Lecture 2

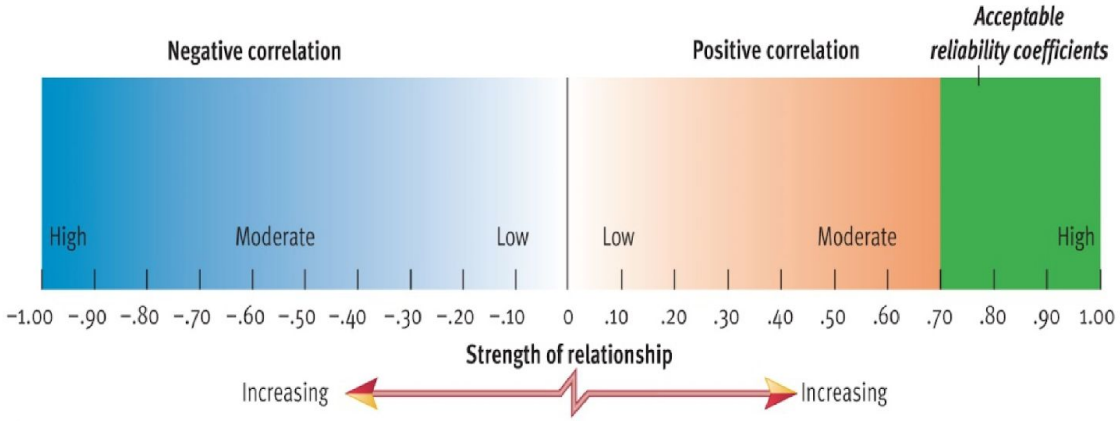
Intro to Psychological Testing and Intelligence Testing

Principles Types of Psychological Tests

- Mental Ability Tests
  - Intelligence- general
  - Aptitude- specific
  - Achievement tests
- Personality Scales
  - Measures motives, interests, values, and attitudes

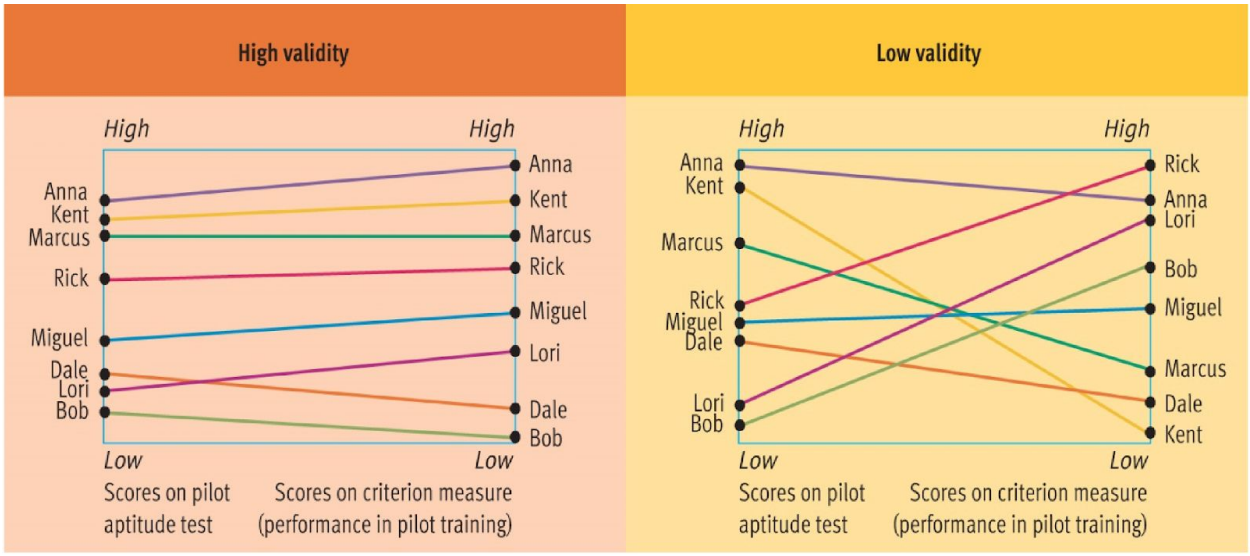
Key Concepts in Psychological Testing

- Standardization
  - Test Norms
  - Standardization Group
- Reliability
  - Correlation coefficient



A positive correlation means that two variables co-vary in the same direction; a negative correlation means that two variables co-vary in opposite directions. The closer the correlation coefficient gets to either –1.00 or +1.00, the stronger the relationship. At a minimum, reliability estimates for psychological tests must be moderately high positive correlations.
Most reliability coefficients fall between 0.70 and 0.95.

- Validity
    - Content Validity: The test needs to be relevant to what it is testing content-wise
    - Criterion-related Validity



To evaluate the criterion-related validity of a pilot aptitude test, a psychologist would correlate subjects' test scores with a criterion measure of their aptitude, such as ratings of their performance in a pilot training program. The validity of the test is supported if the people who score high on the test also score high on the criterion measure (as shown in the left panel), yielding a substantial correlation between the two measures. If little or no relationship exists between the two sets of scores (as shown in the right panel), the data do not provide support for the validity of the test.

    - Construct Validity: You are assessing the construct and relating it to other similar constructs. And it allows the conclusion to be drawn up that either there is no relationship or there is a reasonable comparison.
        - E.g- If you are an extravert and you score high on the extraversion test, I would expect if I gave you an introversion test you would score low on that test and vice versa.

<u>Reliability and Validity of IQ Tests</u>

- Exceptionally reliable- correlation into the .90s
- Qualified validity – valid indicators of academic/ verbal intelligence, not intelligence in a truly general sense
    - Correlations:
        - .40s–.50s with school success
        - .60s–.80s with number of years in school
- Predictive of occupational attainment, debate about predictiveness of performance

- IQ tests in other cultures

To say cultures that have low IQ scores are less intelligent than ones with high is very narrow-minded because of the different aspects of life that are important to other cultures which results in cultural bias in IQ Tests.

Extreme of Intelligence

TABLE 9.2 Categories of Intellectual Disability

Category of Intellectual Disability	IQ Range	Education Possible	Life Adaptation Possible
Mild	55–70	Typically, Grade 6 by late teens; special education helpful; some graduate high school	Can be self-supporting in nearly normal fashion if environment is stable and supportive; may need help with stress
Moderate	40–55	Grade 2-4 by late teens; special education necessary	Can be semi-independent in sheltered environment; needs help with even mild stress
Severe	25–40	Limited speech, toilet habits, and so forth with systematic training	Can help contribute to self-support under total supervision
Profound	Below 25	Little or no speech; not toilet-trained; relatively unresponsive to training	Requires total care

Intellectual Disability or Mental Retardation

- Diagnosis based on IQ and adaptive testing
    - IQ 2 or more SD below mean
    - Adaptive skill deficits
    - Origination before age 18
- 4 levels: mild, moderate, severe, profound
    - Mild most common by far
- Causes:
    - Environmental Vs Biological

Extremes of Intelligence: Giftedness

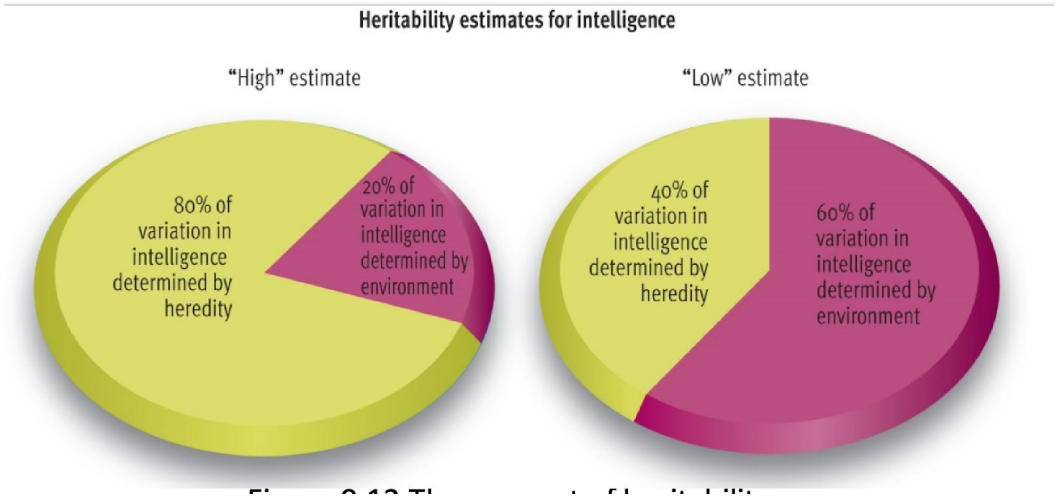
- Identification issues – ideals vs. practice
    - IQ 2 SD above mean standard
    - Creativity, leadership, special talent?
- Stereotypes – weak, socially inept, emotionally troubled
    - Lewis Terman (1925) – largely contradicted stereotypes
    - Ellen Winner (1997) – moderately vs. profoundly gifted
- Giftedness and high achieving – beyond IQ
    - Renzulli (2002) – the intersection of three factors

