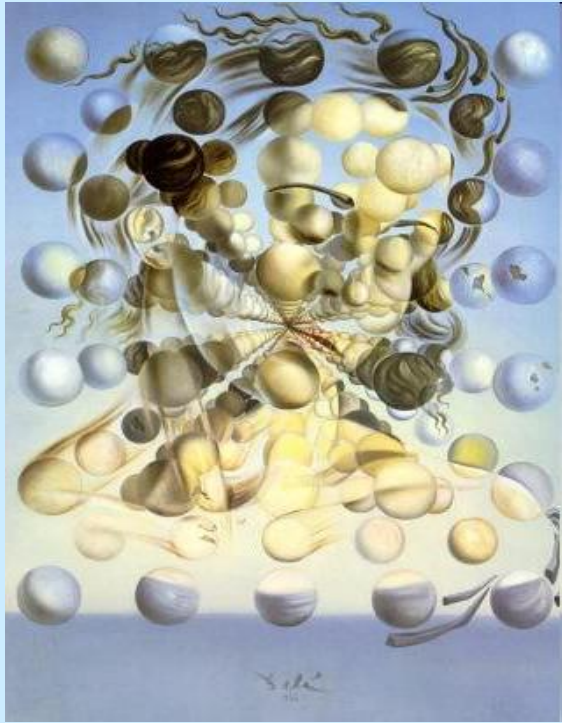


Psychology of Creativity

Dr Massimiliano Palmiero

What is Creativity?

The problem with creativity is that we know it when we see it, but it is hard to define and to study it.



Galatea of the Spheres – 1952 Salvador Dali



Creative Architecture



Creative Object

Some Definitions of Creativity

- **John Watson's said: "How the new comes into being: One natural question often raised is : How do we ever get new verbal creations such as a poem or a brilliant essay? The answer is that we get them by manipulating words, shifting them about until a new pattern is hit upon."**
- **Barron (1955) proposed to be judged as "original" particular group being studied and to some extent adaptive to reality.**
- **Koestler (1964) proposed that creativity involves a "bisociative process"- the deliberate connecting of two previously unrelated "matrices of thought" to produce a new insight or invention.**

Bink & Marsh (2001): the number of definitions of "creativity" is equal to the number of researchers that study this subject.

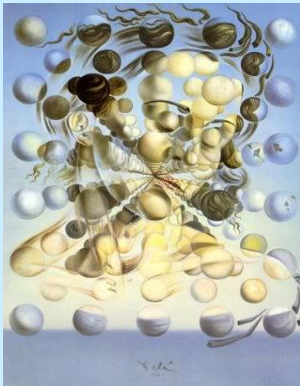
There is no single definition of Creativity

but several emphases have been made in the past to highlight various aspects of the creative effort, both with respect to its process as well as to its product.

In general:

Creativity is a mental process involving the discovery of new ideas, or **new associations** of the existing ideas, relying on the process of either **conscious** or **unconscious** insight, as well as on emotions, personality and contextual factors.

The products of creative thought are usually considered to have both **originality**, **appropriateness**, matching the task constraints, and **authenticity**, a reflection of an individual's own rules and belief.



Wallas (1926)

Information processing model

1. **Preparation:** definition of issue, observation, and study
2. **Incubation:** laying the issue aside for a time
3. **Illumination:** the moment when a new idea finally emerges
4. **Verification:** checking it out

Assumptions:

- creative thinking is a subconscious process that cannot be directed
- creative and analytical thinking are complementary

Rossman (1931)

1. **Observation of the problem**
2. **Analysis of the problem**
3. **A survey of all available information**
4. **A formulation of all objective solutions**
5. **Analysis of solutions for their advantages and disadvantages**
6. **The birth of the new idea - the invention**
7. **Experimentation to test out the most promising solution**

Assumptions:

- the moment of illumination (generation of ideas) is clearly analytical
- no incubation

