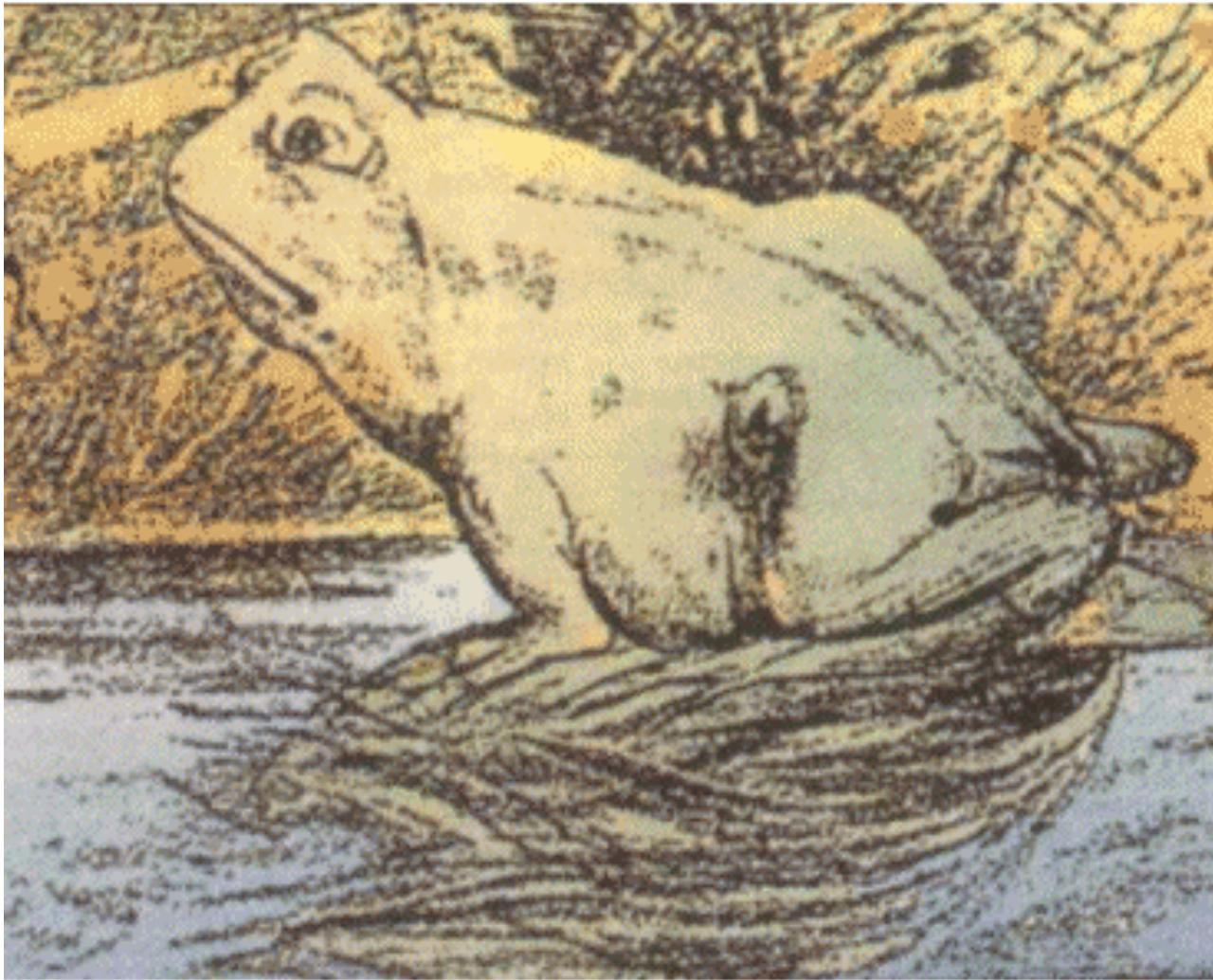
PERCEPTUAL SKILLS



PERCEPTUAL SKILLS



PERCEPTUAL SKILLS



MOTOR SKILLS

- **Characteristics of Motor Skills:**

- Have a relatively complex sequence of movements.
- They are learned and require practice to improve performance.
- They have pre – determined goals and objectives.