- Simonton (2001) – drudge theory and inborn talent
- "Hidden gifted"

Heredity and Environment as Determinants of Intelligence

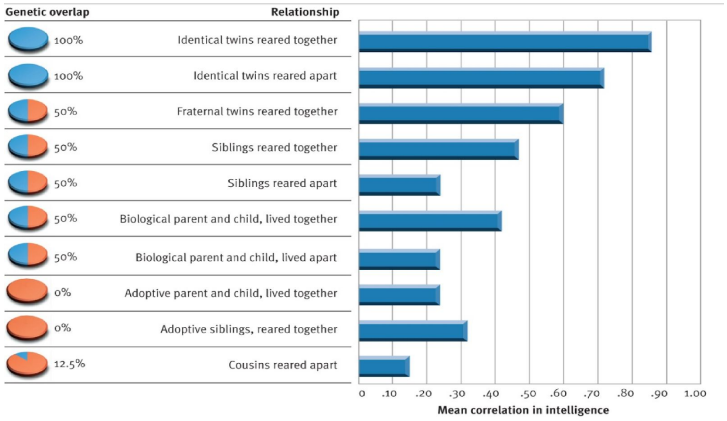
- Heredity
  - Family and twin studies
  - Heritability estimates
  - The Concept of Heritability

Is associated with greater IQ similarity, suggesting that intelligence is partly governed by the environment (compare, for example, the scores of siblings reared together and reared apart).



A heritability ratio is an estimate of the portion of the variation in a trait determined by heredity—with the remainder presumably determined by environment—as these pie charts illustrate. Typical heritability estimates for intelligence range between a high of 80 percent and a low of 40 percent, although some estimates have fallen outside this range. Bear in mind that heritability ratios are estimates and have certain limitations that are discussed in the text.

- Environment

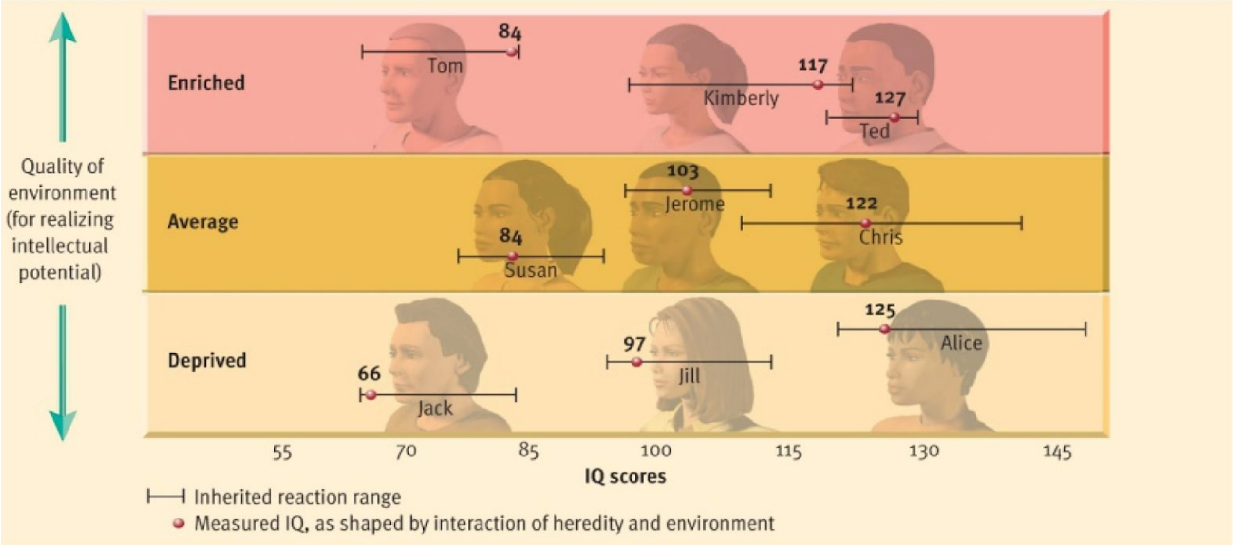


- Adoption Studies

- Cumulative deprivation hypothesis: if you don't have an enriched environment in early development you will not develop well
- The Flynn Effect: That there is a generational increase in IQ scores due to technology

- Interaction
  - The concept of the reaction range

and have certain limitations that are discussed in the text.



The concept of reaction range posits that heredity sets limits on one's intellectual potential (represented by the horizontal bars), while the quality of one's environment influences was one score within this range (represented by the dots on the bars). People raised in enriched environments should score near the top of their reaction range, whereas people raised in poor-quality environments should score near the bottom of their range. Genetic limits on IQ can be inferred only indirectly, so theorists aren't sure whether reaction ranges are narrow (like Ted's) or wide (like Chris's). The concept of reaction range can explain how two people with similar genetic potential can be quite different in intelligence (compare Tom and Jack) and how two people reared in environments of similar quality can score quite differently (compare Alice and Jack).

<u>Cultural Differences in IQ</u>

Heritability as an explanation

- Arthur Jensen (1969)
- Herrnstein and Murray (1994) – The Bell Curve
- Rushton Race, Evolution, and Behavior

Environment as an explanation

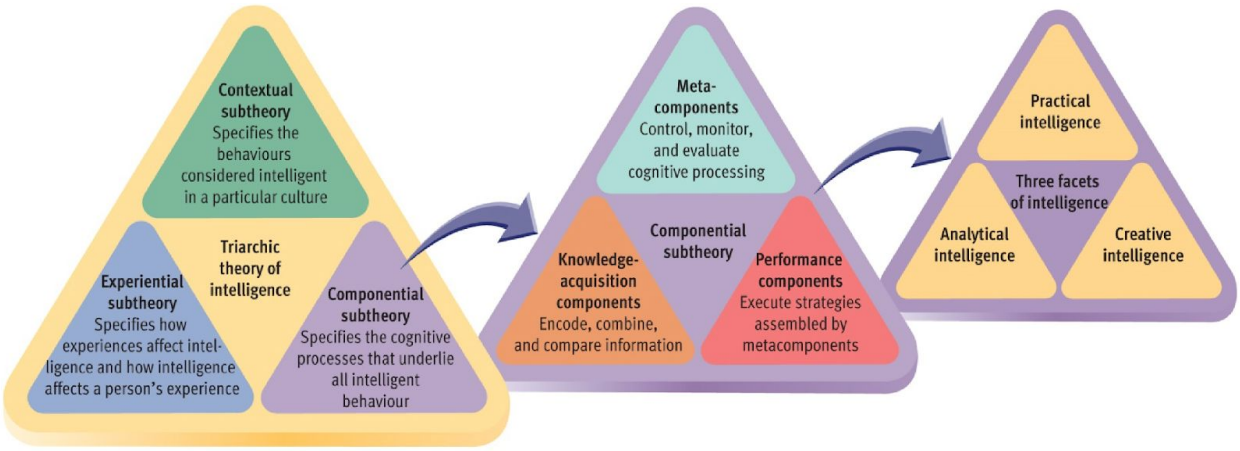
- Kamin's cornfield analogy – socioeconomic disadvantage
- Steele (1997) – stereotype vulnerability

Resulting in cultural bias on IQ tests

Leon Kamin's analogy (see text) shows how between-group differences on a trait (the average height of corn plants) could be due to the environment, even if the trait is largely inherited. The same reasoning presumably applies to ethnic-group differences in average intelligence.

<u>New Directions in the Assessment and Study of Intelligence</u>

- Cognitive conceptualizations of intelligence
    - Sternberg's triarchic theory and successful intelligence



Sternberg's model of intelligence consists of three parts: the contextual sub-theory, the experiential sub-theory, and the componential sub-theory. Much of Sternberg's research has been devoted to the componential sub-theory, as he has attempted to identify the cognitive processes that contribute to intelligence. He believes that these processes fall into three groups: metacomponents, performance components, and knowledge-acquisition components. All three component processes contribute to each of three aspects or types of intelligence: analytical intelligence, practical intelligence, and creative intelligence.

- Expanding the concept of intelligence
    - Gardner's multiple intelligences

Intelligence	End-States	Core Components
Logical–mathematical	Scientist Mathematician	Sensitivity to, and capacity to discern, logical or numerical patterns; ability to handle long chains of reasoning
Linguistic	Poet Journalist	Sensitivity to sounds, rhythms, and meanings of words; sensitivity to the different functions of language
Musical	Composer Violinist	Abilities to produce and appreciate rhythm, pitch, and timbre; appreciation of the forms of musical expressiveness
Spatial	Navigator Sculptor	Capacities to perceive the visual–spatial world accurately and to perform transformations on one's initial perceptions
Bodily–kinesthetic	Dancer Athlete	Abilities to control one's body movements and to handle objects skillfully
Interpersonal	Therapist Salesperson	Capacities to discern and respond appropriately to the moods, temperaments, motivations, and desires of other people
Intrapersonal	Person with detailed, accurate self-knowledge	Access to one's own feelings and the ability to discriminate among them and draw upon them to guide behaviour; knowledge of one's own strengths, weaknesses, desires, and intelligences
Naturalist	Biologist Naturalist	Abilities to recognize and categorize objects and processes in nature

    - Goleman's emotional intelligence

History of Intelligence Tests

Sir Francis Galton

- He found that success appeared consistently in well-bred, upper-class families (like his)
- Discounting obvious advantages like better schools and social connections
- He wanted to believe it was because of hereditary success that is why they were more intelligent.
- He proposed that the term "survival of the fittest" could be applied to intelligence and if it can be quantified, then it could be used to breed superior people.
- While the less endowed will be discouraged or prevented from reproducing
- He founded the eugenics movement
- In an attempt to measure intelligence he assumed our minds were composed of sensory abilities. So the test just measured the simple sensory processes
- Note: Galton's text predated Wundt's laboratory
- He tested over 10,000 people and they paid for it but it did not work
- Even with that, he left a lasting effect by coining the term nature vs nurture and invented scoring.