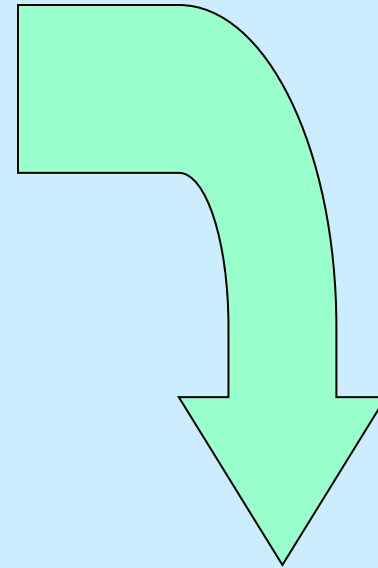
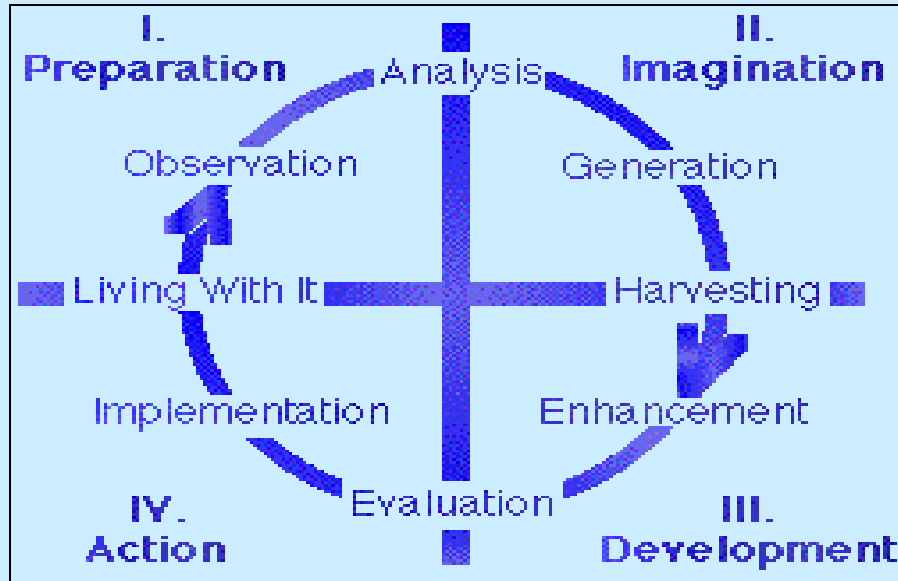
Osborn (1953)

1. **Orientation:** pointing up the problem
2. **Preparation:** gathering pertinent data
3. **Analysis:** breaking down the relevant material
4. **Ideation:** piling up alternatives by way of ideas
5. **Incubation:** letting up, to invite illumination
6. **Synthesis:** putting the pieces together
7. **Evaluation:** judging the resulting ideas

Assumptions:

- purposeful ideation both in the notion of "piling up alternatives" and through the development of the rules of brainstorming as a tool for doing so.

Creativity Process



**Conscious
or
unconscious
Mental processing
during
imagination/generation**

Murray & Denny (1969) showed some evidence that low ability subjects helped by incubation (as a distractor task)

Dijksterhuis & Meurs (2006) revealed that incubation increases the originality of responses

Creative Mental Operations

Application of existing knowledge

The adaptive use of existing knowledge in its habitual context

E.g., Scientific work: existing framework introducing the necessary variation

Combination generation

Merging two or more concepts into one new idea

E.g., the discovery of the chemical structure of DNA: the double helix model resulted from combining existing building elements such as nucleotides, hydrogen bonds and spiral lines into a single structure.

Analogy detection

Transposition of conceptual structure from one habitual context to another innovative context

E.g., Spreading of artistic styles, like Surrealism, across different fields, like photography, cinema, etc...