- **Skilled vs. Unskilled:**

- Consistency
- Accuracy
- Quicker reactions
- Make decisions faster
- Coordination
- Fluency of movement



CLASSIFICATION OF MOTOR SKILLS

- Motor Skills can be put into different continuums based on;
 - The size of the muscle groups involved
 - The impact of the environment on the skill
 - The degree of continuity of the skill
 - The difficulty / complexity of the skill



CLASSIFICATION OF MOTOR SKILLS

PRECISION OF MOVEMENT CONTINUUM

Influenced by the size of the muscle groups involved

FINE MOTOR SKILLS

- Involve smaller muscle groups
- Precise movements
- Involve hand eye coordination
- **Writing your name**
- **Typing on a keyboard**
- **Playing a guitar**

GROSS MOTOR SKILLS

- Involve larger muscle groups
- Large body part movement
- Include fundamental movements
- **Walking**
- **Running**
- **Kicking a football**



CLASSIFICATION OF MOTOR SKILLS

OPEN & CLOSED CONTINUUM

Influenced by the impact of the environment

CLOSED SKILLS

- Stable/predictable environment
- Environment has little influence
- Rehearsed movement
- Reproduce movement consistently
- **Serving in tennis**
- **Throwing a dart**
- **Driving in golf**



OPEN SKILLS

- Changing environment
- Timing determined by outside factors
- Decision making & knowledge
- Team sports – impact of other players
- **Catching a wave on a surfboard**
- **Returning a serve in tennis**
- **Saving a goal in soccer**



CLASSIFICATION OF MOTOR SKILLS

DISCRETE, SERIAL & CONTINUOUS CONTINUUM

Influenced by the definition of the beginning and end of the skill

DISCRETE SKILLS



CONTINUOUS SKILLS

Clear Beginning of End

A drive in golf

Diving off a dive board

SERIAL SKILLS

A number of discrete
skills put together
in a certain order

A gymnastics floor routine
dance routine

Don't have a defined
beginning and end

Cycling

Swimming



CLASSIFICATION OF MOTOR SKILLS

TASK COMPLEXITY CONTINUUM

Based on how difficult the skill is to perform

- The complexity of a skill is defined by:
 - The amount of information to be processed
 - The required level of movement and accuracy
 - The time available to perceptually and cognitively process information



CLASSIFICATION OF MOTOR SKILLS

TASK COMPLEXITY CONTINUUM

Based on how difficult the skill is to perform

SIMPLE SKILLS

- No time pressure
- One cue only
- No opposition players
- Speed not important
- Dart throw
- Shooting an arrow



COMPLEX SKILLS

- Time pressure
- Many cues
- Many available responses
- Speed important
- Returning a serve
- Catching a wave



CLASSIFICATION OF MOTOR SKILLS

QUESTIONS???

For each of the following skills, classify them as:

- a) Fine or Gross
- b) Closed or Open
- c) Discrete, Serial or Continuous
- d) Simple or Complex

Playing a shot in cricket

100m sprint

Chipping a golf ball

Returning a serve in badminton

Taking a penalty in soccer

Snooker shot



PHASES OF MOTOR LEARNING

- Learning is considered an improvement or change in performance associated with experience.
- Fitts and Posner, 1967, proposed that motor learning is done in 3 progressive stages:
 - Cognitive Phase
 - Associative Phase
 - Autonomous Phase



PHASES OF MOTOR LEARNING

THE COGNITIVE PHASE

- The athlete tries to understand 'what to do'
- Errors are large and frequent
- Athlete can't correct their own errors
- Coach instruction and feedback are essential
- Learner begins to develop basic motor patterns
- Instructions, explanations and feedback must be simple



PHASES OF MOTOR LEARNING

THE ASSOCIATIVE PHASE

- Characterised by large amounts of practice
- The athlete can perform the basic skill
- Athlete can better adjust to their environment
- Size and frequency of errors decrease
- External feedback still important BUT athlete is able to use internal feedback to adjust performance
- Length of time in this phase is dependent on the complexity of the task; initial level of ability; amount of practice; quality of feedback.