Binet

- He was commissioned by the French government to develop a test to identify children with specific academic needs without the input of teachers.
- In 1905 Binet and Simon published the first useful test of mental ability which focused on abstract reasoning.
- It was a success because it was easy to administer, objective, inexpensive, and had a good criterion-related validity.
- The test assumed all children follow the same course of mental development but may differ in speed of development. He wanted to believe it was caused by environmental factors.
- Scores were expressed in terms of "mental age"
- Mental abilities are comparable of a child with that chronological age
- Proposed that "dull" children were simply "retarded (from French: en retard) in their development while "bright" children were "advanced"
- Revised twice by Binet, then carried on by other psychologists
- Binet only viewed test in terms of its practical purpose (identify at-risk kids)
- Others saw it as a measure of intelligence

Terman

- Terman (at Stanford) found that the French age norms did not work with California children, so revised the test (Stanford--Binet).
    - Altered content
    - Established new age norms
    - Extended range of use from teenagers to adults
    - Incorporated new scoring ('Intelligence Quotient')
- IQ (according to Stanford--Binet): Child's mental age divide by chronological age and multiplied by 100
- IQ made it possible to compare children of different ages by placing them all on the same scale.
- IQ works well for children, not for adults
- What is the age norm of a 40-year-old vs a 25-year old?
- Became the standard for all intelligence tests that followed

Measure	Child 1	Child 2	Child 3
Mental Age (MA)	6	9	12
Chronological Age (CA)	6	12	9
IQ = MA/CA *100	(6/6)*100 = 100	(9/12)*100 = 75	(12/9)*100 = 133

- Complained about the perceived "dullness" and "prolific breeding" of certain ethnic groups
- Wanted IQ test to lead to policies that would curtail reproduction of feeble--mindedness
- Helped US gov't develop tests to evaluate immigrants
- Led to ~80% of Jewish, Hungarian, Italian and Russian immigrants being deemed "feeble--minded
- Contributed to 1924 immigration law which placed quotas on the number of southern and eastern (non--Anglo Saxon) European immigrants
- Stanford--Binet was used in Canada (Alberta and B.C.) as the basis for the Sexual Sterilization Act

Wechsler

- Assessed general intelligence based on vocabulary
- Artificially lowered scores of most who don't have English as a first language
- This resulted in many bright people being labeled in the low range of intelligence

- David Wechsler-- immigrated to the US from Romania as a child in the early 1900s
    - One of the "feeble--minded" identified by Terman's tests
- As a psychologist (both at Bellevue and in US Army), found S--B to be unsatisfactory
    - Questioned its validity
- Developed the Wechsler Adult Intelligence Scale (WAIS)
- Also: WISC and WPPSI
- Introduced non--verbal reasoning items
    - Separate scores for verbal IQ, performance (non--verbal) IQ, and full--scale (total) IQ
    - Has since been updated to include multiple scales
- Introduced scoring scheme based on the normal distribution
    - Abandoned the 'quotient' in IQ

Current Intelligence Testing

- Most IQ tests (including revised SB) use the normal distribution
- Divided into two types:
    - Individual (e.g. SB5, WAIS--IV): Administered by a trained psychometrist
    - Group (e.g Cognitive Abilities Test; CAT): Commonly administered in schools
- Scored based on the normal distribution
    - Bell curve where most cases fall near the center of the distribution, with increasingly fewer cases as you move away from M
- Raw scores are converted to deviation IQ scores based on where you score according to test norms
- For IQ tests, M= 100 and SD= 15

Lecture 3

Motivation

Motivational Theories and Concepts

- Motives – needs, wants, desires leading to goal-directed behavior
- Drive theories – seeking homeostasis
- Incentive theories – regulation by external stimuli
- Evolutionary theories – maximizing reproductive success

Question: Using the 3 theories above, explain why someone might be motivated to go to University?

Examples of Biological Motives in Humans	Examples of Social Motives in Humans
Hunger motive	Achievement motive (need to excel)
Thirst motive	Affiliation motive (need for social bonds)
Sex motive	Autonomy motive (need for independence)
Temperature motive (need for appropriate body temperature)	Nurturance motive (need to nourish and protect others)
Excretory motive (need to eliminate bodily wastes)	Dominance motive (need to influence or control others)
Sleep and rest motive	Exhibition motive (need to make an impression on others)
Activity motive (need for optimal level of stimulation and arousal)	Order motive (need for orderliness, tidiness, organization)
Aggression motive	Play motive (need for fun, relaxation, amusement)

The Diversity of Human Motives

People are motivated by a wide range of needs, which can be divided into two broad classes: biological motives and social motives. The list on the left (adapted from Madsen, 1973) shows some important biological motives in humans. The list on the right (adapted from Murray, 1938) provides examples of prominent social motives in humans. The distinction between biological and social motives is not absolute.

The Motivation of Hunger and Eating: Biological Factors

- Brain regulation
    - Lateral and ventromedial hypothalamus
    - Paraventricular nucleus
    - Neuropetide Y, serotonin
- Glucose and digestive regulation
    - Glucostatic theory
- Hormonal regulation
    - Insulin, ghrelin, and leptin

The Hypothalamus

This small structure at the base of the forebrain plays a role in regulating a variety of human biological needs, including hunger. The detailed blowup shows that the hypothalamus is made up of a variety of discrete areas. Scientists used to believe that the lateral and ventromedial areas were the brain's on-off centers for eating. However, more recent research suggests that the

paraventricular nucleus may be more crucial to the regulation of hunger and that thinking in terms of neural circuits rather than anatomical centers makes more sense.

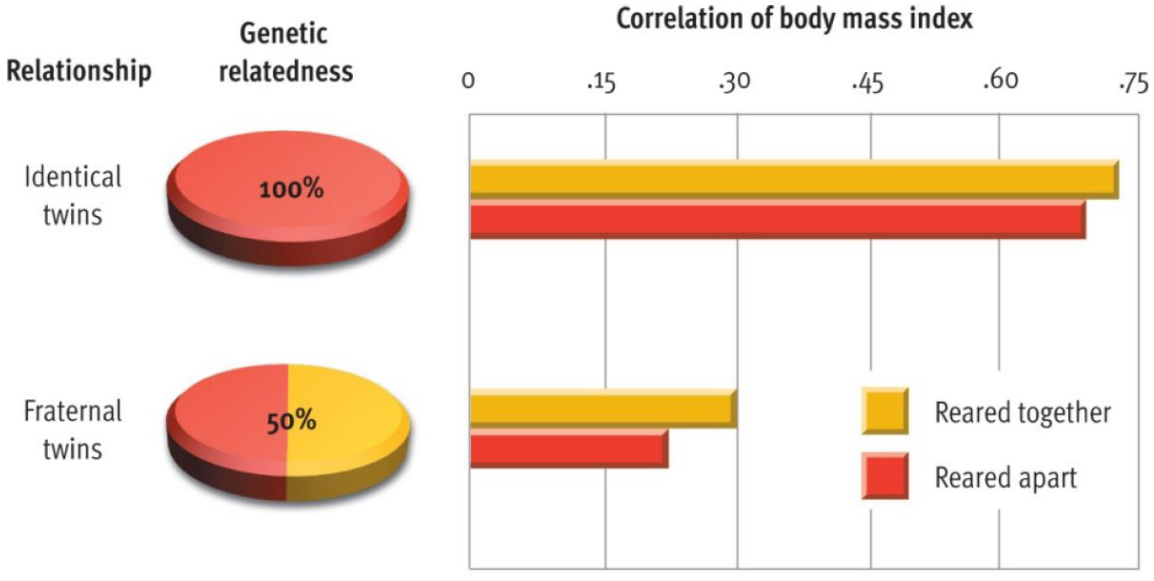
The Motivation of Hunger and Eating: Environmental Factors

- Learned preferences and habits
    - Exposure
    - When, as well as what
- Food-related cues
    - Appearance, odor, effort required
- Stress
    - Link between heightened arousal/negative emotion and overeating

Eating and Weight: The Roots of Obesity

- Evolutionary explanations
- Genetic predisposition
    - Body Mass Index and adoption study
- The concept of set point/settling point
- Dietary restraint
- Eating disorders

The Heritability of Weight



These data from a twin study by Stunkard et al. (1990) reveal that identical twins are much more similar in body mass index than fraternal twins, suggesting that genetic factors account for much of the variation among people in the propensity to become overweight.

