BASIC PRINCIPLES IN PSYCHOLOGY

LECTURE 5

CONSCIOUSNESS AND COGNITION

LEARNING OBJECTIVES

Chapter 4: Consciousness

Consciousness and levels of consciousness

Why sleep and how sleep works

Stages of sleep and dreaming

Psychoactive drugs

Chapter 7: Cognition

Mental images and concepts in thinking

Solving problems and make decisions

Failure of problem solving and creative thinking

Theories of intelligence and IQ Tests

Language and different elements and structure of language

CHAPTER 4: CONSCIOUSNESS

CONSCIOUSNESS

Consciousness

- Awareness of activity around one at any given moment
- The awareness is used to organize behavior

Waking consciousness

- Thoughts, feelings, and sensations are clear, organized
- Feel alert

CONSCIOUSNESS

Altered state of consciousness

- Shift from waking consciousness in the quality or pattern of mental activity
- Can be increased or decreased alertness

WHY WE SLEEP

Circadian rhythm

- Cycle of body rhythms that occur over a 24-hour period
  - "circa" – about
  - "diem" – day
- Sleep-Wake cycle is controlled by the hypothalamus

NECESSITY OF SLEEP

Circadian rhythm

- Suprachiasmatic nucleus
  - Hypothalamic structure that is light sensitive
  - Signals to pineal gland to release melatonin

STAGES OF SLEEP

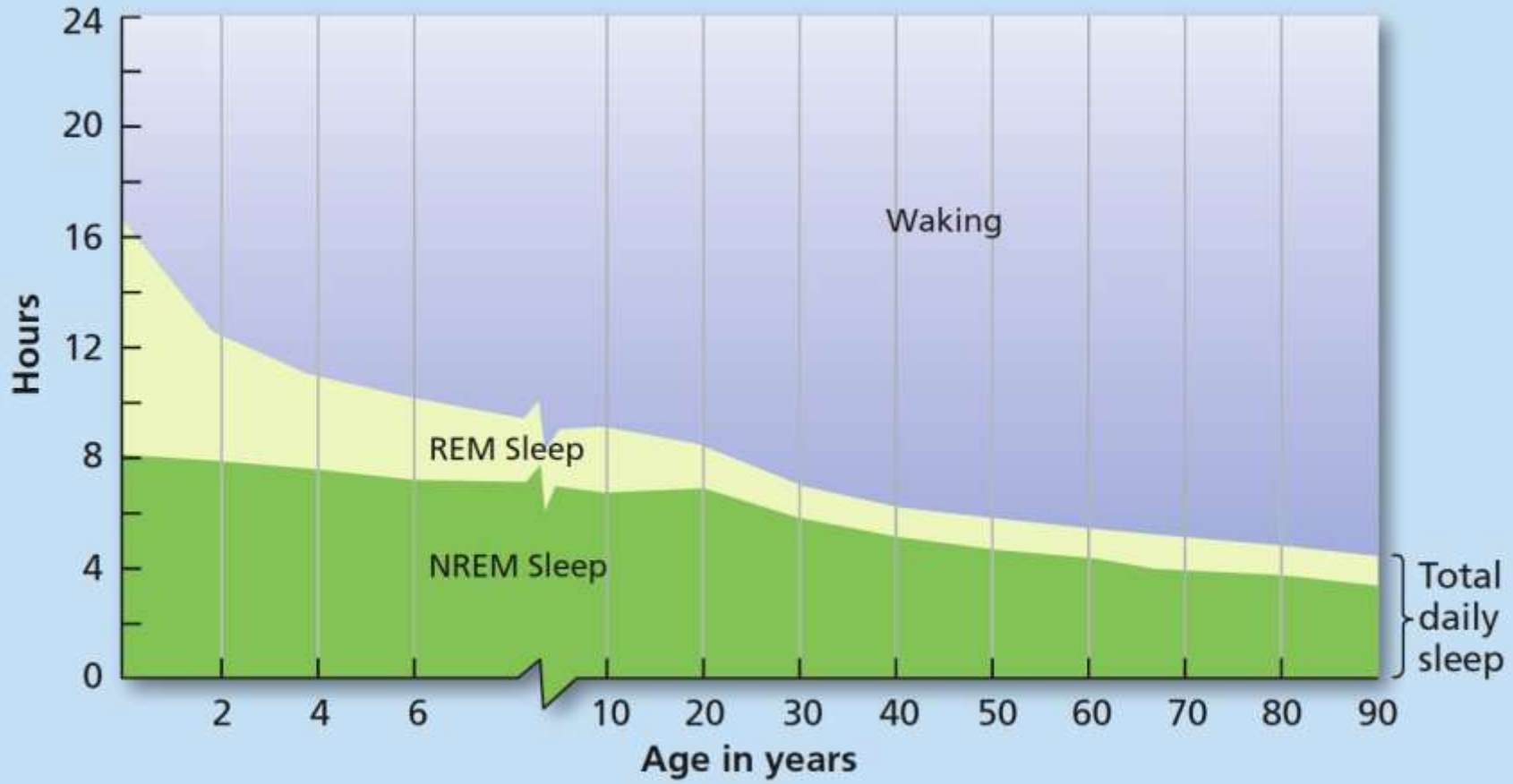
Rapid Eye Movement (REM) sleep

- stage of sleep in which the eyes move rapidly
- Most dreaming takes place in this stage
- Voluntary muscle movement is inhibited

