

Chapter 11 Cognitive Development

Historic Attitudes to Development



Victor
Wild boy of Aveyron
Itard
5yrs of training

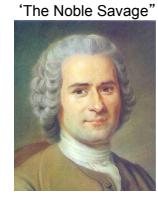
Early example of Scientific Approach



John Locke (1632-1704)

'The Blank Slate'
"a disgusting, slovenly boy, affected with spasmodic, and frequently with convulsive motions, continually balancing himself like some of the animals in the menagerie, biting and scratching those who contradicted him, expressing no kind of affection for those who attended upon him; and, in short, indifferent to every body, and paying no regard to any thing."

Itard 1802



Rousseau (1712-1778)

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Psychology's Ancestors



Plato -
Nativism
Innate

- Aristotle
Empiricism
Environment

Two Main Objectives in Modern Developmental Psychology



Describe

Explain

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Some Problems

- what do you describe?
systems
- sensory
 perceptual
 conceptual
 social
- over what period?
time scale
- weeks
 months
 years
- how do you explain?
theoretical approach
- behavioural
 cognitive
 neuroscience

How To Study Young Children

- Visual preference paradigm
based on where babies look
- Habituation
decline of interest & preference for novelty
- Violation of Expectancy
watching children get surprised
- Clinical Method
observe & intervene (after Piaget)

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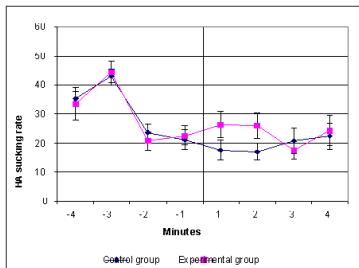
Preferences

Early research simply measured how long infants would look at visual stimuli.

Using this simple technique, Fantz in the 1950s demonstrated that infants had visual preferences



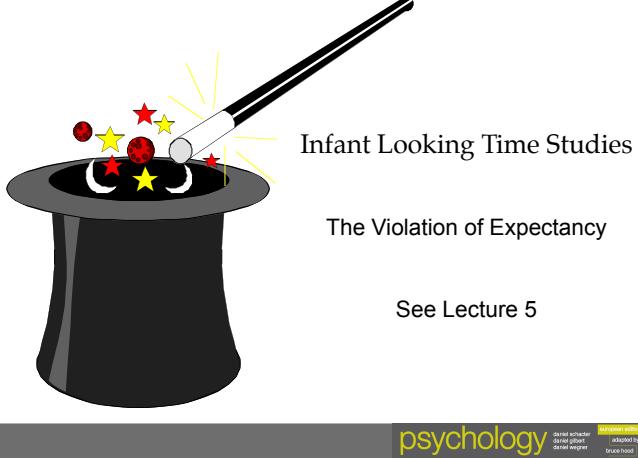
Habituation



Data from 20 newborns discriminating Dutch from Japanese sentences

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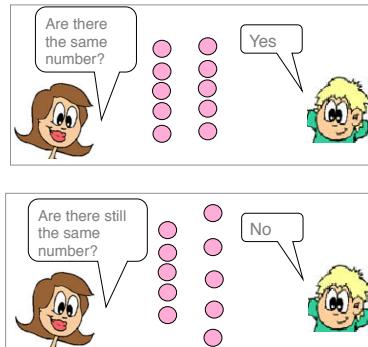
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Piaget's Clinical Method

Observed & interviewed young children often manipulating situation
(See Lecture 4)



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Non-Invasive Neuroscience Techniques



Infant Electroencephalography (EEG)

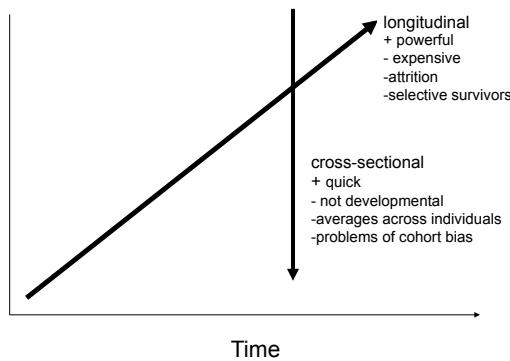
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Developmental Designs

- Longitudinal research
 - Based on sample of children studied over time
- Cross-sectional research
 - Based on groups of children from different ages

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Developmental Designs



When Longitudinal & Cross-Sectional Tell Different Stories

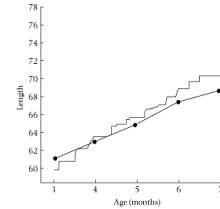


Figure 1.1 A comparison of the continuous-growth function for length/height derived from averaged data from cross-sectional studies (the solid line connected by the filled circles) with the step-like function (sudden increases in length followed by periods of no growth) derived from daily measures on an individual infant.

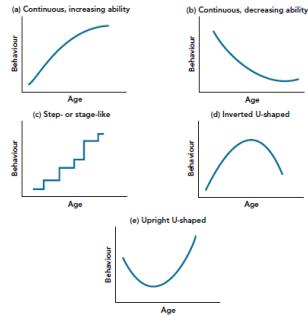
Babson & Brenda (1976) reported a continuous function measured monthly whereas Lampli et al. (1992) found a step function in a smaller group measured daily and weekly.