Sexual Motivation and Behaviour

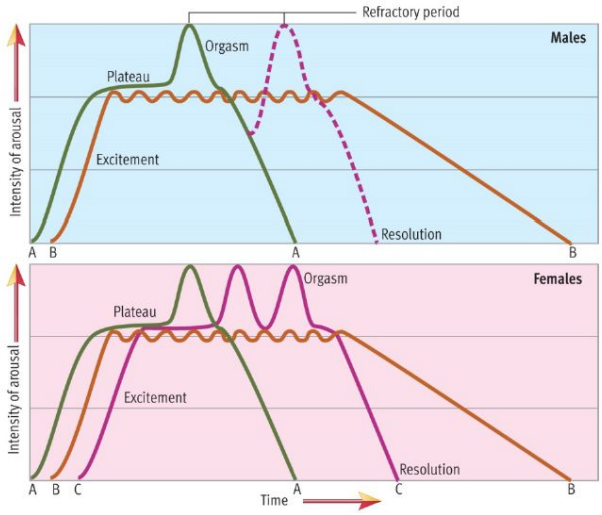
- Hormonal regulation
    - Estrogens
    - Androgens
    - Testosterone
- Evolutionary factors
- Parental investment theory
- Gender differences in mate preference
- Pornography

The Human Sexual Response

Stages:

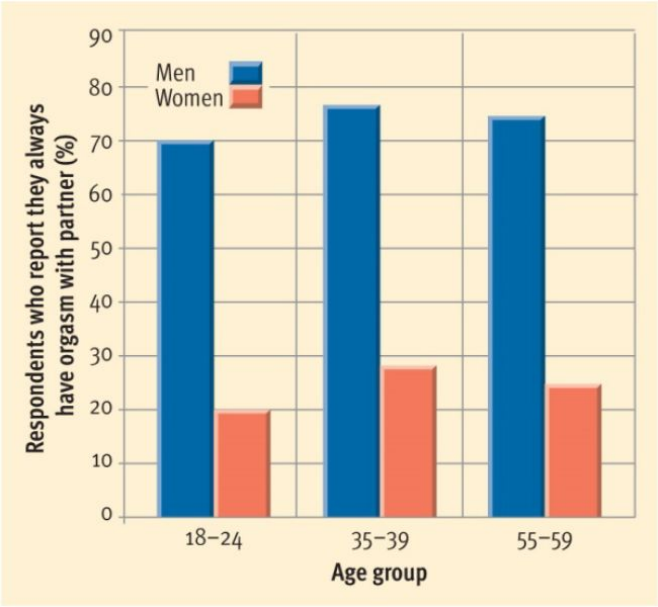
- Excitement
- Plateau
- Orgasm
- Resolution

Cycle:



There are similarities and differences between men and women in patterns of sexual arousal. Pattern A, which culminates in orgasm and resolution, is the ideal sequence for both sexes but not something one can count on. Pattern B, which involves sexual arousal without orgasm followed by a slow resolution, is seen in both sexes but is more common among women (see Figure 10.7). Pattern C, which involves multiple orgasms, is seen almost exclusively in women, as men go through a refractory period before they are capable of another orgasm.

The Gender Gap in Orgasm Consistency



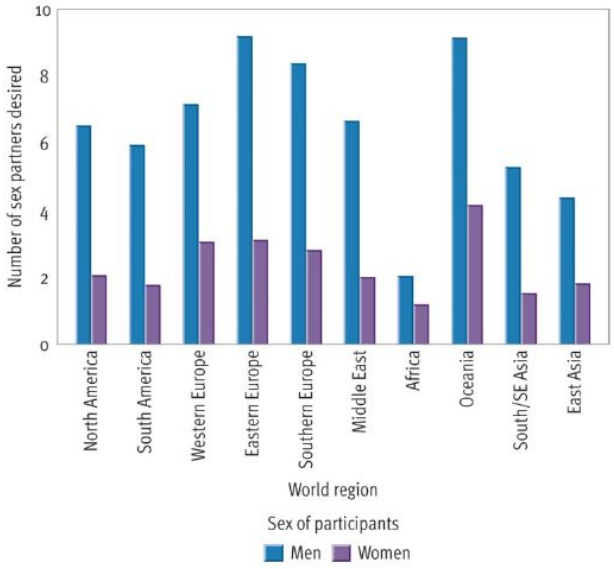
In their sexual interactions, men seem to reach orgasm more reliably than women. The data shown here suggest that the gender gap in orgasmic consistency is pretty sizable. Both biological and sociocultural factors may contribute to this gender gap.

Parental Investment Theory and Mating Preferences

Sex	Biological reality	Evolutionary significance	Behavioural outcomes
Males	Reproduction involves minimal investment of time, energy, and risk	Maximize reproductive success by seeking more sexual partners with high reproductive potential	More interest in uncommitted sex, greater number of sex partners over lifetime; look for youth and attractiveness in partners
Females	Reproduction involves substantial investment of time, energy, and risk	Maximize reproductive success by seeking partners willing to invest material resources in your offspring	Less interest in uncommitted sex, smaller number of sex partners over lifetime; look for income, status, and ambition in partners

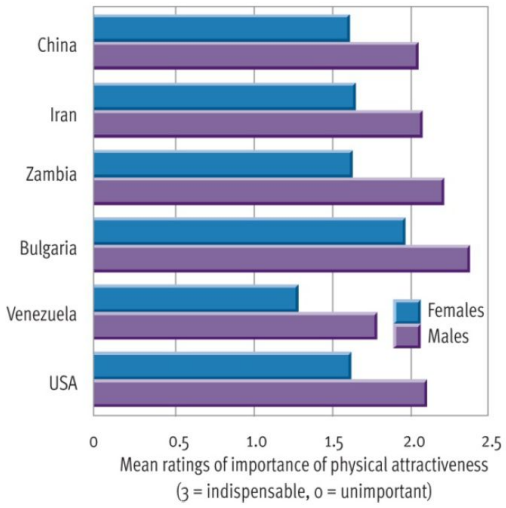
Parental investment theory suggests that basic differences between males and females in parental investment have great adaptive significance and lead to gender differences in mating propensities and preferences, as outlined here.

The Gender Gap in Desire for a Variety of Sexual Partners



Schmitt et al. (2003) gathered crosscultural data on gender disparities in the number of sex partners desired by people. Respondents were asked about how many sexual partners they ideally would like to have in the next 30 years. As evolutionary theorists would predict, males reported that they would like to have more sexual partners in all ten world regions examined.

Gender and Potential Mates' Physical Attractiveness

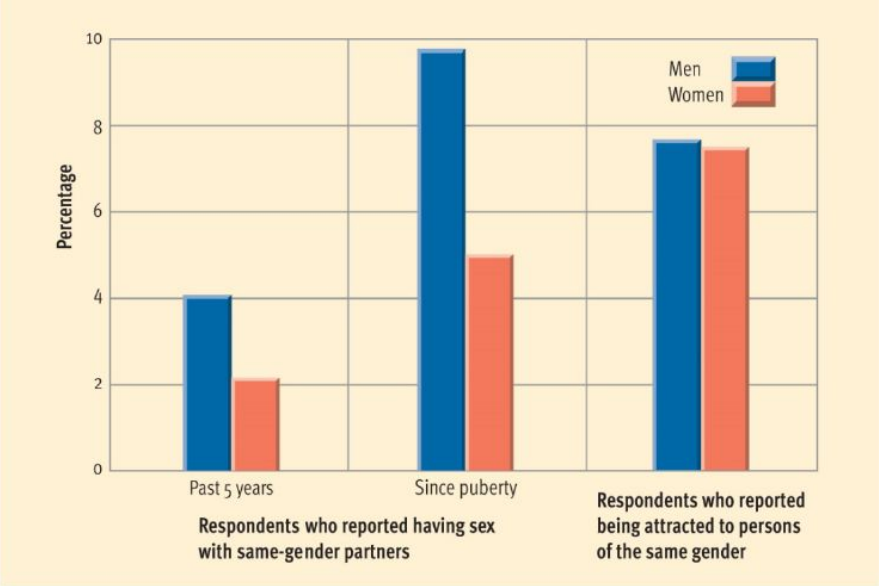


Consistent with evolutionary theory, Buss (1989) found that all over the world, males place more emphasis on potential partners' good looks than females do. The specific results for 6 of the 37 cultures studies by Buss are shown here.