PHASES OF MOTOR LEARNING

THE AUTONOMOUS PHASE

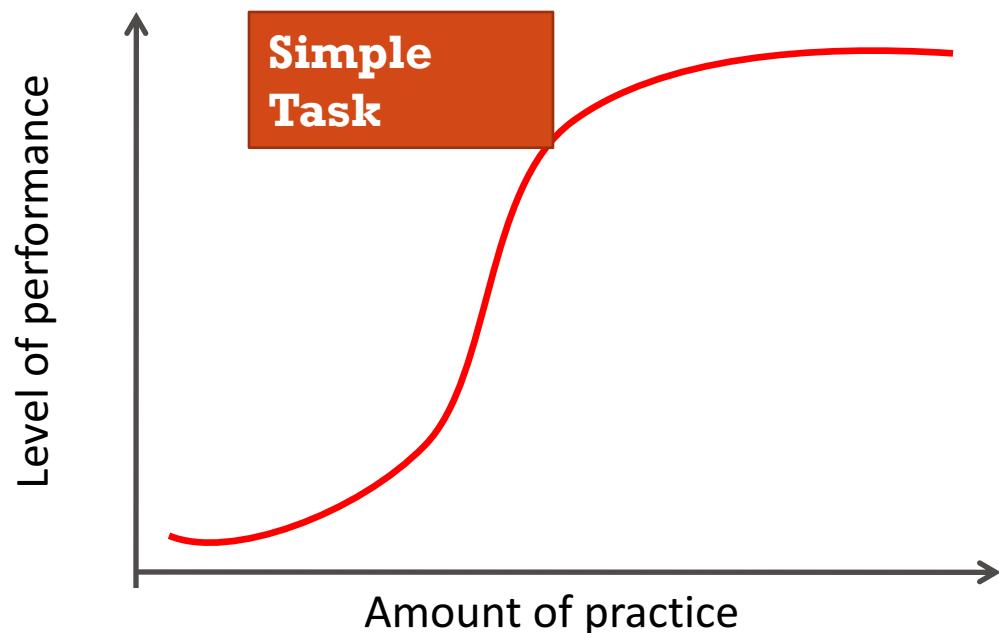
- Athletes movements are fluent and well coordinated
- Increase speed and accuracy in response to external cues
- Low performance variability
- Detect and correct their own errors
- Little attention towards technique = more attention to decision making and applying tactics & strategies



LEARNING CURVES

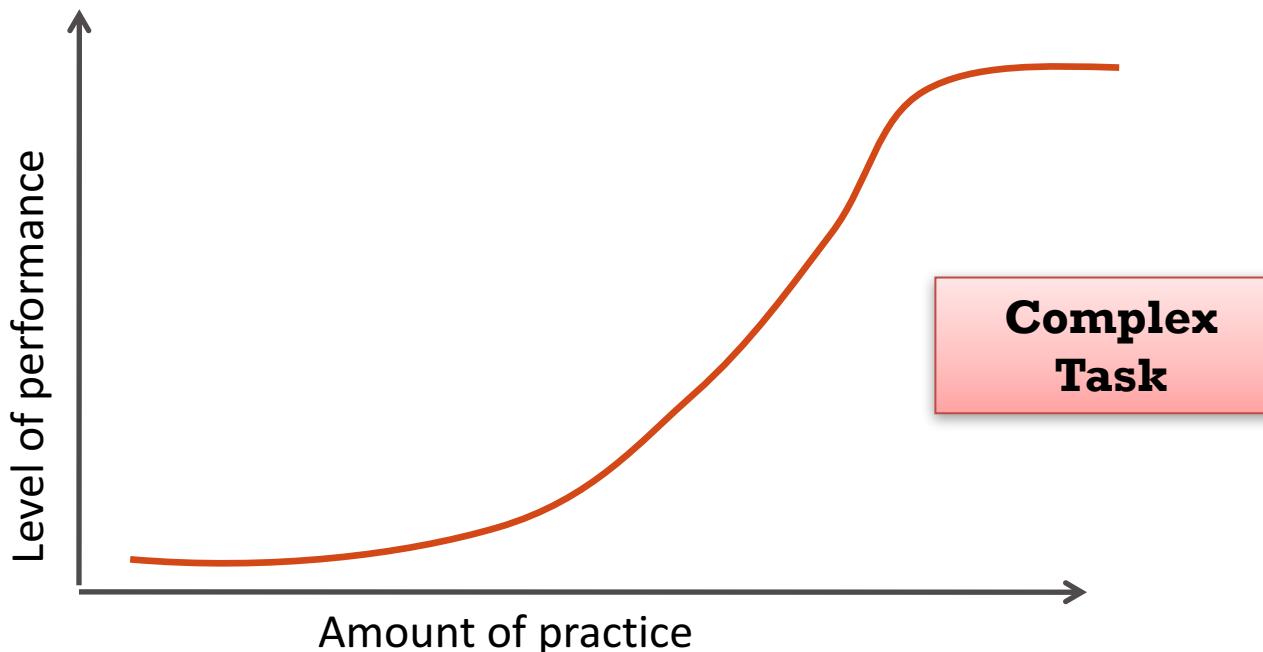
The degree of **LEARNING** that has taken place can be measured by analysing **PERFORMANCE**. The greater the amount of learning that has occurred, the better the performance.