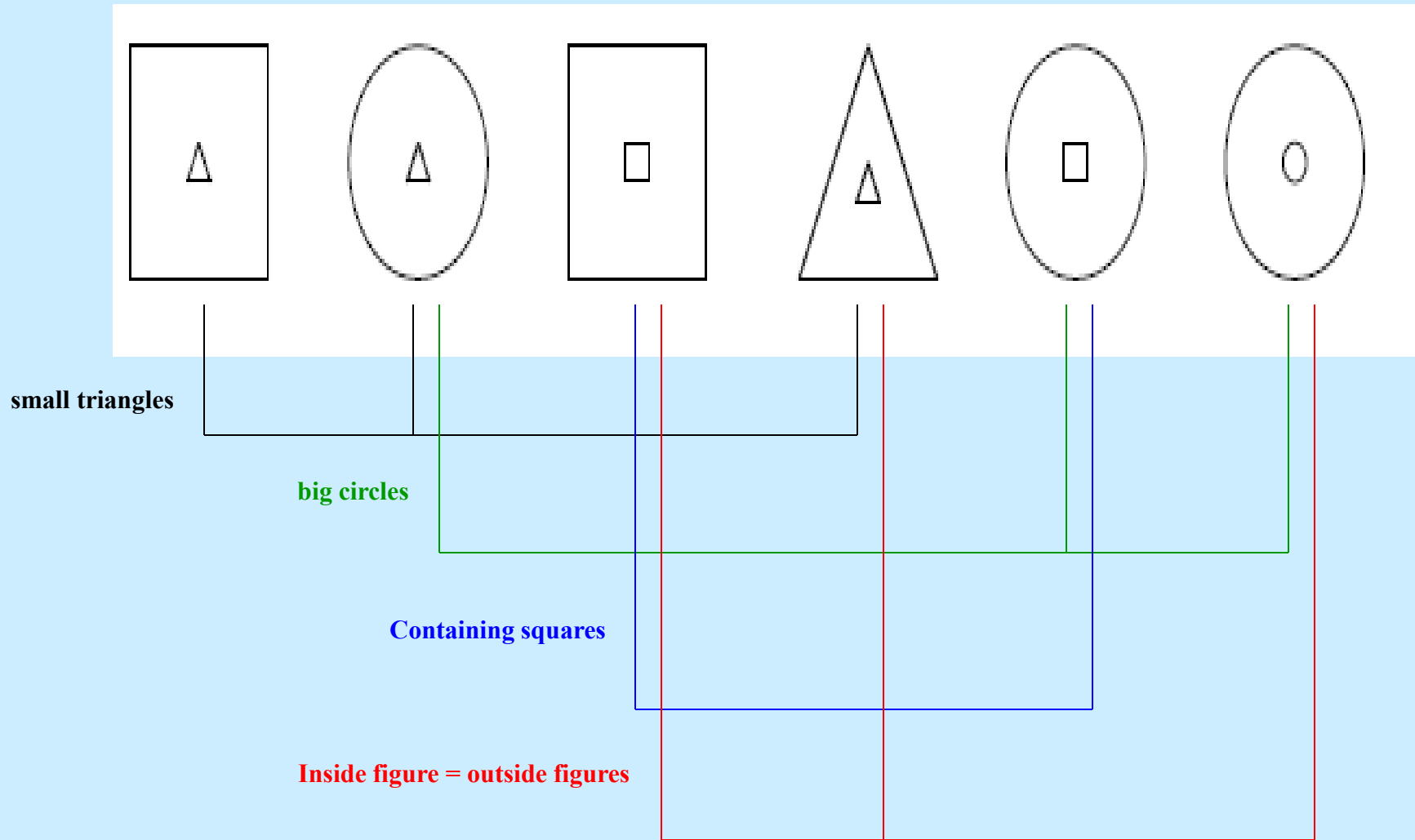
Abstraction discovery

The new structure is formed defining the relationship between existing structures

E.g.