The Mystery of Sexual Orientation

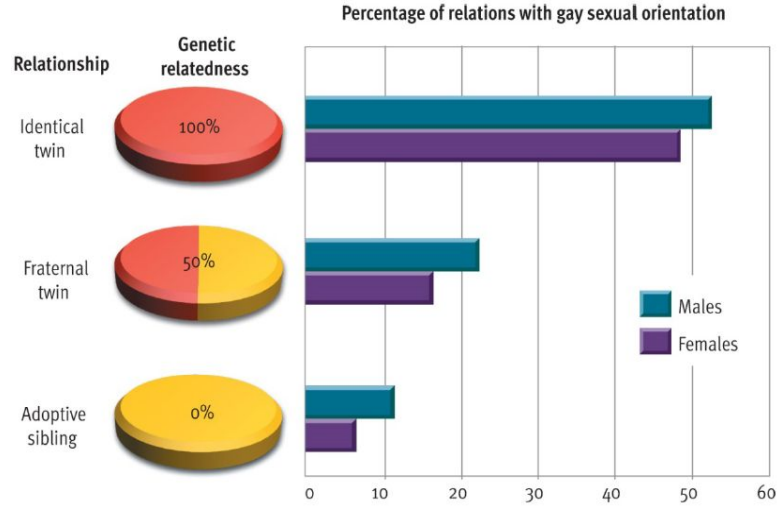
- Heterosexual – Bisexual – Homosexual
    - A continuum
- Theories explaining homosexuality
    - Biological

How common is Homosexuality?



The answer to this question is both complex and controversial. Michaels (1996) brought together data from two large-scale surveys to arrive at the estimates shown here. If you look at how many people have actually had a same-sex partner in the last five years, the figures are relatively low, but if you count those who have had a same-sex partner since puberty, the figures more than double. Still another way to look at it is to ask people whether they are attracted to people of the same sex (regardless of their actual behaviour). This approach suggests that about 8 percent of the population could be characterized as homosexual

Genetics and Sexual Orientation



If relatives who share more genetic relatedness show greater similarity on a trait than relatives who share less genetic overlap, this evidence suggests a genetic predisposition to the characteristic. Studies of both gay men and lesbian women have found a higher prevalence of homosexuality among their identical twins than among their fraternal twins, who, in turn, are more likely to be homosexual than their adoptive siblings. These findings suggest that genetic factors influence sexual orientation.

The Need to Belong: The Affiliation Motive

- Affiliation
- Ostracism
- Fear of rejection

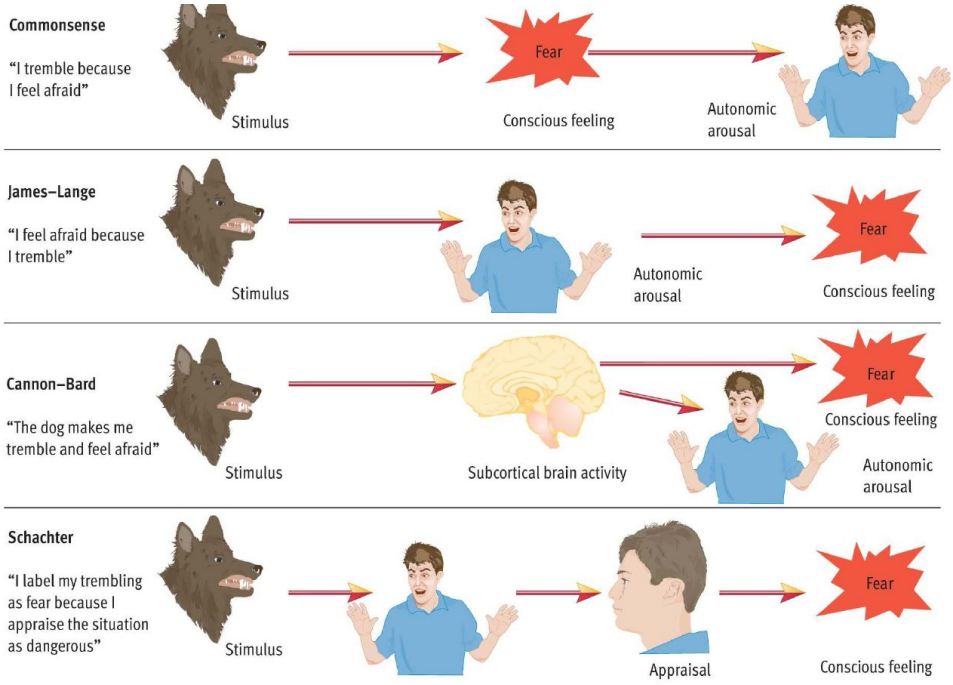
Achievement Motivation

- Achievement motive = need to excel
    - Work harder and more persistently
    - Delay gratification
    - Pursue competitive careers
    - Situational influences on achievement motives
    - Thematic Apperception Test (TAT)

Determinants of Achievement Behaviour

According to John Atkinson, a person's pursuit of achievement in a particular situation depends on several factors. Some of these factors, such as need for achievement or fear of failure, are relatively stable motives that are part of the person's personality. Many other factors, such as the likelihood and value of success or failure, vary from one situation to another, depending on the circumstances.

Theories of Emotion



Nature and Function of Emotions

What are emotions?

- Positive or negative affective states
    - pattern of cognitive, physiological, & behavioural reactions to events

Link between motivation & emotion

- React emotionally when goals are gratified, threatened, or frustrated
- Strong reaction to important goals

Adaptive value of emotions

- Direct attention - Arousal system

Negative emotions (e.g., fright)

- Narrow attention - increased physiological activation

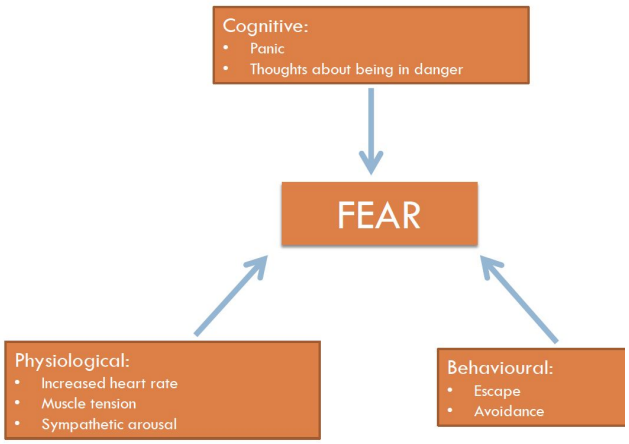
Positive emotions (e.g., love)

- Broaden thinking - exploration & skill learning

Social communication

- Information about internal state
- Influence others' behaviour toward us

Components of Emotion



Facial Expression of Emotions

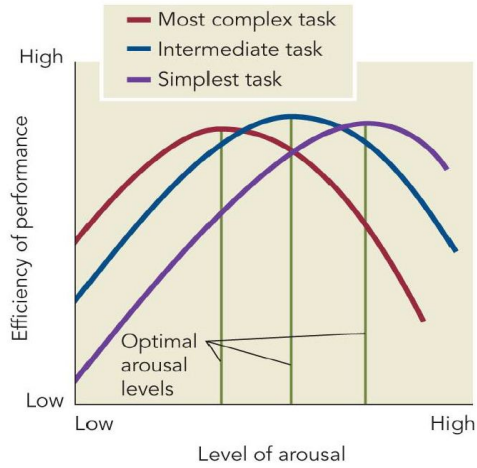
- Humans experience a small number of distinct emotions that can combine in complex ways.
- Primary emotions - cross-culturally universal facial expressions of 6 distinct emotions (Ekman)
    - Happiness
    - Disgust
    - Sadness
    - Fear
    - Surprise
    - Anger

Facial Feedback Hypothesis

Facial expressions can actually influence our emotional state

- Neurological link between facial muscles and brain signals
- Face helps us interpret our emotions!

Behavioural Component



Instrumental behaviours

- Directed at achieving a goal

Emotions -- behaviour

- 'Calls to action'
  - engage in instrumental behaviour
- Yerkes-Dodson law: relationship between arousal & performance
  - Can enhance performance for simple motor tasks
  - Can interfere with complex mental & physical tasks

Theories of Emotion

- Common sense: Stimulus---emotion---bodily reaction
- Example: Stand-up comedian----amusement----laughter
  - "I'm amused, therefore I laugh."

James-Lange (1884, 1885): Conscious experience of emotion results from perception of the autonomic response

- Body informs mind
- Physiological reactions determine emotions
- Stimulus----bodily reaction---emotion
- e.g., "I am laughing, therefore I must be amused."

Problems:

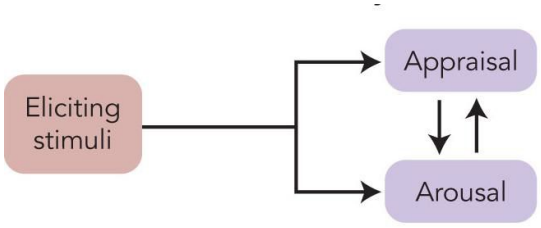
- Autonomic arousal without emotion (e.g., working out)

- Different emotions have almost identical patterns of autonomic arousal (e.g., fear, anger, anxiety, anticipation

Cannon-Bard (1927, 1934): Thalamus sends parallel signals to the cortex (conscious experience) and autonomic nervous system (visceral arousal)

- Conscious feeling and autonomic arousal occur simultaneously
- Stimulus---Brain stimulates autonomic/muscular activity (arousal/action) + cognitive activity (experience of emotion)
- E.g., "The comedian makes me laugh and amuses me."