Non-REM sleep

- any of the stages of sleep that do not include REM

SLEEP PATTERNS OF INFANTS AND ADULTS



BRAIN WAVE PATTERNS AND SLEEP

Electroencephalagram (EEG)

- Measures electrical activity in brain
- Different patterns during different stages
  - Beta waves
    - Awake, mentally active, small and fast EEG pattern
  - Alpha waves
    - Become drowsy, waves slightly larger and slower

BRAIN WAVE PATTERNS AND SLEEP

Electroencephalagram (EEG)

- Different patterns during different stages
  - Theta Waves
    - Slower and larger
  - Delta Waves
    - Deepest sleep, largest and slowest waves

NON-REM STAGES OF SLEEP

Non-REM Stage 1 (N1): Light Sleep

- Theta wave activity increases, alpha wave activity fades
- *Hypnogogic images: hallucinations or vivid visual events*
- *Hypnic jerk: knees, legs, or whole body jerks*

NON-REM STAGES OF SLEEP

Non-REM Stage 2 (N2): Sleep Spindles

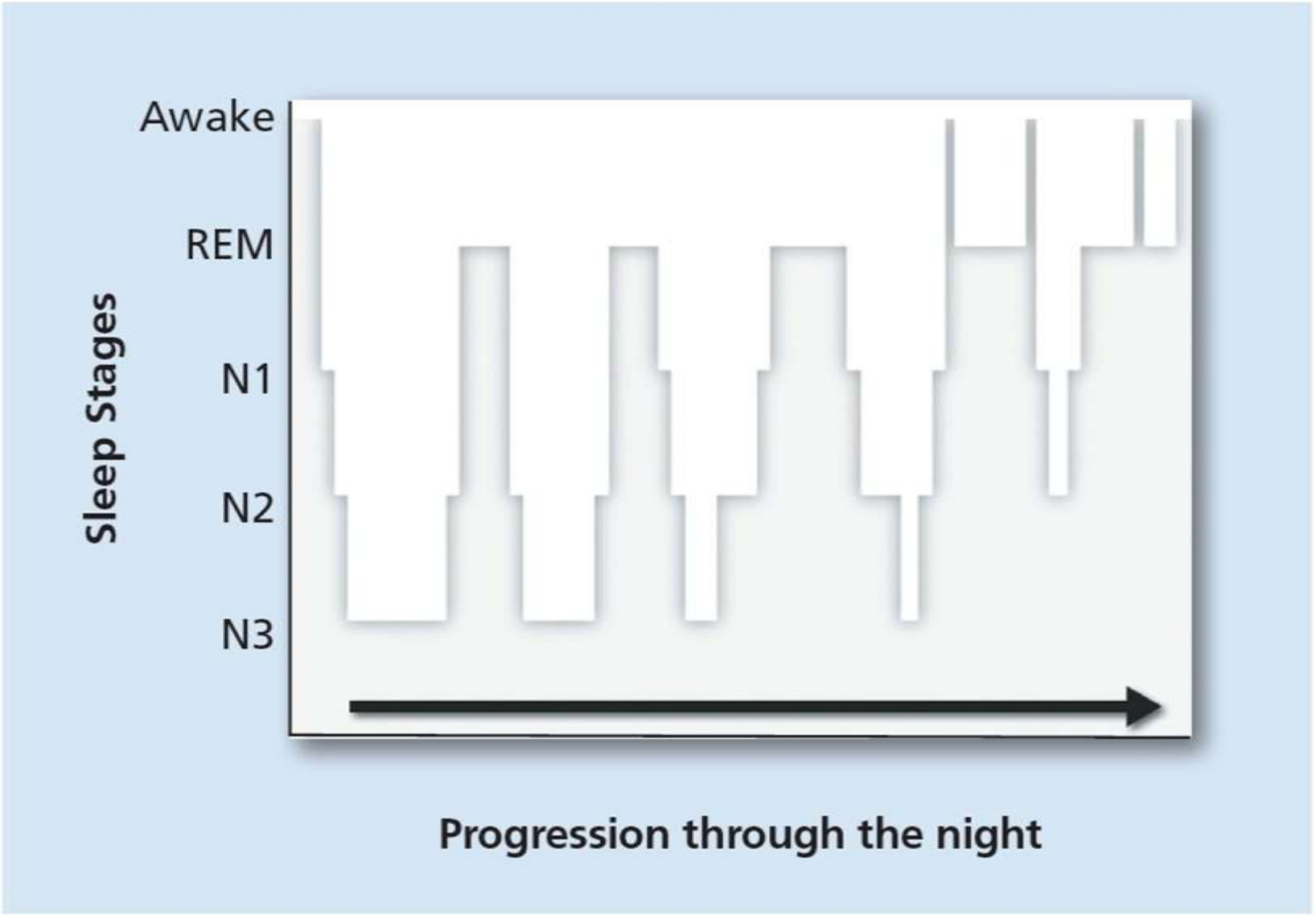
- Body temperature continues to drop
- Heart rate slows, breathing becomes more shallow and irregular
- EEG will show the first signs of sleep spindles
- sleep spindles: brief bursts of activity only lasting a second or two

NON-REM STAGES OF SLEEP

Non-REM Stage 3 and Stage 4: Delta Waves

- Deepest stage of sleep: 50 percent or more of waves are delta waves
- Body is at its lowest level of functioning
- time at which growth occurs

A TYPICAL NIGHT'S SLEEP



REM SLEEP AND DREAMING

REM sleep is paradoxical sleep (high level of brain activity)

If wakened during REM sleep, sleepers almost always report a dream.