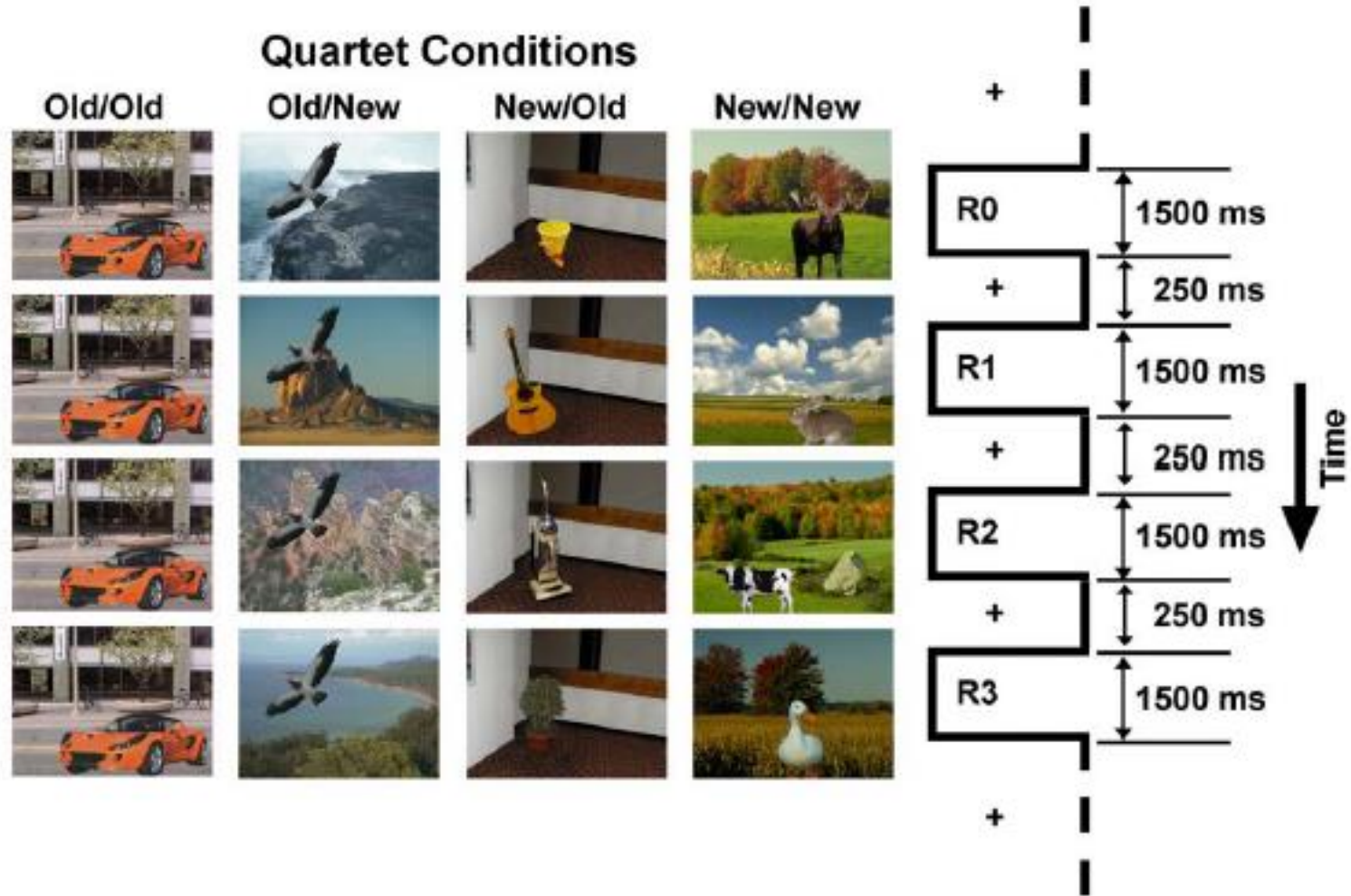
Abstraction Operation

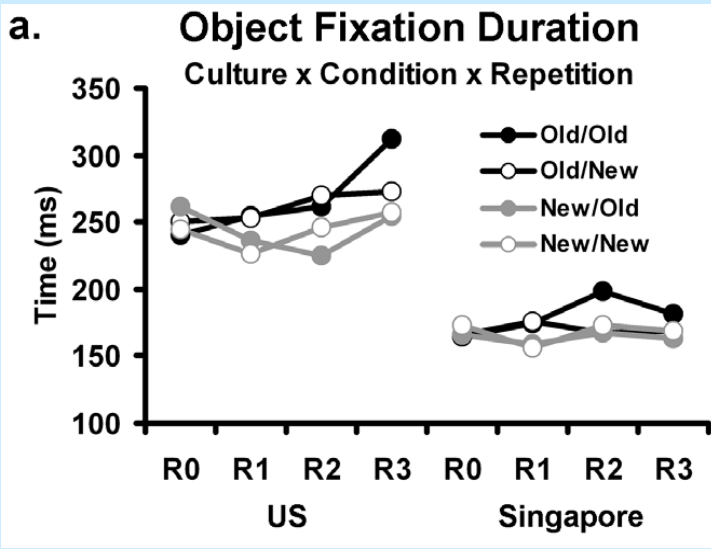


Aspects which can affect Creativity: a cross-cultural perspective

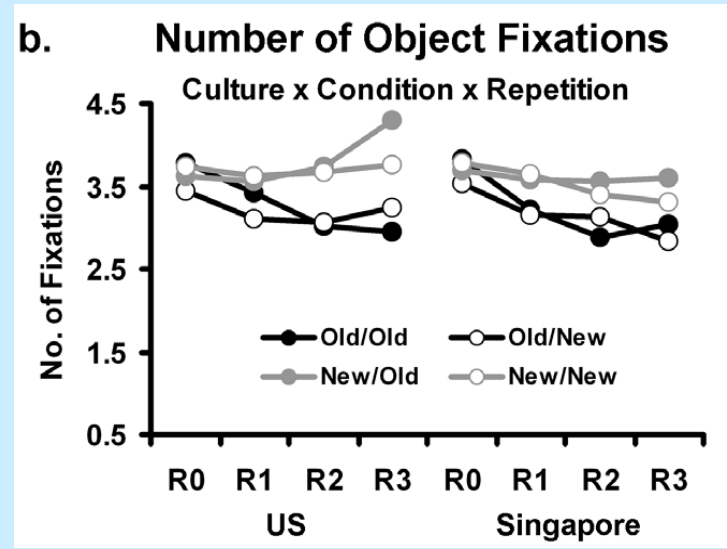
- **Cognition**
- **Personality**
- **Particular specifiable features of products**