Schachter's Two-Factor Model (1962): Experience visceral arousal, see situational cues, combine pattern of arousal with external cues, label emotion.



- Physiological arousal + cognitive labelling determine emotion
- Physiological arousal = how 'strongly' we feel (Factor 1)
- Labelling = 'what' we feel (Factor 2)
- E.g., "I label my laughter as amusement (instead of nervousness) because the comedian is funny."

<u>Detecting Deception</u>

- Truth Bias: assumption that people are honest
    - makes us poor detectors of lies (base rate fallacy)

- People can correctly detect lies around 50% of the time
    - Average accuracy rate for…
        - "Professional lie catchers" (e.g., law enforcement) was 55.5%
        - Students and other citizens was 54.2%

- Confidence in truth detection ability
    - NOT related to accuracy rates!

Lying and Lie Detection

- Polygraph tests
    - Based on idea that lying is associated with autonomic arousal
        - i.e., Pinocchio response - a "perfect" physiological or behavioural indicator of lying (seems to be a myth)

    - Fits with what theory of emotion?
    - Main flaw?
        - High # false positives - the test incorrectly labels innocent individuals as guilty at a high rate
- Truth serum – barbiturates (similar to being more truthful when really drunk)

How to Detect Deception

- Non-Verbal Cues to Lying
    - Gaze aversion, smiling, and eye movements are NOT reliable indicators of deception
    - Microexpressions: Brief, involuntary facial expressions (often inconsistent with emotion person is consciously trying to portray)
        - Questionable reliability

Verbal Cues to Lying

- Most reliable indicator:
    - Liars provide fewer details than do truth-tellers

- Liars were:
    - Less likely to have stories that made sense
        - i.e., less plausible, lack logical structure
    - More nervous and tense
    - Less cooperative

- Truth-tellers were:
    - More likely to spontaneously correct themselves
    - More likely to admit to a lack of memory

Lecture 4

Prenatal Development

Prenatal Period: Conception--Birth (approx.38 weeks)

- Three stages: Germinal, Embryonic & Fetal

Development begins with the creation of a zygote

- Single--celled organism formed by the union of sperm and ovum
- All other cells develop from zygote

Germinal Stage

- First two weeks after conception
- Within 36hrs of fertilization, cell division starts as zygote becomes increasingly multicellular
- Zygote moves down fallopian tube into uterus
- Attempted implantation at 7 days
    - Process takes 7 days
    - ~⅕ pregnancies end at this point with rejection of zygote

Placenta

- Begins to form during implantation
- Oxygen/nutrients:
  Mom --------> Fetus
- Waste products:
  Fetus --------> Mom
- Cloaks fetus from mom's immune system

Embryonic Stage

- From 2 weeks (after implantation) until end of second month
- Vital organs and bodily systems start to grow
- Period of major vulnerability
    - Most miscarriages occur in this window
    - Most major structural problems arise

Fetal Stage

- From 2 months until birth
- Muscle and bones form, allowing physical movement
- Final three months brings intense brain development
- Age of viability: Age at which fetus can survive premature birth (~22--26 weeks)
- Survival rate jumps to 85% at 26--28 weeks

Prenatal Development- Environmental Factors

- Fetus is not immune to environmental factors
    - Up until 1960s it was thought baby was protected in womb, with few exceptions
- Development can be affected by mother's eating habits, drug use, physical health

Prenatal Development- Nutrition

- Fetus needs a variety of nutrients
- Risk of birth complications and neurological defects with maternal malnutrition
    - Prenatal malnutrition has been linked to increased risk of developing schizophrenia and other psychiatric disorders
    - Low birth weight is associated with increased risk of heart disease and diabetes in mid--life
- That said: Hard to dissociate common co--morbid factors (drug use, poor healthcare)

Prenatal Development- Drugs

- Teratogens: Non--genetic agents that can cause malformation of the embryo and/or fetus
    - Primarily refers to drugs, maternal illness and environmental toxins
    - May include malnutrition, maternal age, etc…

- Most drugs pass through placental membrane
- Includes prescribed drugs
    - This is why most women are told to only take tylenol (but definitely not advil/aspirin unless specifically prescribed)

- Thalidomide
- Initiated study of teratogens
- Mild sedative and painkiller
    - Proclaimed a "wonder drug" for insomnia, coughs, colds and headaches
- Produced birth defects that varied according to when mother took drug
    - Malformation of eyes, ears
    - Deformation of internal organs
    - Fused fingers, toes

- Phocomelia: Limbs are drastically shortened; hands and feet are connected to torso like flippers
- Virtually all recreational drugs can be harmful
- Heroin: Born addicted to narcotics; further risk of birth defects; respiratory difficulties; complications due to prematurity
- Cocaine: Reduces blood flow, limiting oxygen and nutrients; difficulty regulating alertness; abnormal sleep patterns

- Marijuana: The controversy

In US samples, maternal MJ use is associated with deficits of executive function (attention/ impulsivity, problem solving)

In Jamaican samples, children of ganja users were no different than those of non--users at 1 month and 5 years

    - Not associated with other drugs, smoking, alcohol

- Caffeine: Drug most commonly consumed during pregnancy
    - Some studies show caffeine associated with miscarriage, prematurity, low birth weight, irritability, poorer muscular development and reflexes
    - Problems more likely with more caffeine
    - Difficult to dissociate from other drugs, like nicotine and alcohol

- Heavy drinking can lead to Fetal Alcohol Syndrome
    - Microcephaly; heart defects; delayed mental and motor development; cranio--facial malformation
    - Most common known cause of intellectual disability

- Nicotine: Estimated 10.5% of pregnant women smoke (down from 17% in 2001)
    - Reduces blood flow and nutrients
    - Constricts blood vessels /suppresses appetite
    - Babies are smaller
    - Chance of prematurity and complications increases with number of cigs smoked/day
    - Increases risk of SIDS

Nicotine and SIDS

- Maternal smoking during pregnancy has emerged as a risk factor in almost every epidemiological study of SIDS
- Smoking during pregnancy is associated with pre--term birth and low birth weight
    - Major risk factors
    - Apnea of prematurity

Prenatal Development- Infection

- Placenta prevents most infections from passing, but not at all
    - Fetal immune system is very weak until late in fetal stage
- Rubella, mumps, severe flu, etc… can be dangerous
- Syphilis: CNS damage, deformities of teeth and skeleton, death
- Gonorrhea: Premature birth, blindness (if untreated)
    - Silver nitrate drops at birth

- Link between maternal infection (influenza, rubella) in first half of pregnancy and SZ
- Mechanism is not well understood
    - Virus directly affects fetal brain
    - Body's inflammatory response (IL--8)
    - Fever from cytokines
    - Auto--immune response
- Most are preventable with early & consistent medical care
- Health Canada recommends exclusive breastfeeding until 6 mos.
    - Anti--bodies in breastmilk

Prenatal Development- Toxins

- Mercury: Between 1954--1960, industrial dumping of Hg in a bay in Japan
    - Mothers who ate fish from bay gave birth to kids with cerebral palsy--like neuro disorder
- Lead: Linked to miscarriage, neuromuscular problems, ID
- BPA: Girls are more aggressive, hyperactive (no effect on boys)
    - Disrupts estrogen in developing brain

Human Development

The Childhood Years: Motor Development

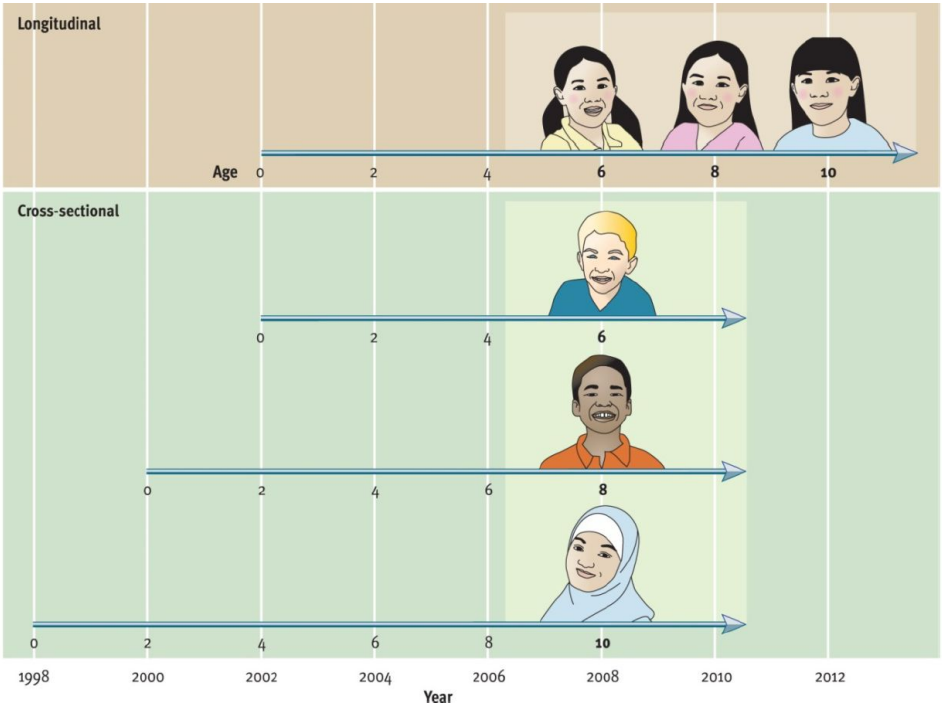
- Basic principles
    - Cephalocaudal trend – head to foot
    - Proximodistal trend – centre-outward
- Maturation – gradual unfolding of genetic blueprint
- Developmental norms – median age
    - Cultural variations