The amount of learning you achieve during PE Studies will be measured by how well you perform in your tests, essays and exams. Better learning results in better performance.



- A learning curve showing the improvement in performance with increasing amounts of practice.
- Learner grasps concept quickly, improvement is rapid and levels off when the skill is acquired.

LEARNING CURVES



A learning curve depicting change in performance for a complex task.

- Performer takes a longer time to grasp the basic concepts and little improvement occurs in the early stages of practice.
- Improvement is slower compared to simple tasks

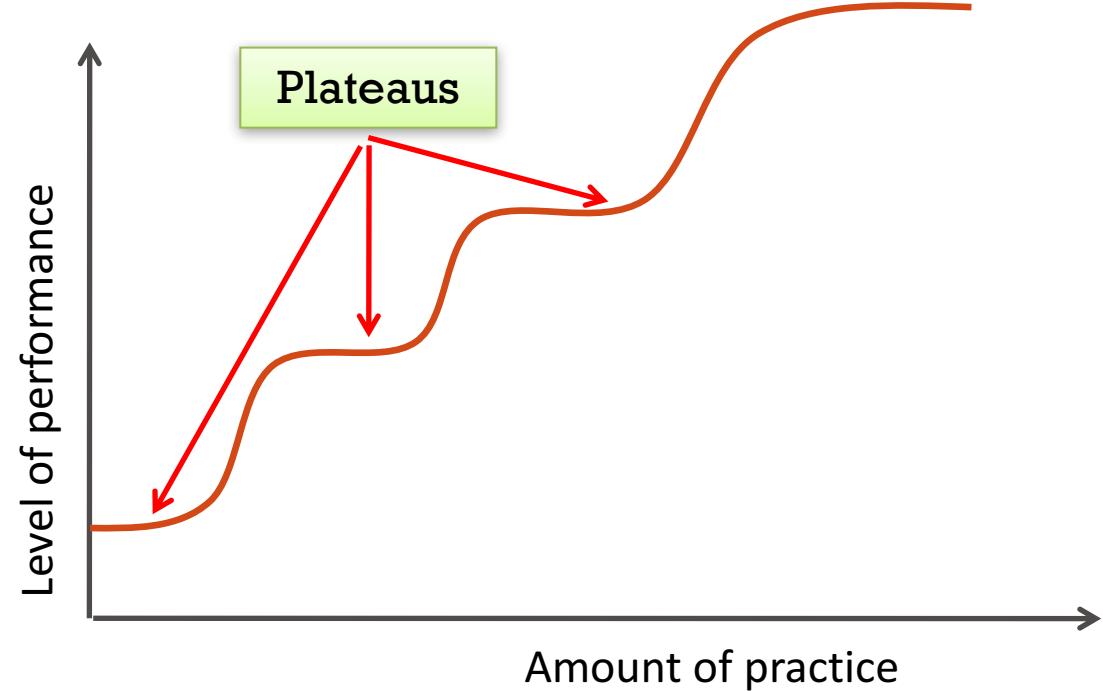


LEARNING CURVES

A plateau occurs when there is no improvement in performance despite practice still occurring. This can be a very demoralising period for the performer when practice does not improve performance.

A plateau can represent a period of consolidation of a newly acquired skill.

With ongoing training, performers will continue to improve as long as the plateau has not occurred as a result of the performer having reached the limit of their ability eg the athlete cannot run any faster and has reached the physical limit of their performance



TYPES OF CUES TO IMPROVE PERFORMANCE

- To maximise performance, a performer needs to be able to interpret and understand internal and external cues
- Cues begin to improve performance during the cognitive phase of learning and continue throughout the associative and autonomous phases
- Three main types of cues are used to improve performance:
 - Visual
 - Verbal
 - Proprioceptive



TYPES OF CUES TO IMPROVE PERFORMANCE

VISUAL CUES

- Visual cues occur externally and allow the learner to SEE what the movement requires
- Take on 3 main forms:
 - **Demonstration** – critical when introducing skills; highly important in cognitive phase
 - Learners are shown how to perform the skill with a 3 or 4 key points verbalised
 - **Visual Aids** – pictures; diagrams; videos
 - **Enhancing the visual environment** – targets; positional markers
- *Give an example of each type of visual cue, that could be used for a novice and experienced athlete in a sport of your choice*