REM rebound: increased amounts of REM sleep after being deprived of REM sleep on earlier nights

PSYCHOACTIVE DRUGS

Psychoactive drugs: drugs that alter thinking, perception, and memory

PSYCHOACTIVE DRUGS AND PHYSICAL DEPENDENCE

Tolerance: more and more of the drug is needed to achieve the same effect

Withdrawal: physical symptoms resulting from a lack of an addictive drug in the body systems can include nausea, pain, tremors, crankiness, and high blood pressure

PSYCHOACTIVE DRUGS AND PSYCHOLOGICAL DEPENDENCE

Psychological dependence: the feeling that a drug is needed to continue a feeling of emotional or psychological well-being

CHAPTER 7: COGNITION

THINKING AND MENTAL IMAGES

Thinking (cognition)

- Mental activity that involves
  - Organizing and attempting to understand information
  - Communicating information to others

THINKING AND MENTAL IMAGES

Mental images

- Representations that stand for objects or events
- Have a picture-like quality

CONCEPTS

Represent category of objects, events, or activities

Ability to think in terms of concepts allows communication with others

Formal concepts: concepts that are defined by specific rules or features

Natural concepts: concepts people form as a result of their experiences in the real world

THE CONCEPT OF "CHAIR"

CONCEPTS

Prototype

- A concept that closely matches the original concept
- Personal knowledge about a type of object affect the nature of a given prototype for the category
- Greater differences and variations in prototypes exist between cultures that are dissimilar

PROBLEM-SOLVING

Problem-solving

- Cognition that occurs when a goal must be reached
- Thinking and behaving in certain ways

Decision making: identifying, evaluating, and choosing between alternatives

PROBLEM-SOLVING

Trial and error (mechanical solution)

- One possible solution after another is tried until a successful one is found

Algorithms

- Specific, step-by-step procedures for solving a problem type

THESE CHILDREN TRY ONE POSSIBLE SEQUENCE OF MOVES AFTER ANOTHER UNTIL FINDING JUST THE RIGHT COMBINATION. THIS IS AN EXAMPLE OF TRIAL-AND-ERROR LEARNING.

PROBLEM-SOLVING

Heuristic

- "Rule of thumb"
- Simple rule intended to apply to many situations

PROBLEM-SOLVING: HEURISTICS

Representative heuristic: assumption that any object (or person) sharing characteristics with the members of a particular category is also a member of that category

Availability heuristic: estimating the frequency or likelihood of an event based on how easy it is to recall relevant information from memory or how easy it is to think of related examples

working backward from the goal is a useful heuristic

break a goal down into *subgoals*, so that as each subgoal is achieved, the final solution is that much closer

PROBLEM SOLVING: INSIGHT

Insight: sudden perception of a solution to a problem

- "aha!" moment
- problem may be recognized as similar to another previously solved, for example

PROBLEM-SOLVING BARRIERS

Functional fixedness

- Block to problem solving
- Comes from thinking about objects in terms of only their typical functions

