

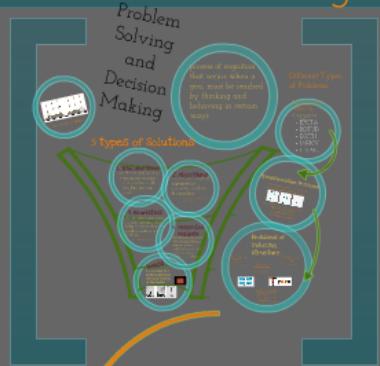
Language

1) a system for combining symbols (words) so that an infinite number of meaningful statements can be made for the purpose of communicating with others

2) the communication of information through symbols arranged according to systematic rules

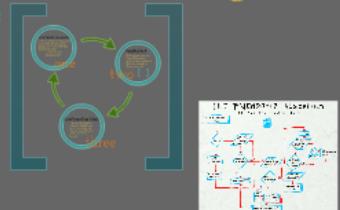


Problem Solving and Decision Making

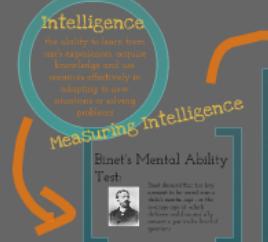


Problems with Problem Solving

Common Barriers:



- How do we organize our thoughts?
- How do we communicate with others?
- How do we learn language?



Our brains are like super computers and they can process many pieces of information simultaneously - but how to organize all this information?

Concepts:



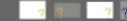
In pairs, think of as many concepts as possible give superordinate, basic, and subordinate levels for each!

Natural Concepts

Concepts that are common, familiar, and easy to learn
• share a set of general, relatively loose characteristics rather than the clearly defined properties of a formal concept
• our concepts are fuzzy



What is a vehicle?



Cognition: Thinking and Language

Cognitive psychology is a sub-discipline of psychology exploring internal mental processes. It is the study of how people perceive, remember, think, speak, and solve problems

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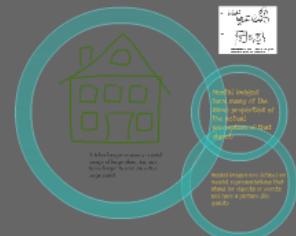
Cognition: Thinking and Language



Cognitive psychology is a sub-discipline of psychology that studies internal mental processes. It is the study of how people remember, think, speak, and solve problems.

How do we organize our thoughts?
How do we communicate with others?

Cognition: Thinking and Language



We also consider objects without having about all the examples of

Cognitive psychology is a sub-discipline of psychology exploring internal mental processes. It is the study of how people perceive, remember, think, speak, and solve problems

- organize our thoughts?
- communicate with others?
- learn language?

elligence
learn from
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ing Intelligence



The Wechsler Tests

Wechsler developed tests for children and adults that have both a verbal and a performance (non-verbal) scale, as well as providing an overall score of intelligence.



Cognitive psychology
internal mental processes
remember, think, speak

- How do we organize our thoughts?
- How do we communicate with others?
- How do we learn language?