Easy and Difficult Babies: Differences in Temperament

- Longitudinal vs. cross-sectional designs
- Thomas, Chess, and Birch (1970)
    - 3 basic temperamental styles
        - easy – 40%
        - slow-to-warm-up – 15%
        - difficult – 10%
        - mixed – 35%
            - stable over time
- Kagan & Snidman (1991)
    - Inhibited vs. uninhibited temperament
        - inhibited – 15–20%

- uninhibited – 25–30%
- stable over time, genetically based

Longitudinal versus cross sectional research



In a longitudinal study of development between ages six and ten, the same children would be observed at six, again at eight, and again at ten. In a cross sectional study of the same age span, a group of six-year-olds, a group of eight year- olds, and a group of ten-year-olds would be compared simultaneously. Note that data collection could be completed immediately in the cross sectional study, whereas the longitudinal study would require four years to complete.

Early Emotional Development: Attachment
Separation anxiety

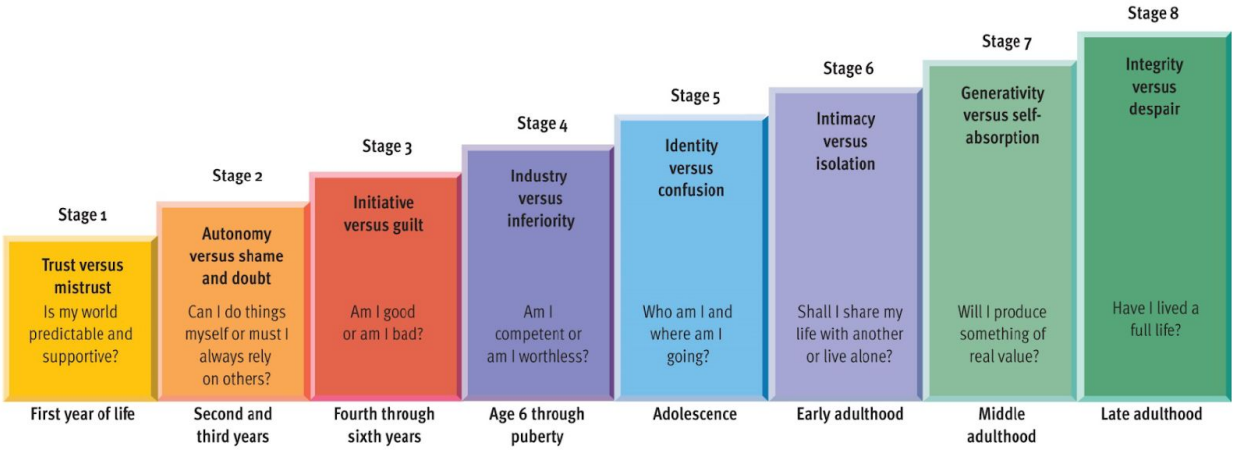
- Ainsworth (1979): The strange situation and patterns of attachment
  - Secure
  - Anxious-ambivalent
  - Avoidant
  - Disorganized/disoriented

• Evolutionary perspectives on attachment

Stage Theories of Development: Personality

- Stage theories, three components
  - Progress through stages in order
  - Progress through stages related to age
  - Major discontinuities in development

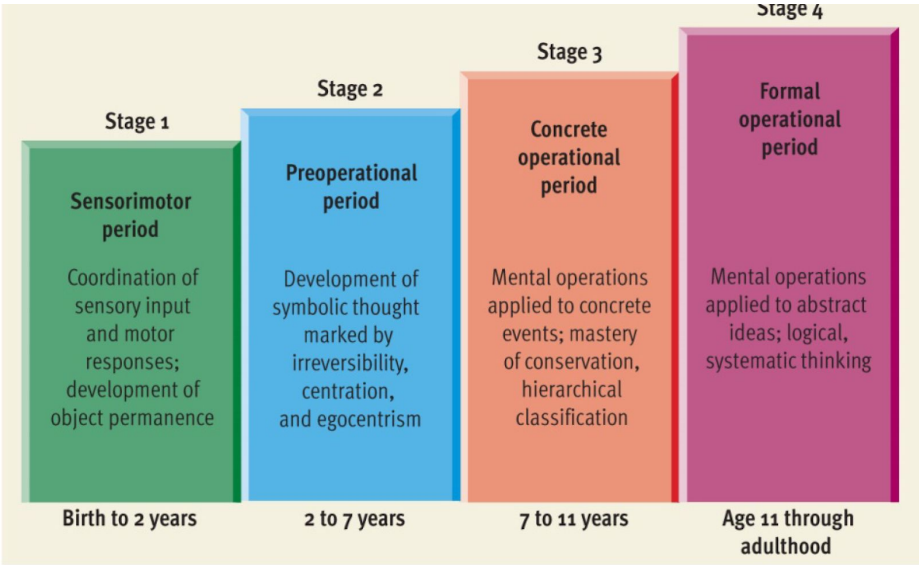
- Erik Erikson (1963)
    - Eight stages spanning the lifespan
    - Psychosocial crises determining balance between opposing polarities in personality



Erikson's theory of personality development posits that people evolve through eight stages over the lifespan. Each stage is marked by a psychosocial crisis that involves confronting a fundamental question, such as "Who am I and where am I going?" The stages are described in terms of alternative traits that are potential outcomes from the crises. Development is enhanced when a crisis is resolved in favour of the healthier alternative (which is listed first for each stage).

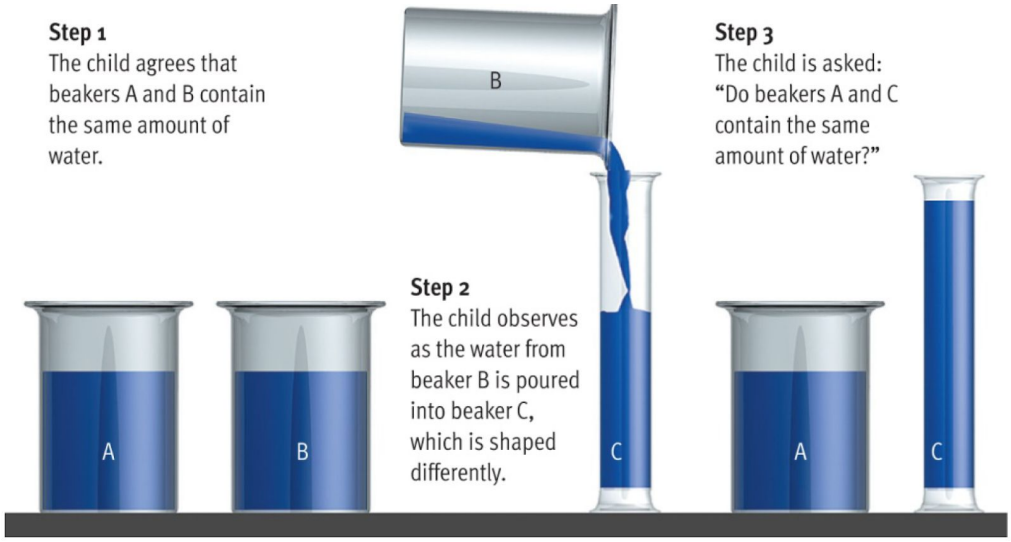
Stage Theories: Cognitive Development

- Jean Piaget (1920s–1980s)
- Assimilation/accommodation
    - 4 stages and major milestones



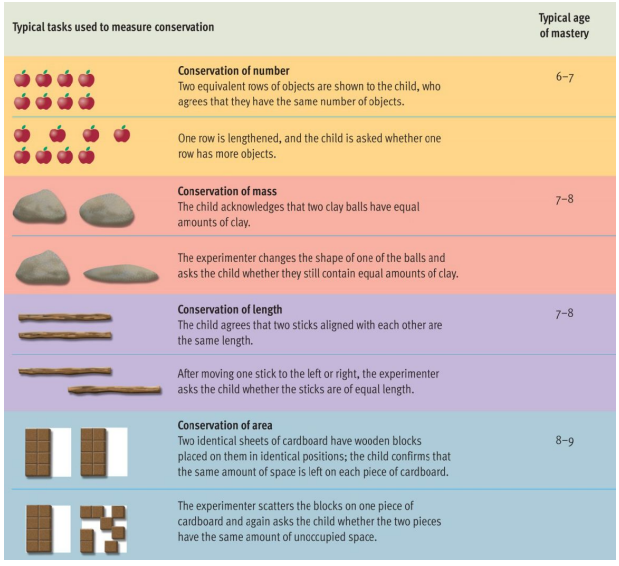
Piaget's theory of cognitive development identifies four stages marked by fundamentally different modes of thinking through which youngsters evolve. The approximate age norms and some key characteristics of thought at each stage are summarized here.