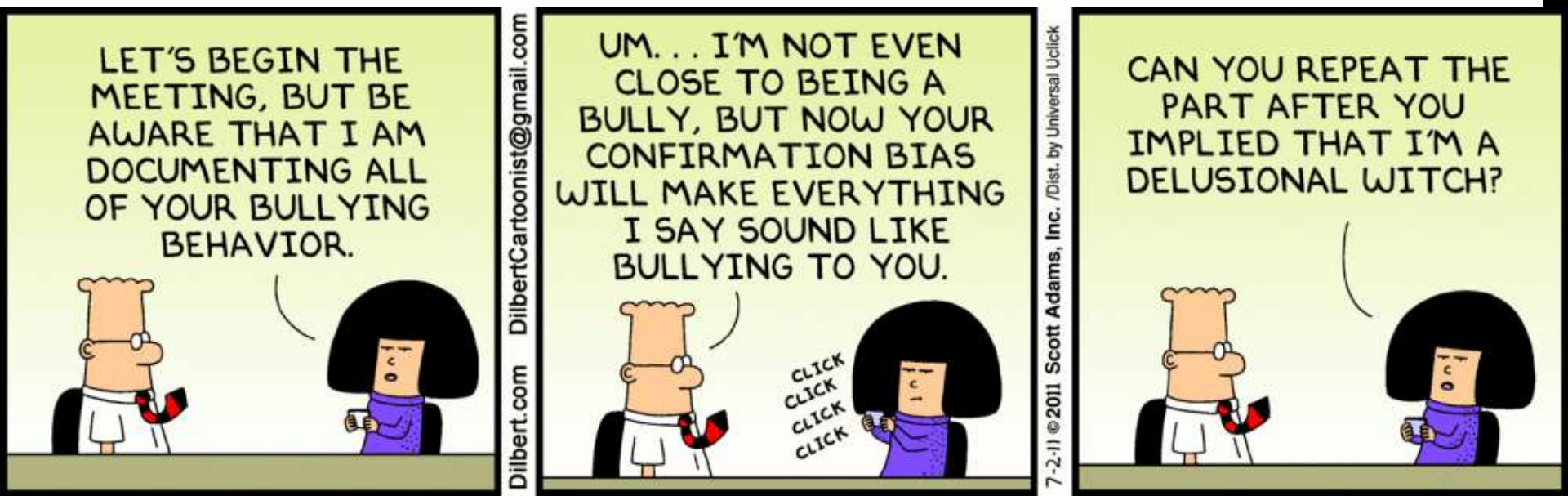
Mental set

- Persist in using problem-solving patterns that have worked in the past
- Hesitate in trying new solution

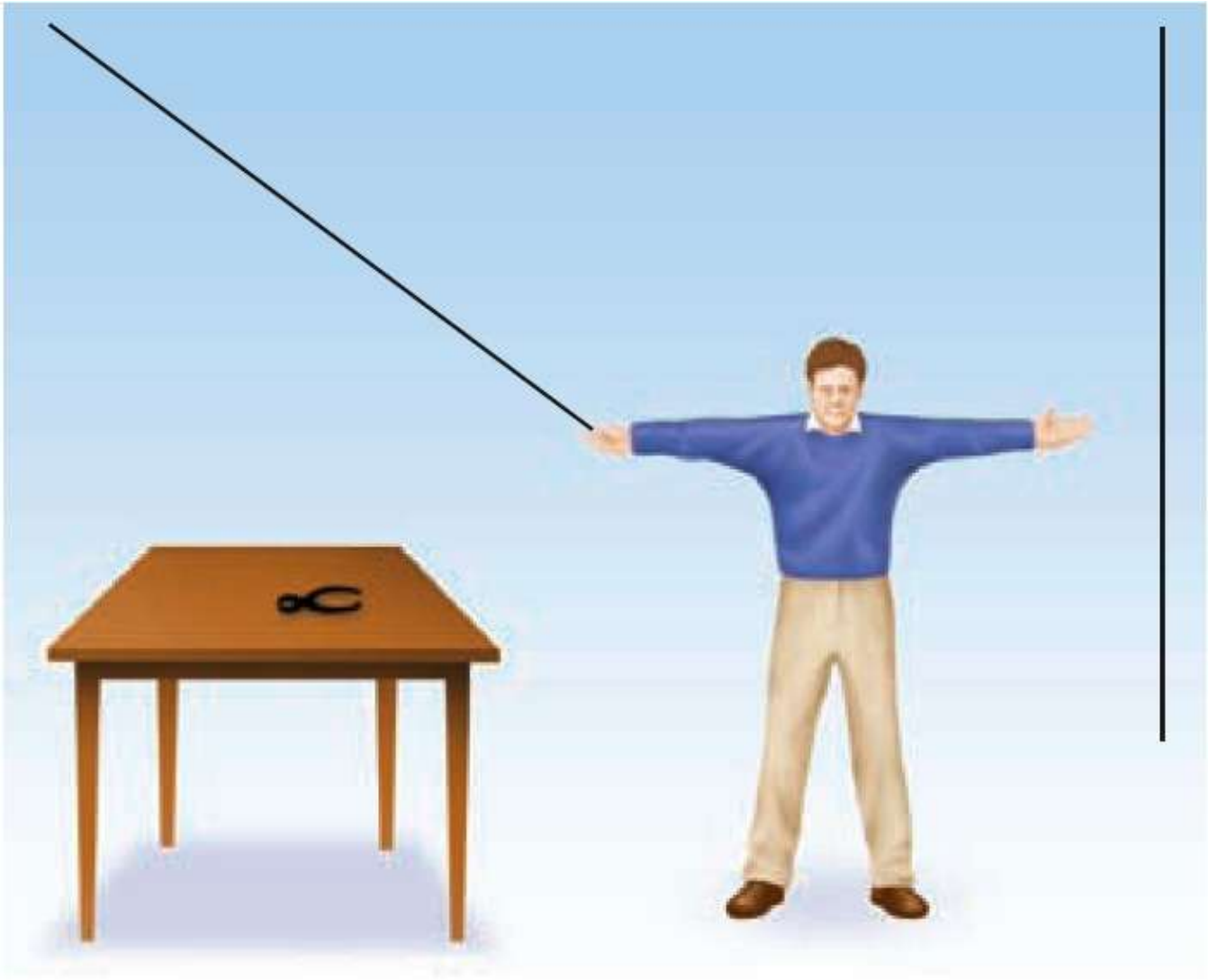
PROBLEM-SOLVING BARRIERS

Confirmation bias

- Search for evidence that fits one's beliefs
- Ignore evidence that does not fit those beliefs