Intelligence

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

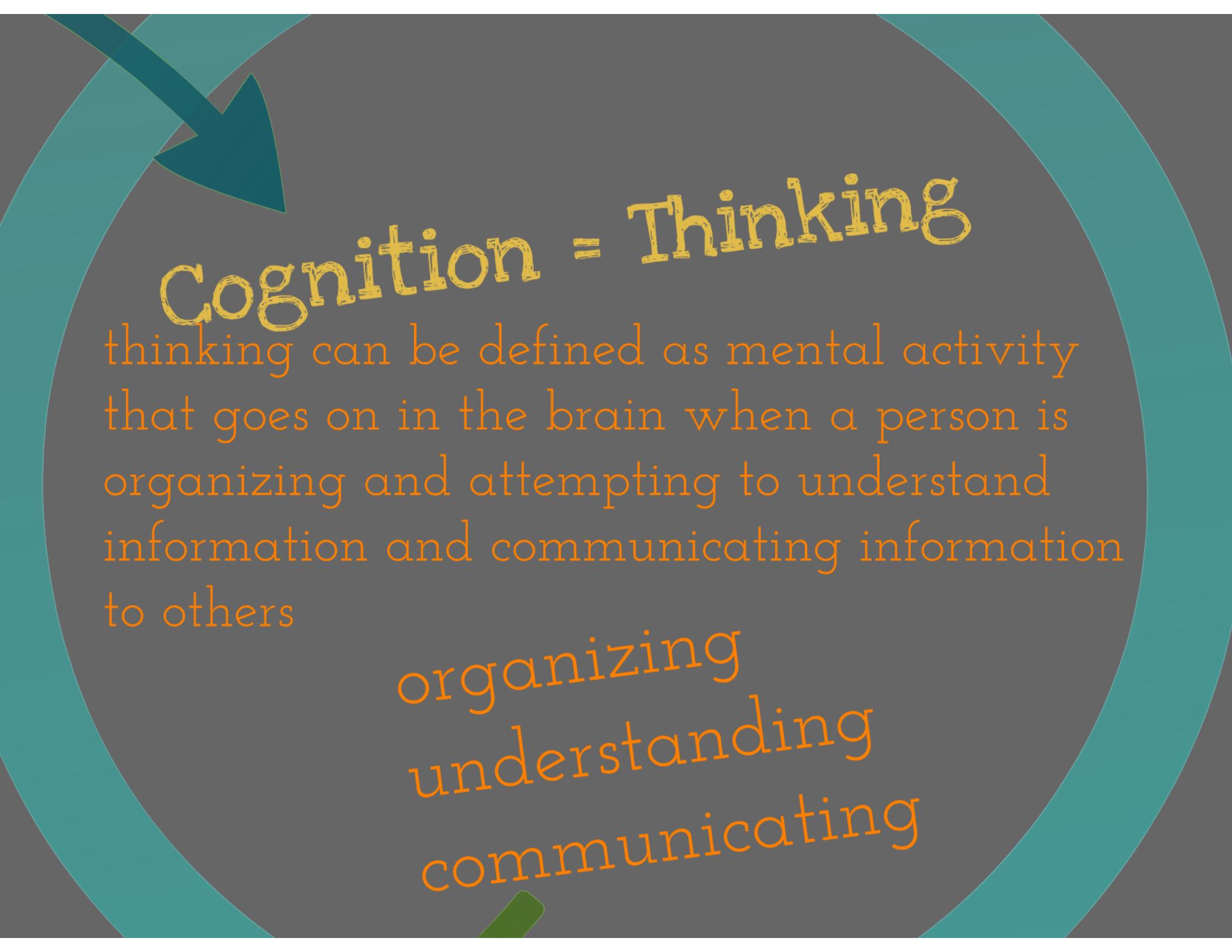


Stanford-Binet



Cognition = Thinking

thinking can be defined as mental activity that goes on in the brain when a person is organizing and attempting to understand information and communicating information to others



Cognition = Thinking

thinking can be defined as mental activity that goes on in the brain when a person is organizing and attempting to understand information and communicating information to others

organizing
understanding
communicating

organizing
understanding
communicating

Did you ever think:

When people are thinking, they are not only aware of the information in the brain but they are also simultaneously making decisions about it, comparing it to other information, and using it to solve problems!

Mental images are defined as mental representations that stand for objects or events and have a picture-like quality

Mental images
have many of the
same properties of
the actual
perception of that
object:

(b)



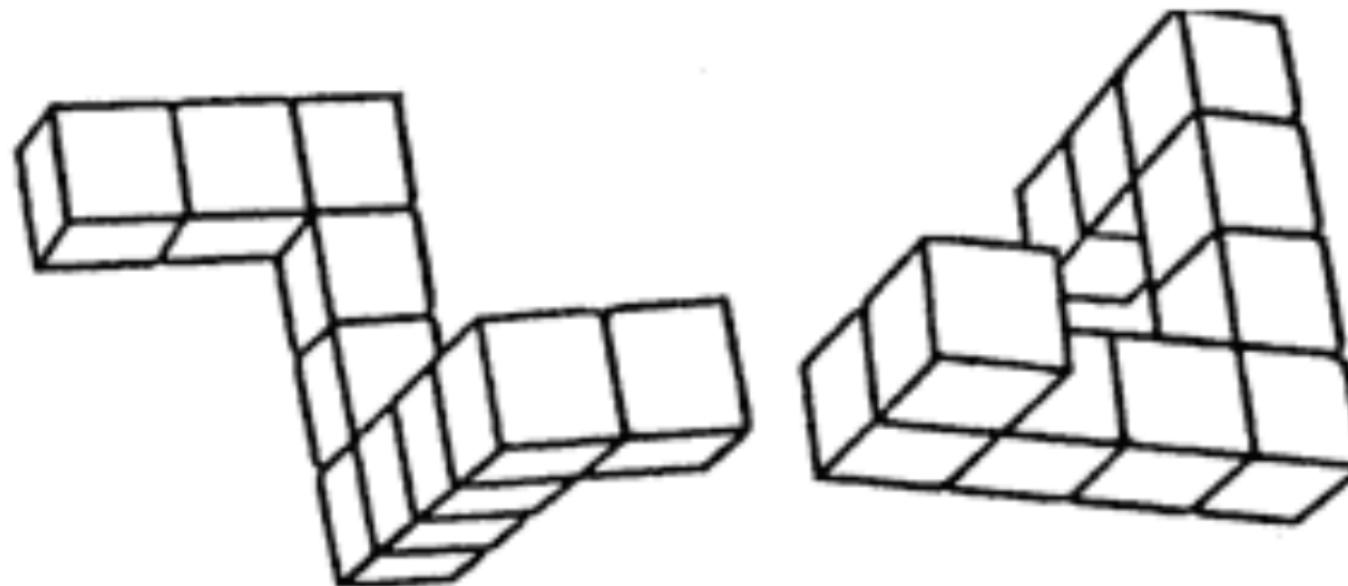
It takes longer to scan a mental image of large object just as it takes longer to scan an actual large object

Mental images have more

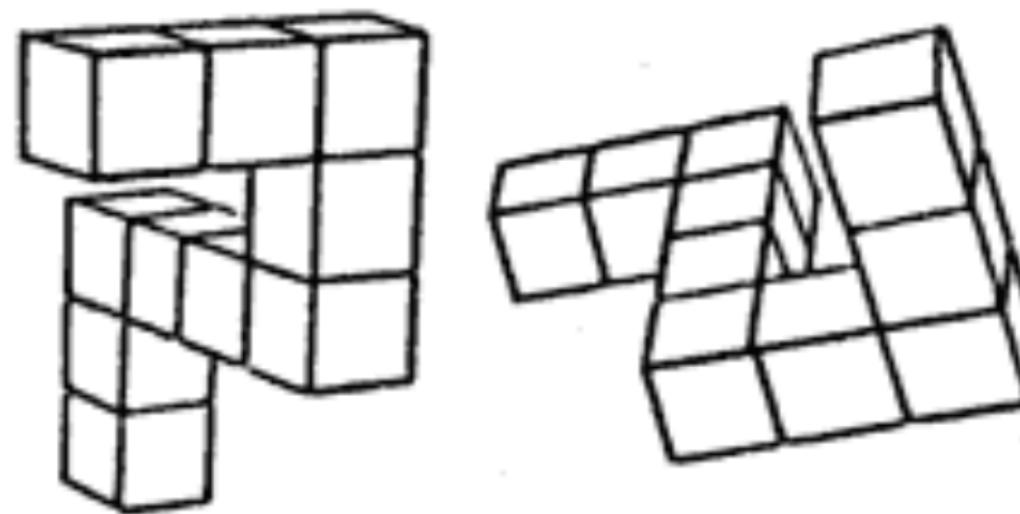
Same problem as the actual perception of object:

Mental images have more

(a)



(b)



Mental Rotation Test—Are these two figures the same except for their orientation?