Basic difference between West and East in terms of cognition: Analytical versus Holistic approach



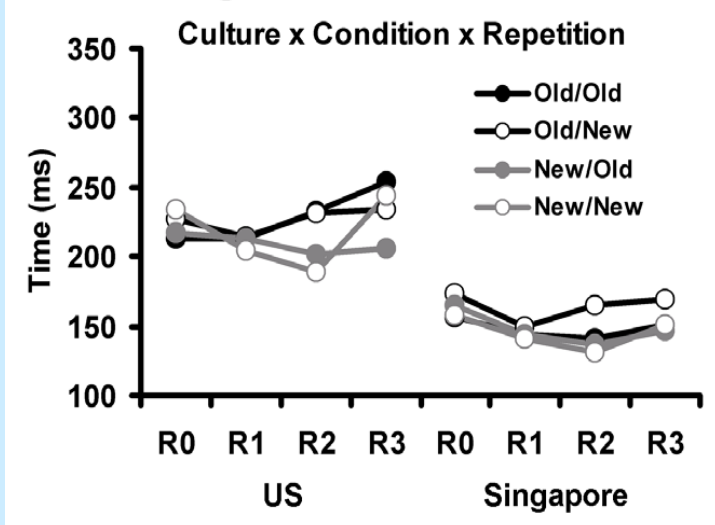


When objects were repeated during the Old/Old and Old/New conditions, fixation duration to objects in the US participants was magnified over repetitions regardless of the background changes.