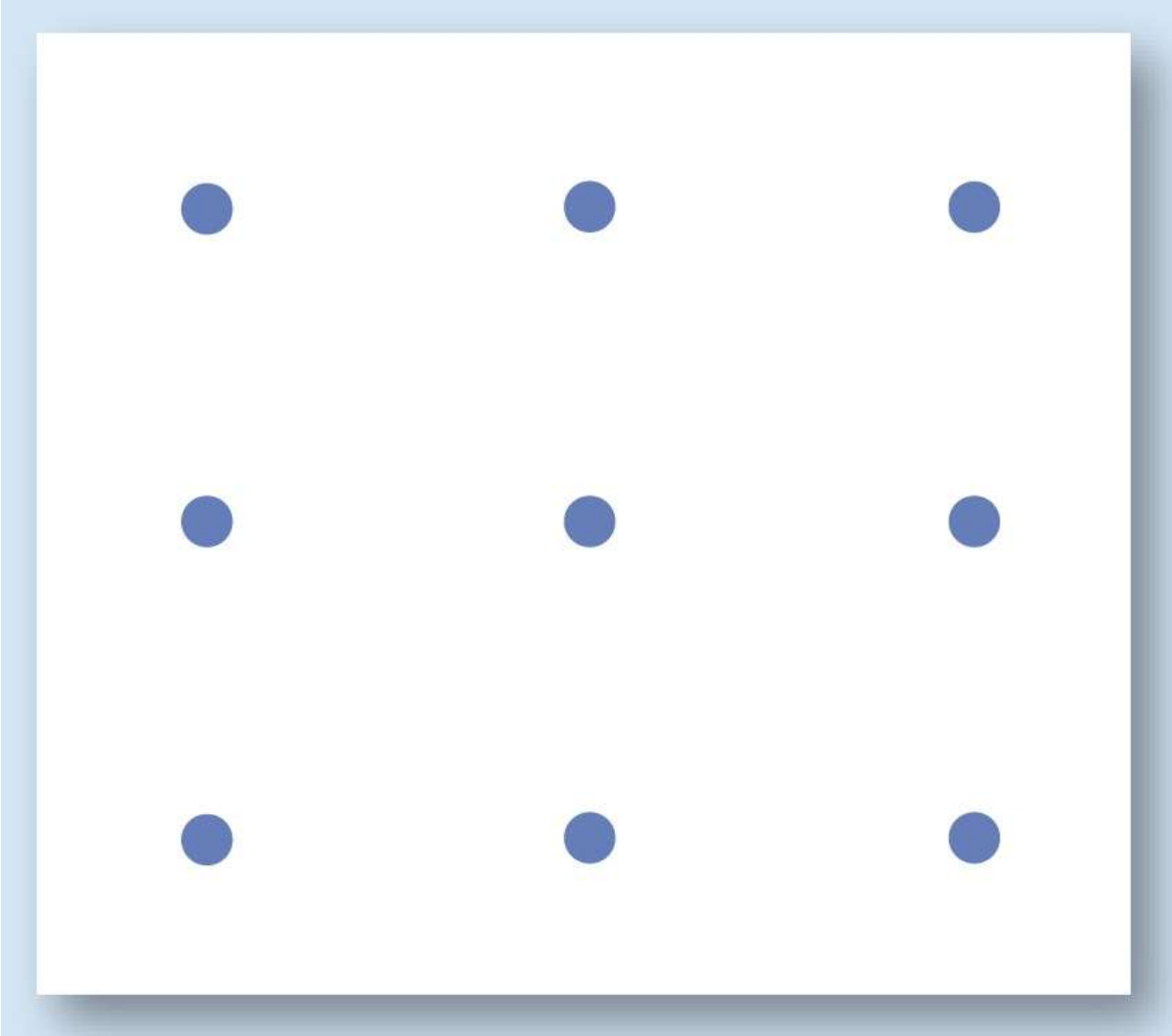


HOW DO YOU TIE THE TWO STRINGS TOGETHER IF YOU CANNOT REACH THEM BOTH AT THE SAME TIME?



THE DOT PROBLEM

CAN YOU DRAW FOUR STRAIGHT LINES SO THAT THEY PASS THROUGH ALL NINE DOTS *WITHOUT LIFTING YOUR PENCIL FROM THE PAGE AND WITHOUT TOUCHING ANY DOT MORE THAN ONCE?*