Our brains are like Super
computers and they can process
many pieces of information
simultaneously - but how to
organize all this information?

Concept

you entry into processes
of information
sly - but how to
this information?

Concepts:

- i
- c
- a
- a
- 1
- 1
- 2

S.
.

- ideas that represent a class or category of objects, events or activities
- we use concepts to think about objects or events without having to think about all the specific examples of the category:

- fruit
- sports
- dogs



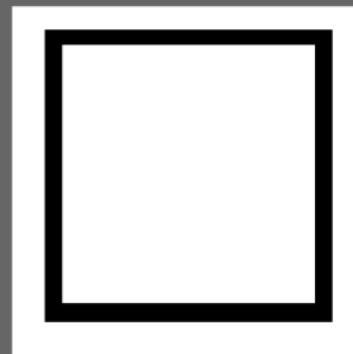
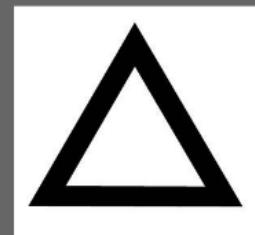


Ukrainian Levkoy

Formal Concepts:

defined by specific and rigid rules or features

- square
- triangle



Superordinate Concept:



Concepts of a very
general form
i.e. Fruit

Basic Concept:

more Specific, but
can be further
divided
i.e. apple



Subordinate Concept: the most specific example of the concept i.e. Granny Smith Apple



In pairs, think of as many concepts as possible: give Superordinate, basic, and Subordinate levels for each!

Natural Concepts

- other concepts are more ambiguous and difficult to define
- share a set of general, relatively loose characteristics rather than the clearly defined properties of a formal concept
- natural concepts are fuzzy







What is a vehicle?

- natural co



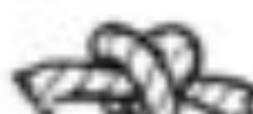
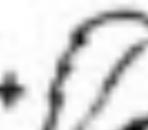


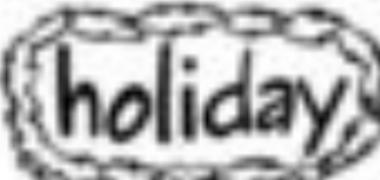


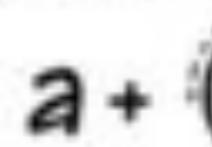


REBUS

Tur +  is  + ular

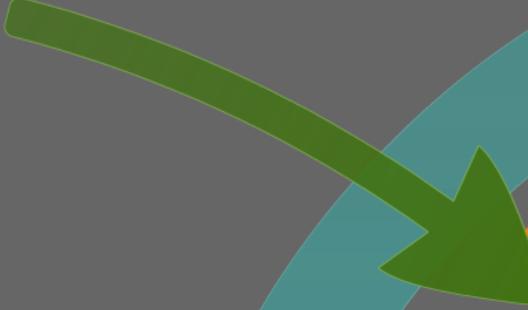
 own +  -f  -h

 -h   holiday

 +s but all y + 
a +  !

END YOUR HOLIDAY

Most Native American Indians hunted turkeys for
their meat, turkey feathers are artifacts
and for arrows, and skins from turkey traps
are artifacts. Turkey quills were often used
in making games.



Prototypes:
an example of a
concept that closely
matches the defining
characteristics of a
concept

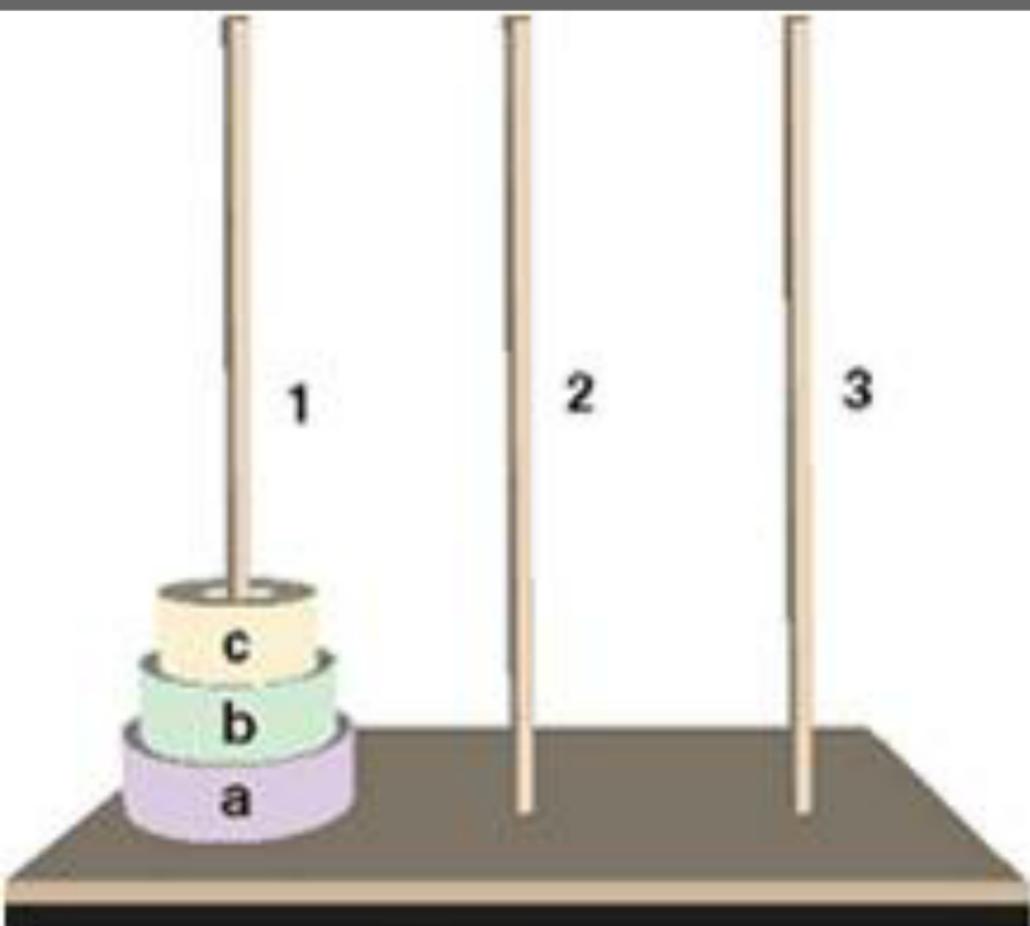
What do you think of first
when someone asks you
about fruit? Animals? Birds?

