

Human Motor Skill Development

Notes

Introduction: Motor Control, Learning and Development?

- *Motor Control*

The understanding of how the nervous system controls muscle to the permit skilled and coordinated movements

Bernstein's Degree of Freedom Problem

- *Coordination*

Involves bringing body parts into a functional relationship in order to achieve a task goal

- The problem of understanding coordination is that redundant biomechanical **degree of freedom** create an infinite number of possible movements

Motor Control, Learning and Development

- *Motor Control*

The understanding of how the nervous system controls muscle to the permit skilled and coordinated movements

- *Motor Learning*

Changes in skilled and coordinated movements that are related to experience and practice

Motor Development

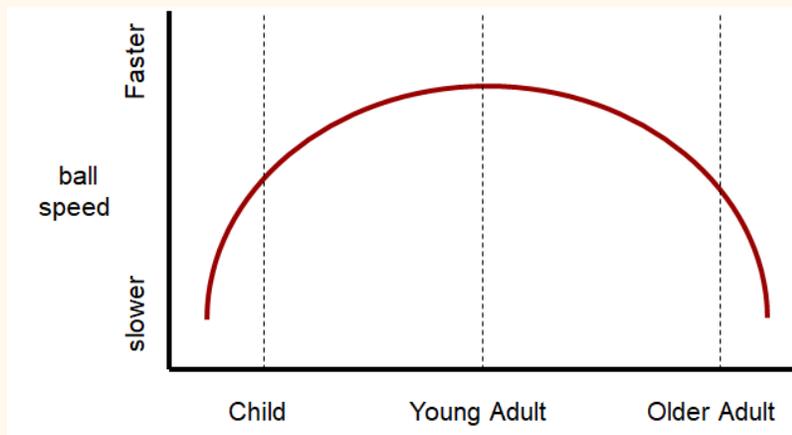
- Development is a **continuous** process of change in functional capacity
 - Functional capacity is the ability to **successfully interact with the world**
 - Represents a cumulative process-development is always occurring, but the amount of change may be more or less noticeable at various points in the life span

- Motor Development affects motor learning
- Development is related to, **but not dependant on age**
- Development involves **sequential** change
- Development occurs through maturation and growth of all body systems **AND its interactions with environment and task**

Growth, Maturation and Aging

- Physical growth: quantitative **increase in size or body mass**
- Physical maturation: qualitative advance in **biological makeup**
- Aging: process occurring with passage of time, leading to **loss of adaptability or full function** and eventually to death

Changes In Motor Performance



Common Themes In Course

- *Universality vs Variability*
 - Individuals show a great deal of similarity in the course of development
 - Common development stages based on shared characteristics
 - Typical or average behaviours can be useful for tracking development change

- BUT, **any individual is more likely to be below or above the average**
- Individuals can also **skip”milestones”(follow different pathways in development).**

- **Nature vs Nurture**

- Contribution of genetic and environmental factors
 - Nature= genetics
 - Nurture= environment

What about movement/sport?

- *Ericsson*
 - 10,000 hours of deliberate practice, lead to success no matter the skill
 - Don't require talent and opportunity, genes not important overtime we build up skill, through new neural pathways
 - Champions aren't born they're made

- *Naturist*
 - Prodigy of composition, such as Mozart
 - Music comes to him in his head, his unconscious mind gives orders/ideas at the speed of light, it's involuntary he doesn't think about it.

- Talent Identification
 - Training does explain a lot of the variance....BUT not only about training genetic-environment interactions.

Asynchronous Session 1

- *Normative Descriptive Period*

Although motor developmentalists were influenced by the maturational perspective, they focused on the products(scores,outcomes) of development rather than on the developmental process that led to these quantitative scores.

They were less focused on the process, and more on the results

- *Biomechanical Descriptive Period*

Biomechanical descriptions of movement patterns, used in performing fundamental skills such as jumping, children obtained efficient movement patterns, both were important to aid educators with information on age-related changes in motor development

Longitudinal Design, was used to identify improvements in children

- *Information Processing Perspective*

The brain acts like a computer, taking in information , processing it, and outputting movements. Motor learning and development is described as a sort of computer like operations, as a result of external environmental inputs

- Concepts: stimulus-response bonds, feedback, and knowledge of results
- Studies: Attention, memory, and effect of feedback, across age levels.
- Still used today to study motor development
- Lead to perceptual-motor development

Research Development Change

- *Longitudinal Research*
 - **Same individuals** are observed over a **long period of time** (ex: 5, 10, 15 and 20 years old)
 - Gold Standard
- *Cross-sectional Research*

- **Different individuals** of **various ages** are observed at the **same point in time** (ex: in 2010 groups of children born in 1990, 1995, 2000, 2005 are observed)

- *Advantages and Disadvantages*

	Advantage	Disadvantage
Longitudinal	<ul style="list-style-type: none"> ● Direct observation of change ● Can see variation in patterns ● More powerful design 	<ul style="list-style-type: none"> ● Takes a long time ● More costly ● Attrition ● Learns tests used
Cross-Sectional	<ul style="list-style-type: none"> ● Faster timeline ● Less costly ● No learning of test 	<ul style="list-style-type: none"> ● Inference is made bc cannot directly observe change ● Less powerful design ● Risk of cohort effect

- *Cohort Study*

A group whose members share a common characteristic, such as age or experience

- *Cohort Effect*

Motor difference that can be explained by **a common characteristic other than developmental change**

- **Sequential Research Design**

A cross-sequential design is a research method that combines both a longitudinal design and a cross-sectional design. It aims to correct for some of the problems inherent in the cross-sectional and longitudinal designs

- Design can help to detect whether a cohort effect is influencing the results