CREATIVITY

Process of solving problems by combining ideas or behavior in new ways

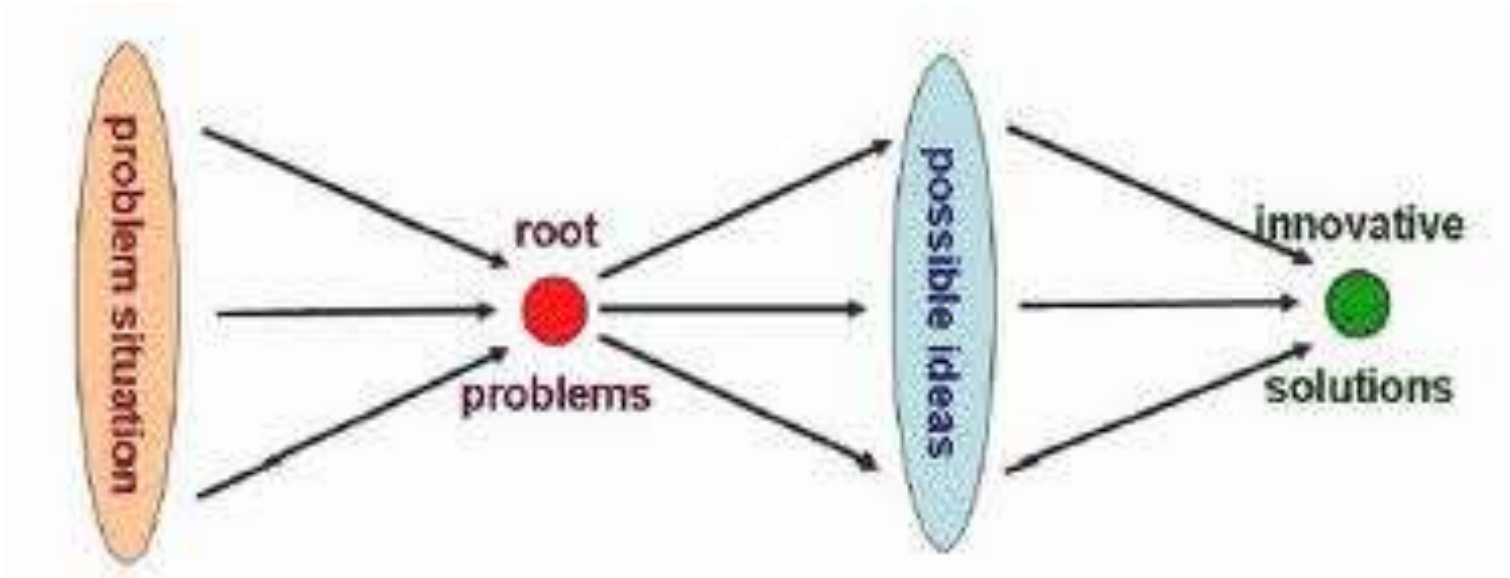
CREATIVITY

Convergent thinking

- Problem is seen as having only one answer
- All lines of thinking lead to single answer
- Uses previous knowledge and logic

Divergent thinking

- Starts from one point
- Develop different ideas or possibilities based on that point


problem situation
root
problems
possible ideas
innovative
solutions

INTELLIGENCE

Intelligence: the ability to learn from one's experiences, acquire knowledge, and use resources effectively in adapting to new situations or solving problems

THEORIES OF INTELLIGENCE

Spearman's Theory

- g factor: the ability to reason and solve problems; general intelligence
- s factor: the ability to excel in certain areas; specific intelligence

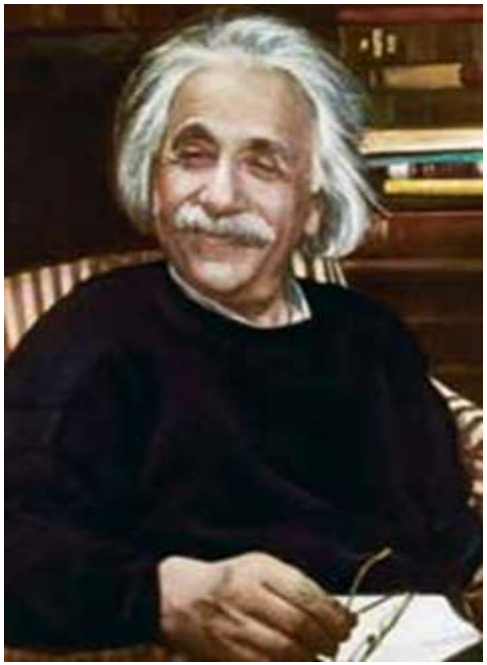
GARDNER'S MULTIPLE INTELLIGENCES

Table 7.2

Gardner's Nine Intelligences

TYPE OF INTELLIGENCE	DESCRIPTION	SAMPLE OCCUPATION
Verbal/linguistic	Ability to use language	Writers, speakers
Musical	Ability to compose and/or perform music	Musicians, even those who do not read musical notes but can perform and compose
Logical/mathematical	Ability to think logically and to solve mathematical problems	Scientists, engineers
Visual/spatial	Ability to understand how objects are oriented in space	Pilots, astronauts, artists, navigators
Movement	Ability to control one's body motions	Dancers, athletes
Interpersonal	Sensitivity to others and understanding motivation of others	Psychologists, managers
Intrapersonal	Understanding of one's emotions and how they guide actions	Various people-oriented careers
Naturalist	Ability to recognize the patterns found in nature	Farmers, landscapers, biologists, botanists
Existentialist (a candidate intelligence)	Ability to see the "big picture" of the human world by asking questions about life, death, and the ultimate reality of human existence	Various careers, philosophical thinkers


ARCO



THEORIES OF INTELLIGENCE

Sternberg's triarchic theory of intelligence: there are three kinds of intelligences

1. analytical,
2. creative
3. practical

THEORIES OF INTELLIGENCE

Triarchic theory of intelligence

- analytical intelligence: the ability to break problems down into component parts, or analysis, for problem solving
- creative intelligence: the ability to deal with new and different concepts and to come up with new ways of solving problems
- practical intelligence: the ability to use information to get along in life and become successful; “street smarts”