Problem Solving and Decision Making

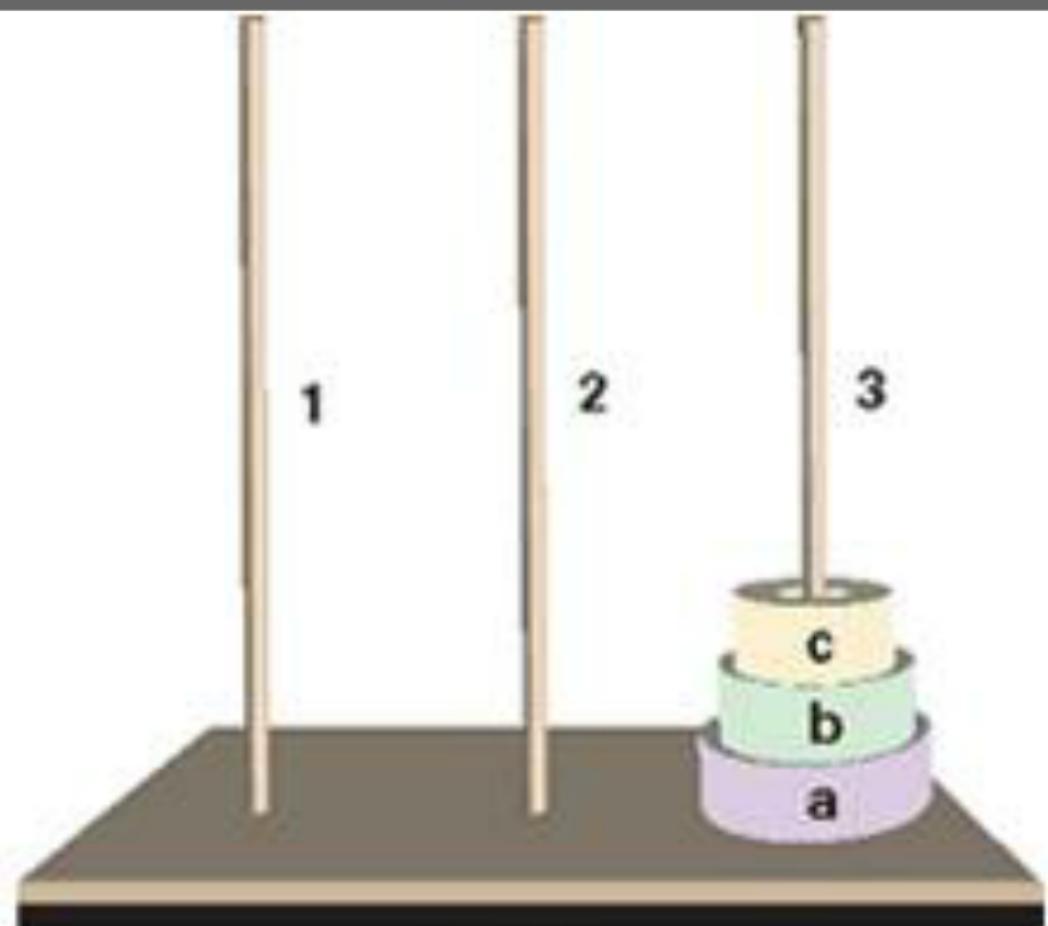


process of cognition that occurs when a goal must be achieved by thinking and behaving in certain ways

process of cognition
that occurs when a
goal must be reached
by thinking and
behaving in certain
ways



Start



Finish

The Tower of Hanoi

Different Types of Problems:

Arrangement

Arrangement Problems: Anagrams

- EFCTA
- BOTUD
- IKCTH
- IAENV
- LIVAN



Transformation Problems

Water jars: a person has three jars having the following capacities:



Jar A: 280ml Jar B: 70ml Jar C: 50ml

How can the person measure exactly 110 millilitres of water?

Water jars: a person has three jars having the following capacities:



Jar A: 280ml Jar B: 70ml Jar C: 50ml

How can the person
measure exactly 110
millilitres of water?

Problems of Inducing Structure

What number
next in the

What number comes
next in the series?

1 4 2 4 3 4 4 4 4 5 4 6 4 _

What number
comes next in the
series?

1 2 3 5 8 13 21 34 _

What number comes
next in the series?

1 11 21 1211 111221 _

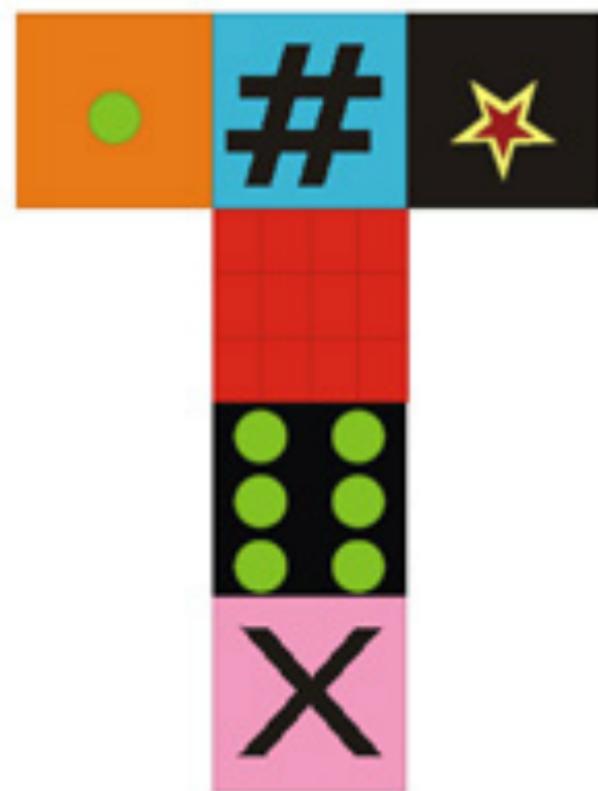


a

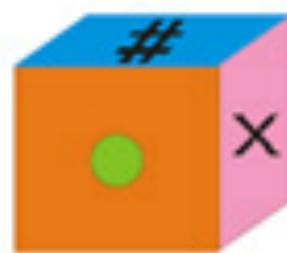
b

c

d



a



b



c



d

analogies:



Complete these analogies:

- Baseball is to bat as tennis is to _____
- Merchant is to sell as customer is to _____

Making

by
beh
way

5 types of Solutions

1. Trial and Error

aka Mechanical Solution

- trying one solution after another until you find one that

2. Algorithm

a rule that, if applied appropriately, guarantees a solution

1. Trial and Error

aka Mechanical Solution

- trying one solution after another until you find one that works

2. Algorithms

a rule that, if applied
appropriately,
guarantees a solution
to a problem

e.g. Mathematical formulas
e.g. Library

3. Heuristics

An educated guess based on prior experience that helps to narrow down the possible solutions for a problem

a 'rule of thumb'

4. Means-End

Analysis

the difference between
the starting situation
and the goal is
determined and then
steps are taken to
reduce that difference

23
determined and
steps are taken to
reduce that differen-

InSight

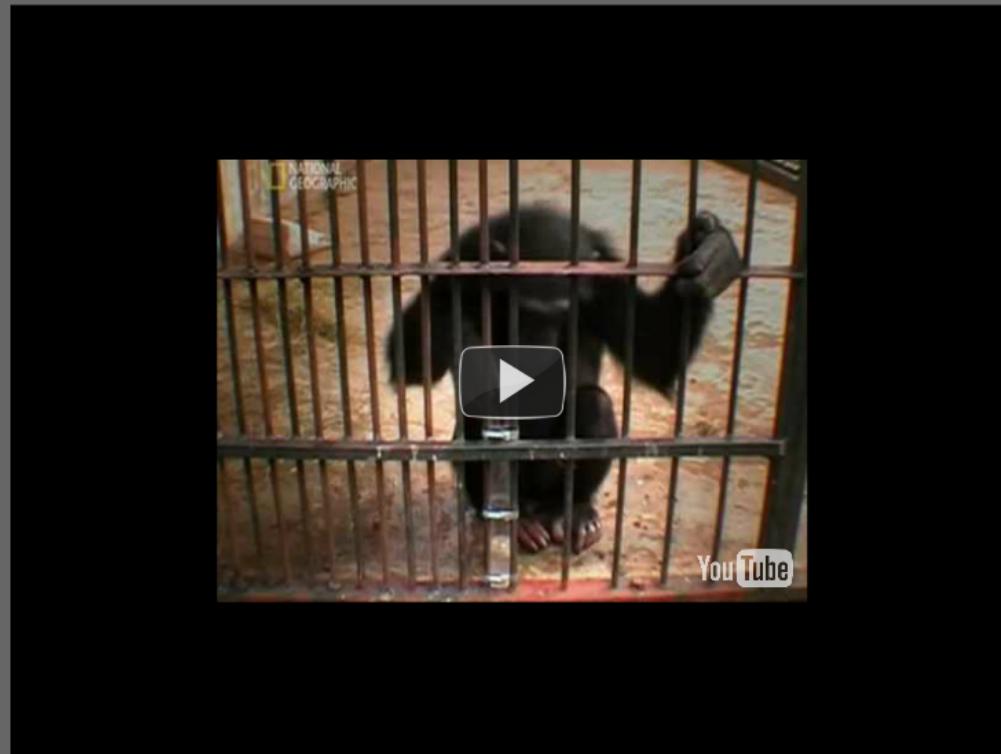
*the solution to a
problem just pops
into your mind all
of the sudden*