Piaget's Conservation task



After watching the transformation shown, a preoperational child will usually answer that the taller beaker contains more water. In contrast, the child in the concrete operational period tends to respond correctly, recognizing that the amount of water in beaker C remains the same as the amount in beaker A.

The Gradual Mastery of Conservation



Children master conservation during the concrete operational period, but their mastery is gradual. As outlined here, children usually master the conservation of numbers at age six or seven, but they may not understand the conservation of area until age eight or nine.

Vygotsky – SocioCognitive Development

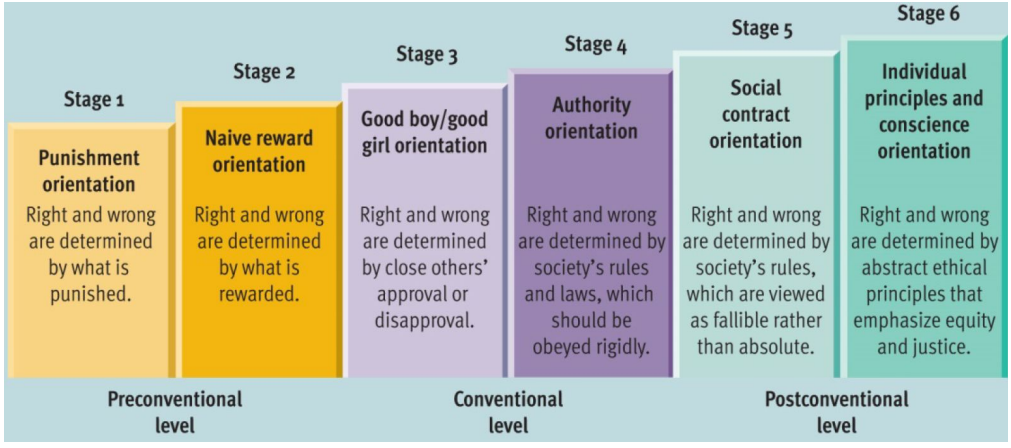
- Social interaction is key – cognitive development occurs gradually (continuous)
- Scaffolding – learning mechanism -- parents provide initial guidance in child's learning then gradually remove structure
- Zone of proximal development – Difference between what child can do independently & what she can do with assistance
- Others can facilitate child's cognitive development within limits of biological maturation

Critical Periods in Development

- Limited time span when it is optimal for certain capacities to emerge because the organism is especially responsive to certain experiences
    - Sensitive periods
    - Evident in language development
    - Theory of mind

The Development of Moral Reasoning

- Kohlberg (1976)
    - Reasoning as opposed to behaviour
        - Moral dilemmas
            - Measured nature and progression of moral reasoning
- 3 levels, each with 2 sublevels
    - Preconventional
    - Conventional
    - Postconventional

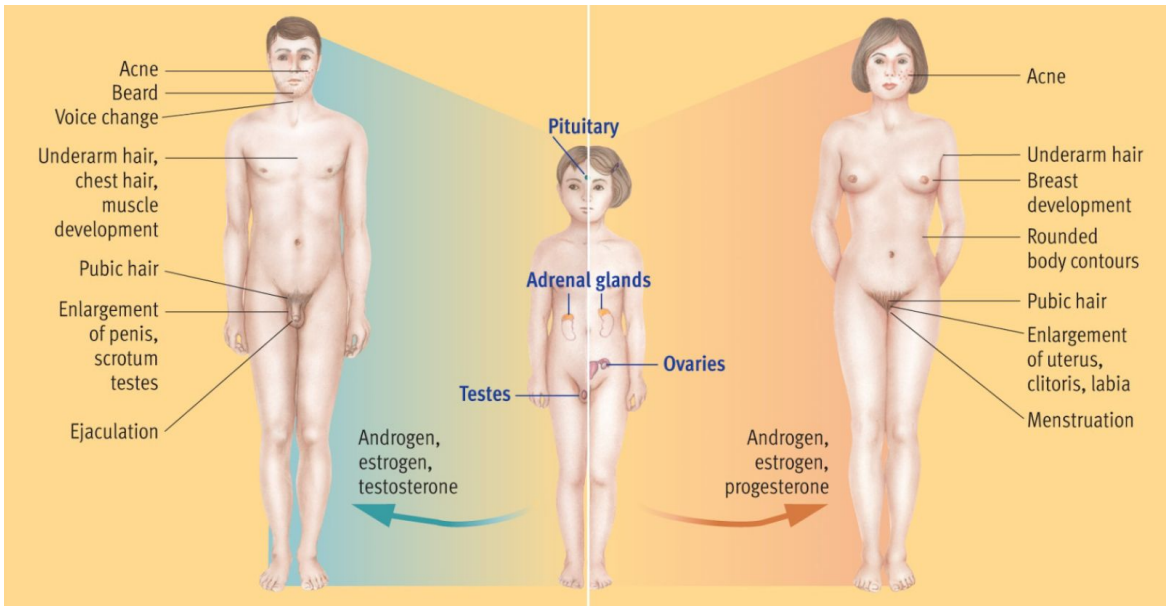


Kohlberg's model posits three levels of moral reasoning, each of which can be divided into two stages. This chart summarizes some of the key facets in how individuals think about right and wrong at each stage.

The Transition of Adolescence

- Pubescence

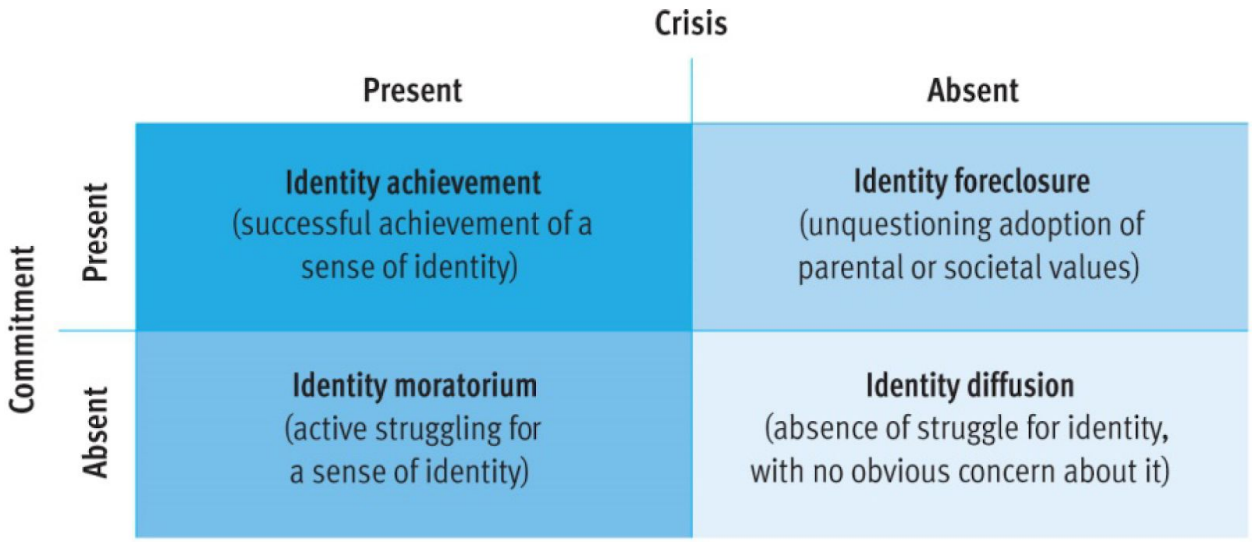
- Puberty
    - Secondary sex characteristics
    - Primary sex characteristics
        - Menarche
        - Sperm production
    - Maturation: early vs. late
        - Sex differences in effects of early maturation
- Depression
- Brain Development



Hormonal changes during puberty lead not only to a growth spurt but also to the development of secondary sex characteristics. The pituitary gland sends signals to the adrenal glands and gonads (ovaries and testes), which secrete hormones responsible for various physical changes that differentiate males and females.

The Search for Identity

- Erik Erikson (1968)
    - Key challenge – forming a sense of identity
- James Marcia (1988)
    - 4 identity statuses
        - Identity Diffusion
        - Identity Foreclosure
        - Identity Moratorium
        - Identity Achievement



According to Canadian psychologist James Marcia (1980), the occurrence of identity crisis and exploration and the development of personal commitments can combine into four possible identity statuses, as shown in this diagram. The progressively darker shades of blue signify progressively more mature identity statuses.

The Expanse of Adulthood

- Personality development
- Social development and family life
- Physiological changes
- Neural changes
- Cognitive changes