IQ TESTS

Intelligence quotient (IQ): a number representing a measure of intelligence, resulting from the division of one's mental age by one's chronological age and then multiplying that quotient by 100

- Stanford-Binet Intelligence Scales yield an IQ score
- allows testers to compare intelligence levels of people from different age groups
- Wechsler Intelligence Tests yield a verbal score and a performance score, as well as an overall score of intelligence

DEVELOPMENT OF IQ TESTS

Reliability: the tendency of a test to produce the same scores again and again each time it is given to the same people

Validity: the degree to which a test actually measures what it's supposed to measure

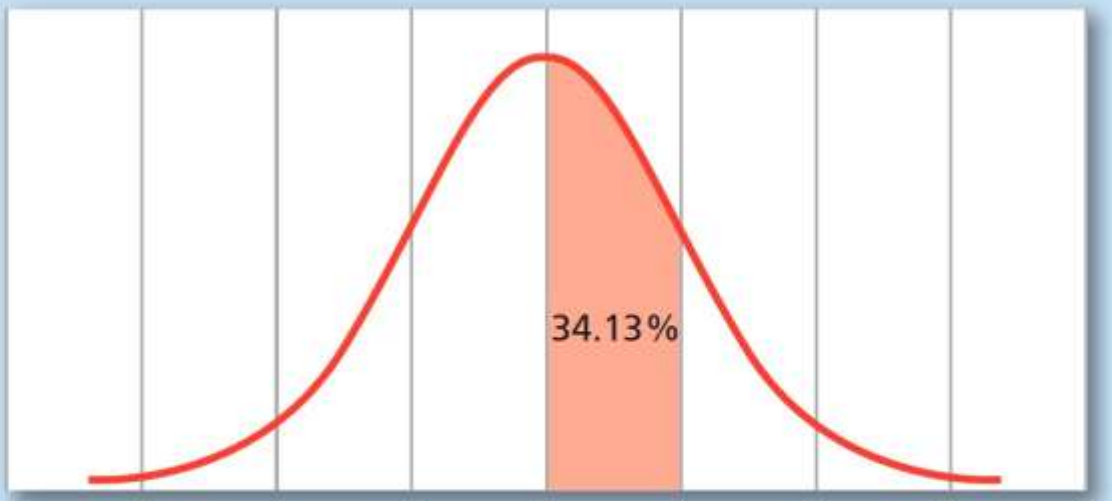
DEVELOPMENT OF IQ TESTS

Standardization: the process of giving the test to a large group of people that represents the kind of people for whom the test is designed

Norms: scores from the standardization group

Most intelligence tests follow a normal curve

THE NORMAL CURVE



Standard Deviations	-4	-3	-2	-1	0	1	2	3	4
Wechsler IQ	40	55	70	85	100	115	130	145	160
Stanford-Binet 4 IQ	36	52	68	84	100	116	132	148	164
Cumulative %	0.003	0.135	2.275	15.856	50.00	84.134	97.725	99.865	99.997

HEREDITY, ENVIRONMENT, AND INTELLIGENCE

Stronger correlations are found between IQ scores as genetic relatedness increases