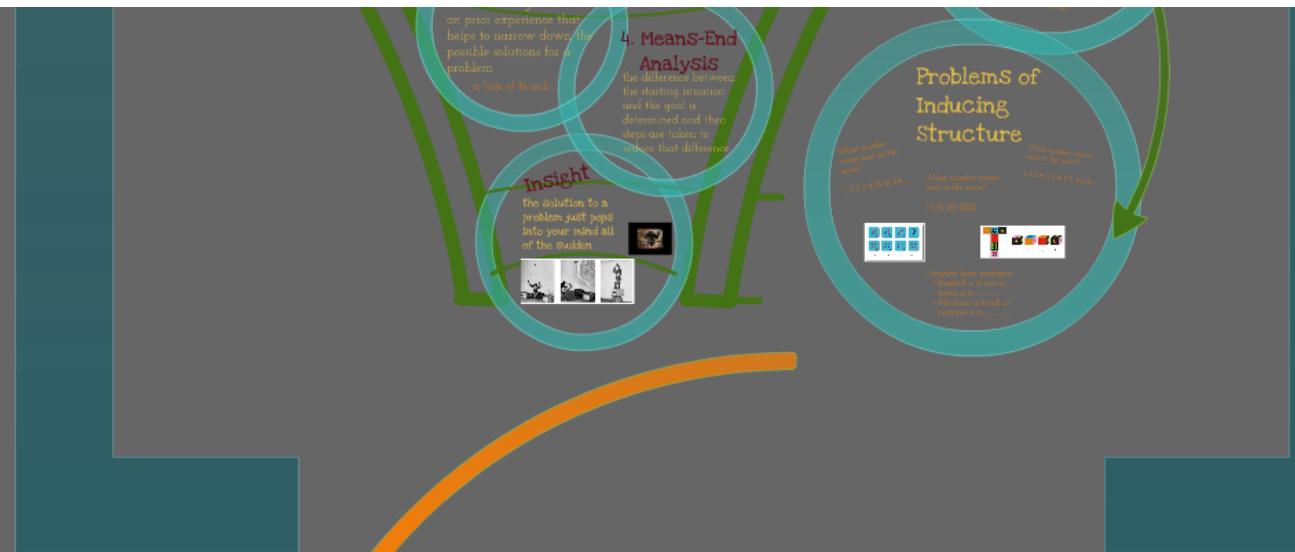


of the Sudden



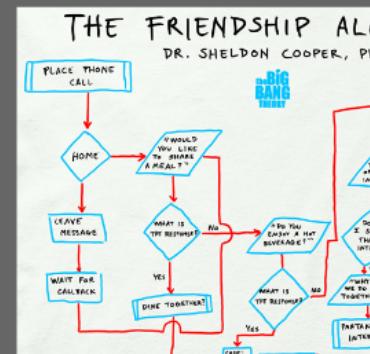
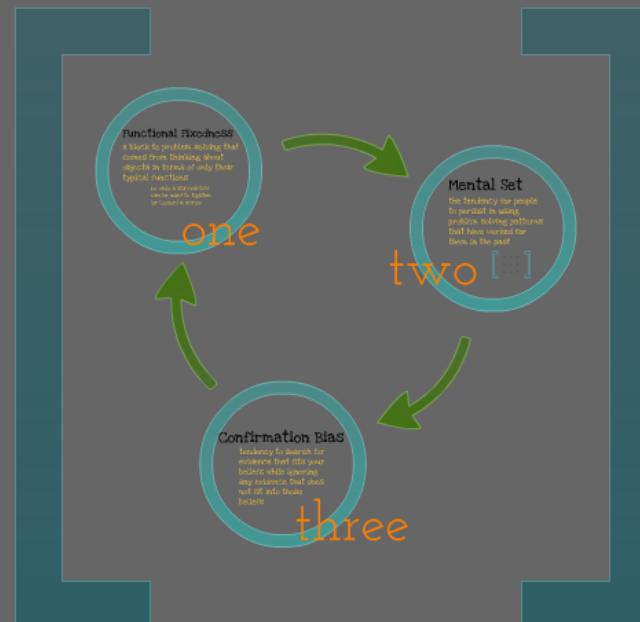
OS
all





Problems with Problem Solving

Common Barriers:



Functional Fixedness

a block to problem Solving that comes from thinking about objects in terms of only their typical functions

i.e. only a screwdriver can be used to tighten (or loosen) a screw

One

Mental Set

the tendency for people
to persist in using
problem solving patterns
that have worked for
them in the past

two [...]



Confirmation Bias

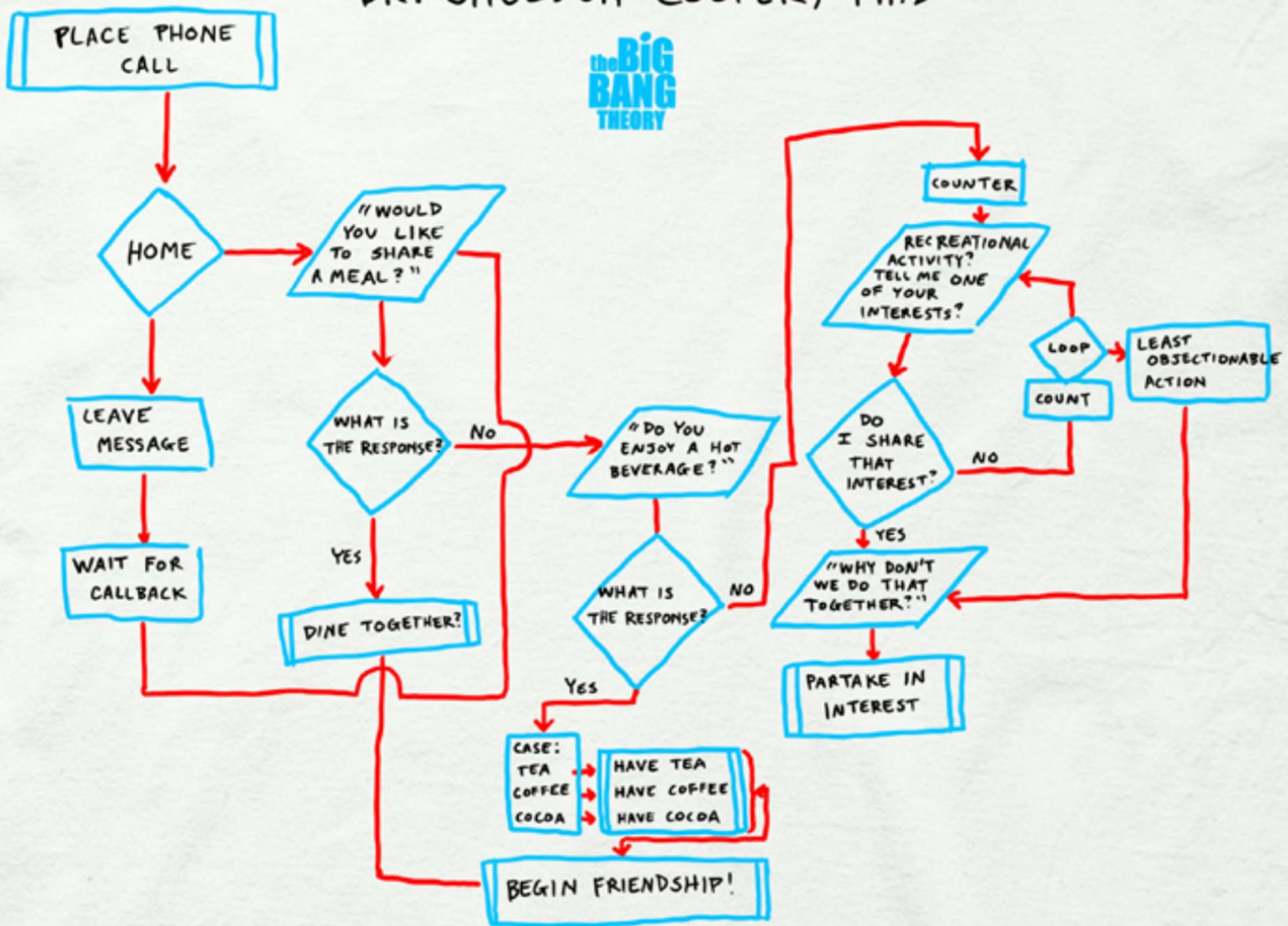
tendency to search for evidence that fits your beliefs while ignoring any evidence that does not fit into those beliefs