TYPES OF CUES TO IMPROVE PERFORMANCE

VERBAL CUES

- Instruction and feedback provide information to the performer about what is being done correctly and incorrectly. Can also be used to motivate performers.
- Verbal cues can increase in complexity and specificity as the performer becomes more experienced
- Coaches and players can use verbal cues:
 - Prior to performance (front-loading)
 - During performance (concurrent)
 - After performance (terminal)
- *Explain why learners in the cognitive phase would benefit more from front-loading and terminal feedback?*



TYPES OF CUES TO IMPROVE PERFORMANCE

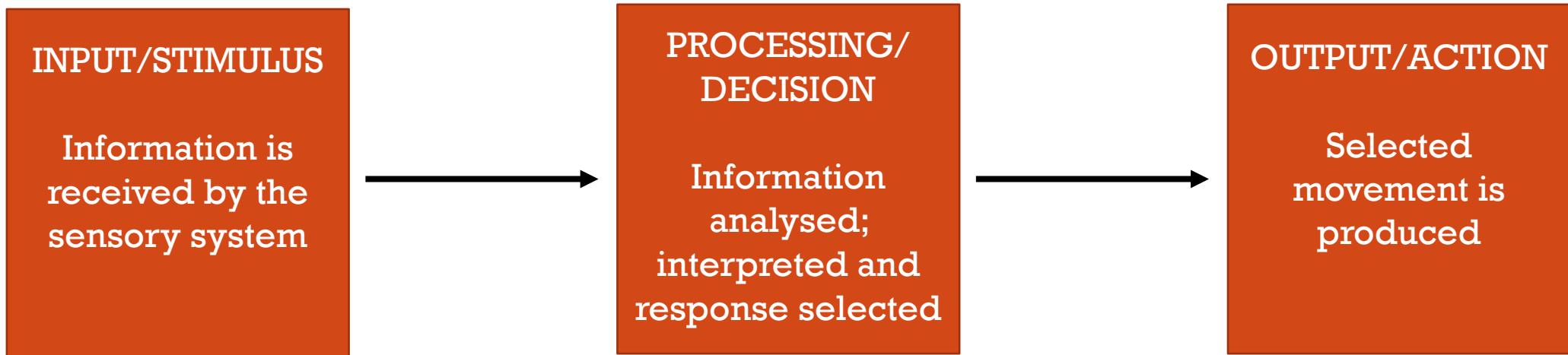
PROPRIOCEPTIVE CUES

- Internal feedback which comes from sensory receptors – called “proprioceptors” - found in joints, tendons and muscles
- Proprioceptors send information to the central nervous system detailing position, posture, equilibrium, and internal conditions of the body
- **Kinaesthetic information** is information from within the body about how the movement felt and can be used by performers to adjust performance
- Kinaesthetic awareness develops with practice and increasing experience. It increases the ability of the performer to self – detect errors about how the movement felt and make corrections to improve subsequent performances
- *What phase of learner would a performer be in to use proprioceptive cues?*
- *From a sport of your choice, give an example of a type of kinaesthetic information a performer could use to improve performance.*



PHASES OF INFORMATION PROCESSING

- When a person wishes to perform a motor skill, their body must go through 3 distinct phases of processing information.
- Information processing describes how performers;
 - Take in large amounts of information from the environment
 - Analyse and interpret the relevant information
 - Make decisions about what response to make



PHASES OF INFORMATION PROCESSING

PHASE 1: INPUT/STIMULUS

- Stimulus can be both Internal & External
 - Information is received via;
 - Sight
 - Sound
 - Touch
 - Proprioception
 - Equilibrium
 - Irrelevant information is discarded / Relevant information sent to the brain for processing
-
- *What is the stimulus in a 100m sprint?*
 - *What are the stimuli in catching a cricket ball in the outfield?*



PHASES OF INFORMATION PROCESSING

PHASE 2: PROCESSING/DECISION

- This phase begins once the performer has sufficient information from Phase 1
- Involves 3 steps:
 - **Perception** = interpret the data received from the senses
 - **Decision** = what response should be made?
 - **Effector** = the way to respond is retrieved from long term memory / message sent to muscles to respond
- *What are the potential decisions when a batter hits the ball high in a cricket game?*
- *What would you expect the difference between a performer in the cognitive vs. autonomous phase?*



PHASES OF INFORMATION PROCESSING

PHASE 3: OUTPUT/ACTION

- This phase begins once the performer has decided what to do in Phase 2
- This phase involves the movement of the muscles to execute the response
- The time the response takes is dependent on **Reaction Time + Movement Time**
- This phase is always followed by FEEDBACK to improve subsequent performances