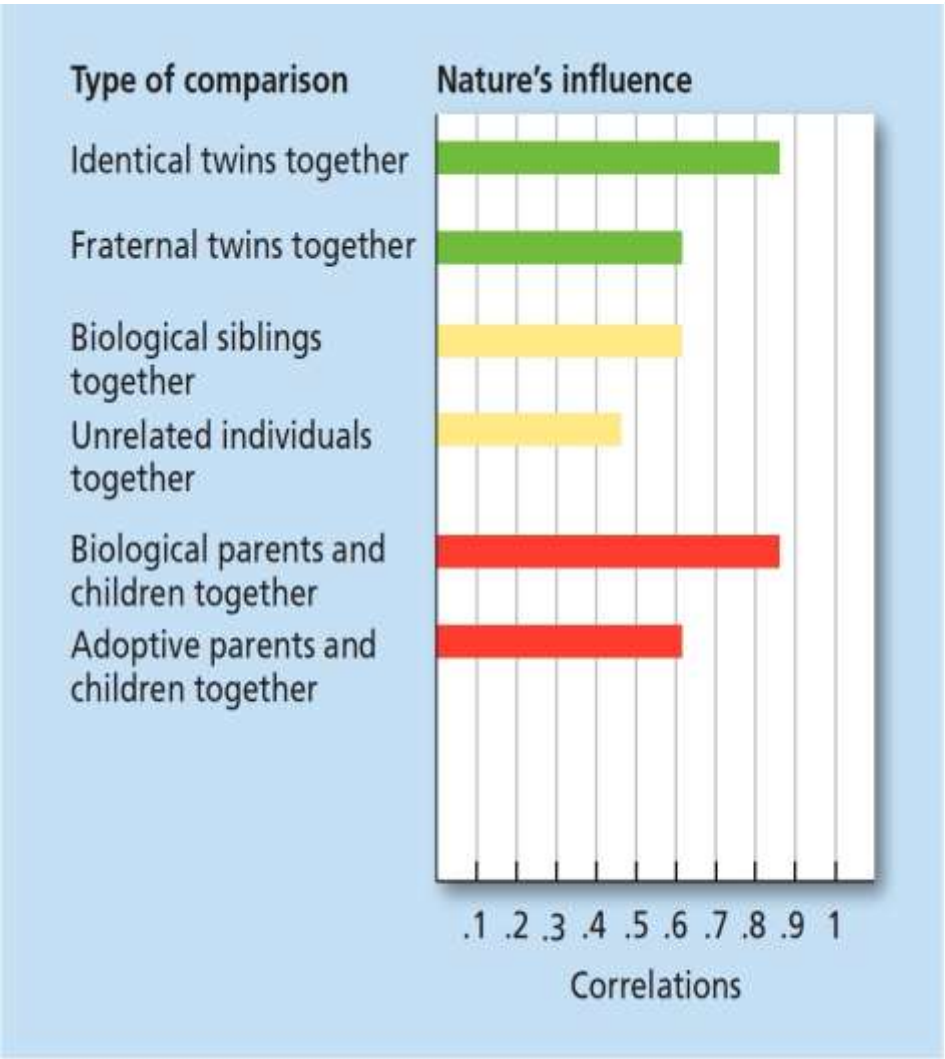
Heritability of IQ is estimated at 0.50

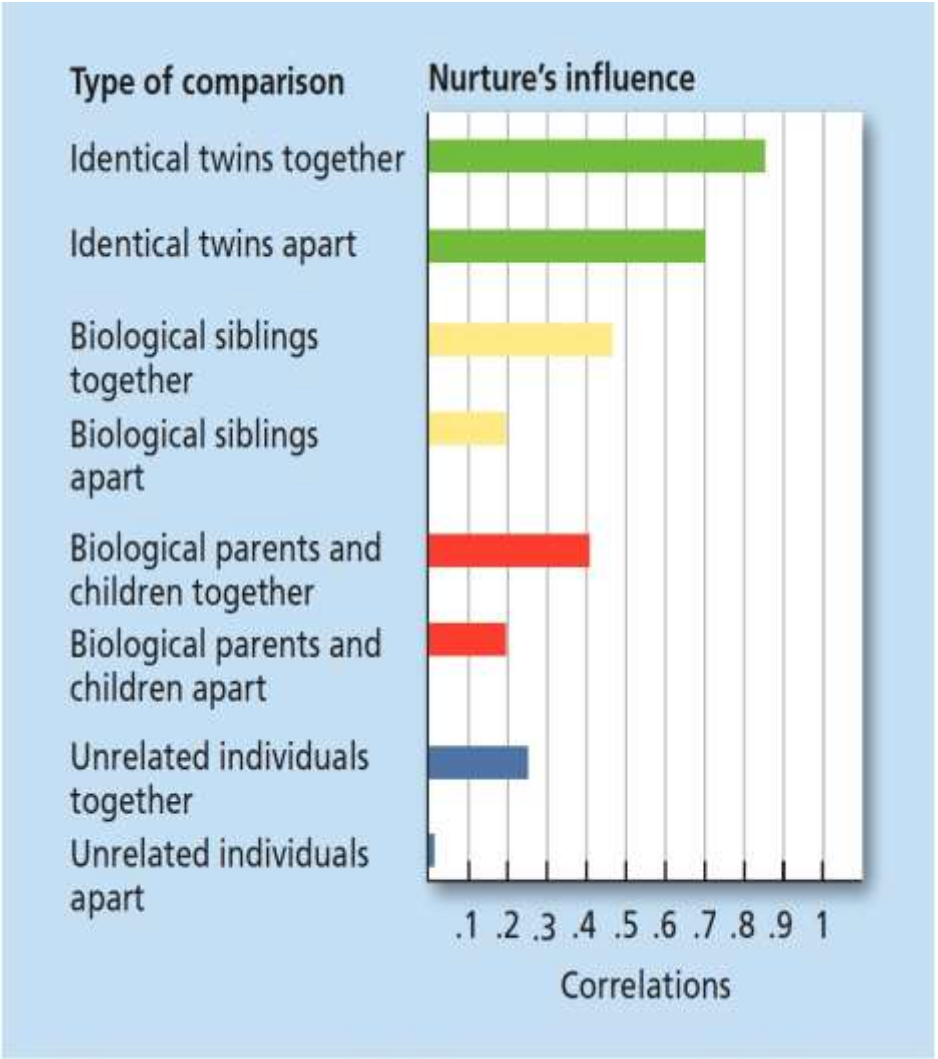
Flynn effect: IQ scores steadily increasing over time in modernized countries

The Bell Curve: a book that made widely criticized claims about the heritability of intelligence

- stereotype threat

CORRELATIONS BETWEEN IQ SCORES OF PERSONS WITH VARIOUS RELATIONSHIPS





LANGUAGE

System for combining symbols (such as words)

Unlimited number of meaningful statements

Statements made for the purpose of communicating with others

LANGUAGE AND COGNITION

Linguistic relativity hypothesis

- Thought processes and concepts are controlled by language
- E.g. English has one word for snow whereas Eskimo has four.

Cognitive universalism

- Concepts are universal and influence the development of language