three

THE FRIENDSHIP ALGORITHM

DR. SHELDON COOPER, Ph.D

the
BIG
BANG
THEORY



Intelligence

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

Measuring Intelligence

One's experiences, acquire knowledge and use resources effectively in adapting to new situations or solving problems

Measuring Intelligence

Binet's Mental Ability Test:



Binet decided that the key element to be tested was a child's mental age - or the average age

Binet's Mental Ability Test:



Binet decided that the key element to be tested was a child's mental age - or the average age at which children could successfully answer a particular level of questions



Stanford-Binet and IQ

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 to get IQ.

Stanford-Binet and IQ

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 to get IQ.

$$IQ = MA/CA \times 100$$

$$IQ = MA/CA \times 100$$

If a child who is 10 years old takes the test and scores a mental age of 15 (is able to answer the level of questions typical of a 15 year old) their IQ would look like this:

$$IQ = 15/10 \times 100 = 150$$

The WeSchler Tests

WeSchler developed tests for children and adults that have both a verbal and a performance (non-verbal) scale, as well as providing an overall score of intelligence.

IQ

Types of Items Found on the Wechsler Intelligence Scales for Children

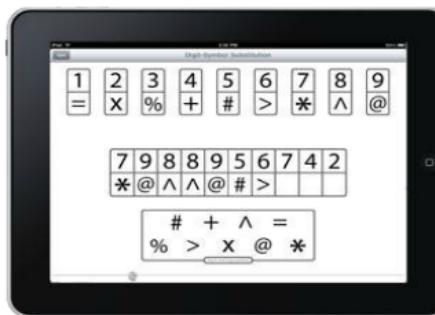
| Name | Goal of Item | Example |
|---------------------|--|--|
| Verbal Scale | | |
| Information | To assess general information | Where does milk come from? What is steam made of? Who wrote Tom Sawyer? |
| Comprehension | To test understanding and evaluation of social norms and past experience | Why do we put food in the refrigerator? What is the advantage of keeping money in the bank? |
| Arithmetic | To assess math reasoning through verbal problems | Stacy had two crayons and the teacher gave her two more. How many did she have altogether? |
| Similarities | To test understanding of how objects or concepts are alike, tapping abstract reasoning | In what way are cows and horses alike? In what way are hammers and saws alike? |

Performance Scale

Digit Symbol

To assess speed of learning

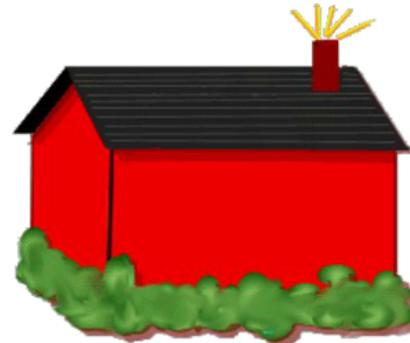
Match symbols to numbers using the key:



Picture Completion

To identify missing parts, testing visual memory and attention

Identify what is missing:



Object Assembly

To test understanding of relationship of parts to wholes

Put pieces together to form a whole:



Picture Arrangement

A story is told in three or more cartoon panels placed in the incorrect order

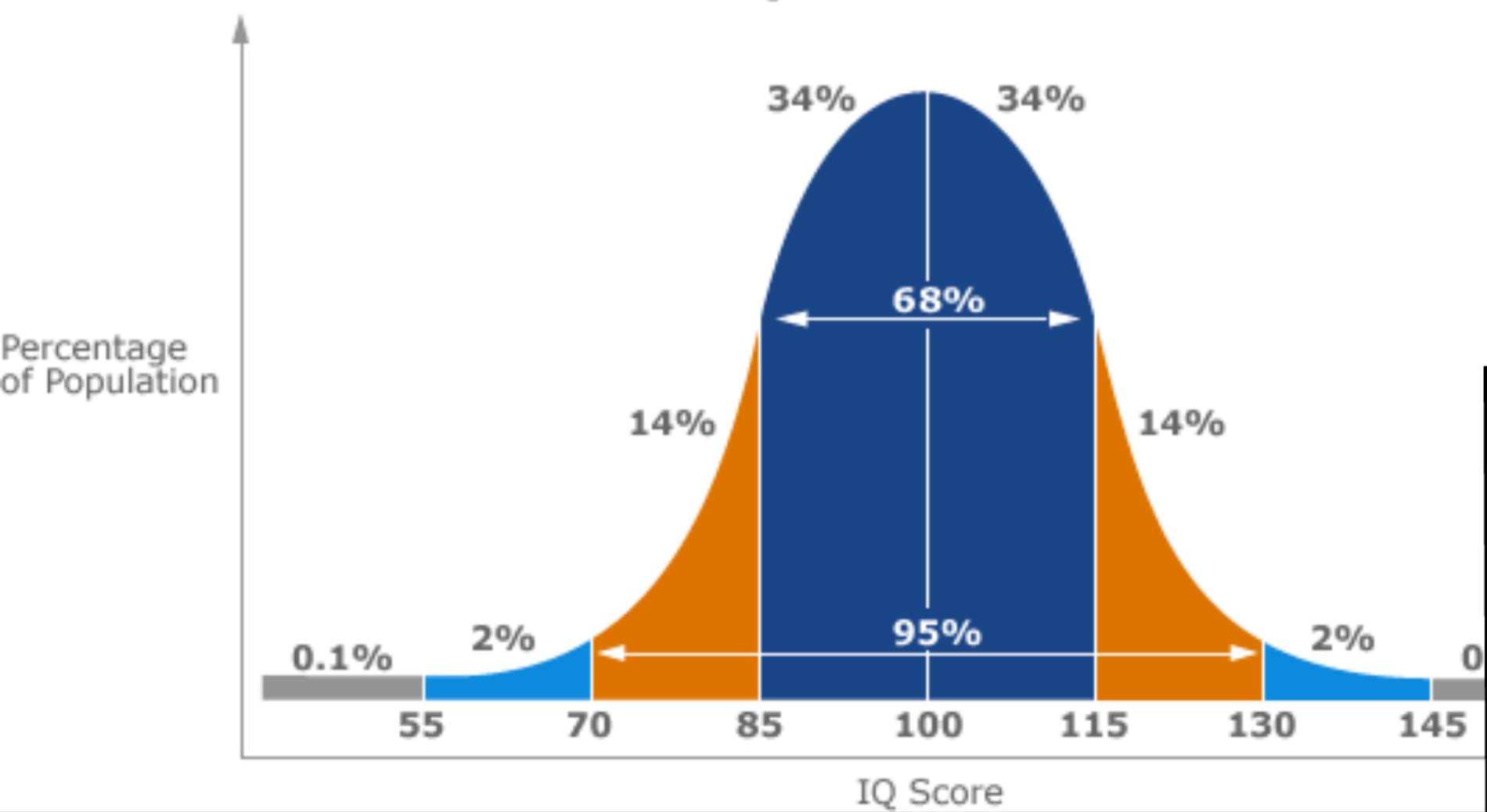
Put them together to tell the story:

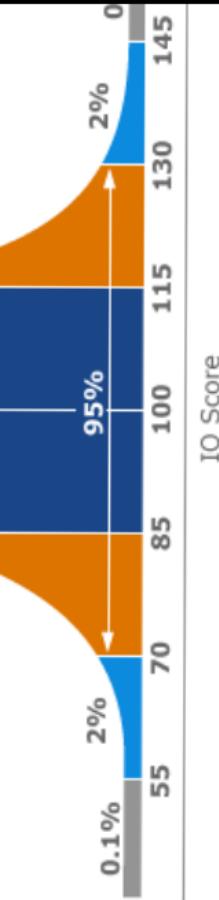




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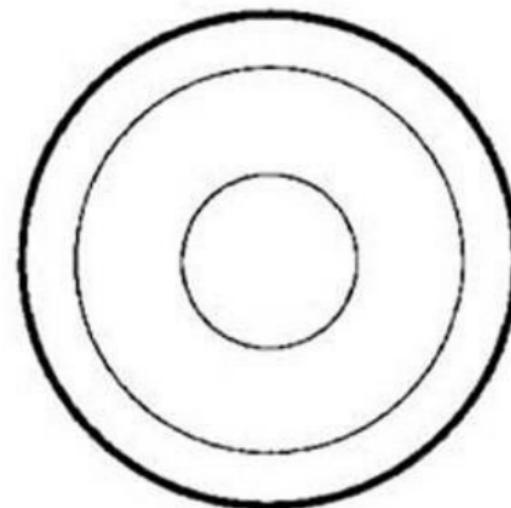
IQ Score Distribution





IQ Tests and Cultural Bias

the biggest problem with trying to measure intelligence with a test that is based on an understanding of the world and its resources is that not everyone comes from the same 'world'





You Tube

2% 0
145



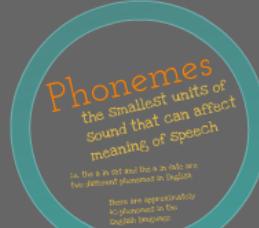
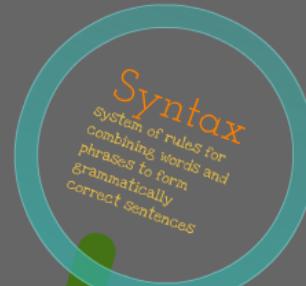
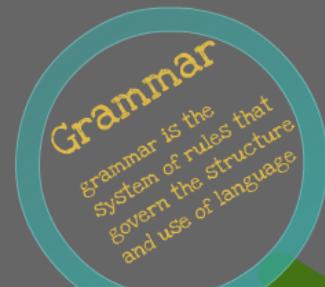
Language

- 1) a System for combining Symbols (words) So that an infinite number of meaningful statements can be made for

1) a System for combining symbols (words) so that an infinite number of meaningful statements can be made for the purpose of communicating with others

2) the Communication
of information
through Symbols
arranged according
to Systematic rules

Elements of Language



Grammar

grammar is the
System of rules that
govern the structure
and use of language

Syntax

System of rules for
combining words and
phrases to form
grammatically
correct sentences

Consider this:

"The boy kidnapped John"

"John, the kidnapped
boy"

"John kidnapped the boy"

Semantics

the rules for determining
the meaning of words and
sentences

Consider this:

"The truck hit Laura"

"Laura was hit by the truck"

Phonemes

the Smallest units of
Sound that can affect
meaning of Speech

*i.e. the a in fat and the a in fate are
two different phonemes in English*

*There are approximately
40 phonemes in the
English language*

Morphemes

*the smallest units
of meaning within a
language*

e.g. 'Play' and 'ing'

Pragmatics

the practical aspects
of communicating:

knowing things like:

- how to take turns in a conversation
- using gestures to make a point

Play - the practical aspects of communicating:

knowing things like:

- how to take turns in a conversation
- using gestures to make a point
- how to indicate you need more information

The Relationship between Language and Thought

Linguistic Relativity



Check out both Kanzi (a Bonobo Chimpzee) and Koko (a Gorilla) in your SLATE folder!

Linguistic Relativity Hypothesis

*the theory that thought
processes and concepts
are controlled by
language*

Cognitive Universalism

theory that says that concepts
are universal and influence the
development of language