Sampling Effects

Changing Patterns

Different attributes & behaviours can follow different developmental trajectories.

The non-continuous functions are some of the most interesting as they indicate qualitative change and different mechanisms.



Example of 'U' Shaped Function

Stepping Reflex: present in newborns but drops out. Why?

Reflexes do not necessarily disappear.

'U' shaped functions may signal significant transitions in underlying mechanisms.



Correlational Studies

Correlations reflect the degree of relationship between two measures on a range from -1.0 (perfect negative) to 1.0 (perfect positive)

Two types:
Concurrent/Predictive

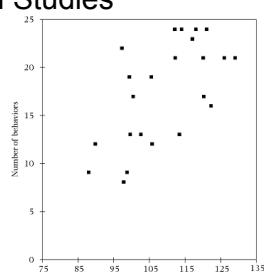


Figure 1.5 Scattergram to show the relationship between the number of successful reaching behaviors at 9 months (vertical axis) and 3-year IQ (horizontal axis). The most successful infants turned out to be those with the higher IQs. Reprinted with permission from Peter Wissa.

Interpreting correlations are problematic e.g. reading skill, hrs spent reading and SES of the household – (3rd variable problem)

Example of Experimental Approach

Judy DeLoache noted that infants often treated pictures as real objects. (observation)

This finding was related to the theoretical position of Michotte that pictures are representations of objects. (theory)



2 A 9-month-old infant as he grasps and mouths a photograph of a baby bottle – the picture is just too enticing. Photographs by Sophia Pierroultakos, reprinted with permission.

Maybe babies do not distinguish easily between representations and real objects. (hypothesis)

Experimental Study on Representation

DeLoache created different versions of a representation (independent variable)



An example of a photograph and a line drawing of the same object, to explore children's grasping and reaching behaviors.

Measured the amount of reaching and grasping (dependent variable)

Also studied infants in US & Africa, across 3 different ages (cross-cultural & cross-sectional).

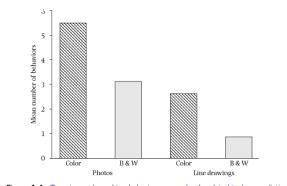


Figure 1.4 Grasping and reaching behaviors were clearly related to how realistic the pictures were; the more the pictures looked like a real object, the more reaches they evoked.

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Example of Newborn Experiment



Plate 1.1 Which one is mother? A few hours after birth newborn infants prefer to look at their mother's face. Photograph by Ian Bushnell.

Even newborns can be tested given the appropriate technique!

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What is the Origin of Change?

a) Organismic World View

Emphasis on organic change driven by endogenous, internal mechanisms that drive the developmental process. Most closely linked to Nativism

b) Mechanistic World View

Inherently passive recipient of input from the environment leading to change by exogenous, external influences. Most closely linked to Behaviourism

What is the Nature of Change?

Continuous (Core Theory)

No essential changes in the underlying structures - Only elaboration
= quantitative change

Discontinuous (Stage Theory)

Development undergoes restructuring
Each stage is significantly different from another
= qualitative change

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Continuous (Core Theory)



e.g. Spelke

- Sensory Systems
- Perceptual Systems
- Cognitive Systems
- Social Systems



e.g. Piaget

Stage Theories

Fundamental Re-Organization

Invariant Sequences

Universal

Maturation

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Nature vs Nurture

- Tabloid mentality: must be one or the other
 - Genes for
 - homosexuality
 - humour
 - religiosity
- Reality is that genes influence development in relation to the environment

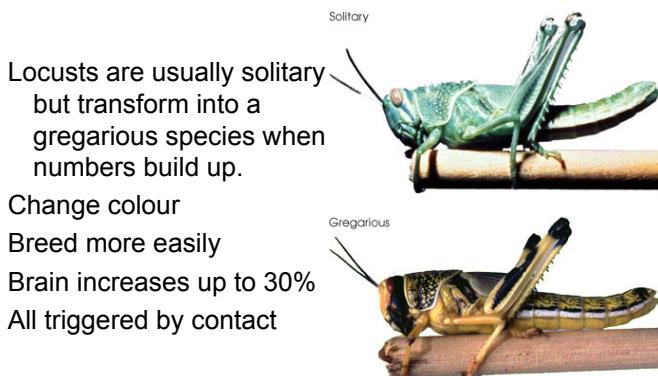
Nature vs Nurture

Clownfish can change sex

- When dominant female in a school dies, the dominant male changes sex



Nature vs Nurture



Locusts are usually solitary but transform into a gregarious species when numbers build up.

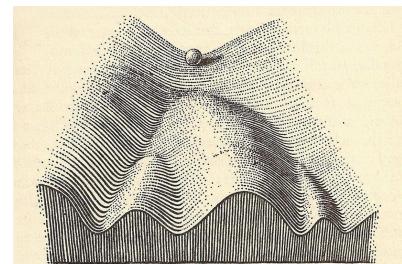
Change colour

Breed more easily

Brain increases up to 30%

All triggered by contact

Waddington's Epigenetic Landscape



Epigenesis: the interaction between genes & environment

Canalization: extent to which development is constrained by epigenesis

Learning Points

- Different types of developmental research design, techniques and measurements
- Difference between continuous and discontinuous change
- Role of intrinsic and extrinsic influences on development