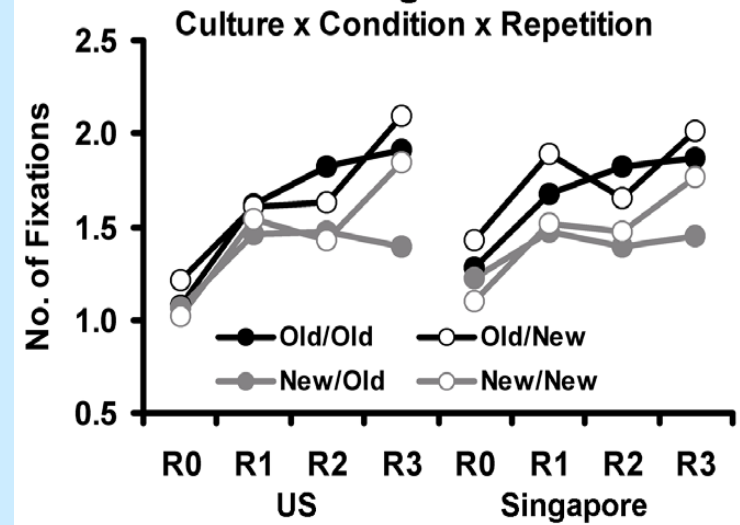


The number of object fixations in the US participants was more affected by object change than in the Singapore participants.

a. Background Fixation Duration



b. Number of Background Fixations



Overall the background data yielded evidence for longer fixations to backgrounds in the US participants compared to the Singapore participants and evidence that attention to background was most likely when the objects were held constant.

Western Cultures

Divergent thinking

Analytic approach: Decompositional

Intense interaction during education and teaching

Emphasis on verbal activities

Abstraction

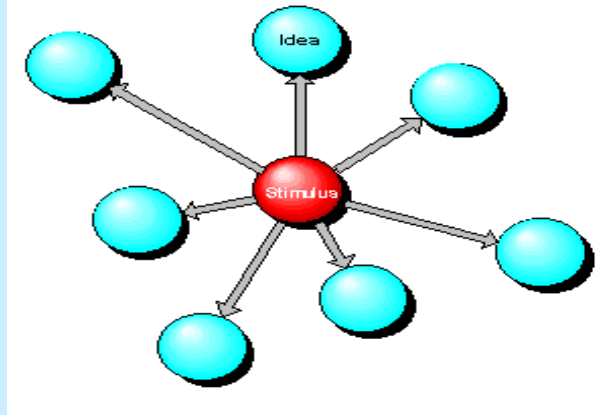
Guilford (1950)

Factorial Model

Convergent Thinking

and

Divergent Thinking



it is concerned with exploring ideas and their relationships.

Is the ability to find many possible answers to a particular problem

Guilford's Alternate Uses Test

Name all the uses for a brick:

a paperweight
a doorstop
a mock coffin at a Barbie funeral
to throw through a window
to use as a weapon
to hit my sister on the head with

Scoring method

- Fluency - the number of relevant ideas in a short period of time
- Originality - the unusualness of the ideas within the sample: 5% = 1; 1% = 2
- Flexibility (Shifts) - the variety of ideas; different categories of ideas
- Elaboration – amount of details provided

Torrence Test of Creative Thinking

Verbal responses

- 6 activities
- 45 minutes test time
(3 x 5) + (3 x 10)
- 3 scoring components

Drawn responses

- 3 activities
- 30 minutes test time
(3 X 10)
- 5 norm-ref and 13
scoring components

The Verbal and Figural forms measure the same abilities in two different formats, including:

Verbal Form

Activities 1-3: Ask and Guess are based on one picture...

1. **Asking questions** about the picture
2. **Guessing Causes** of the action in the picture
3. **Guessing Consequences**, immediate or long-term about the picture

5 Minutes Each



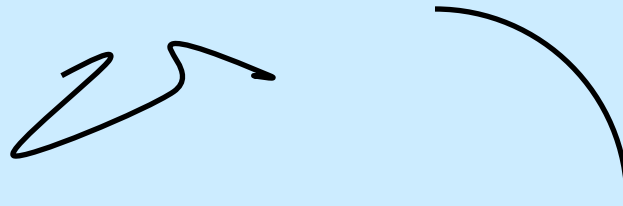
A



B

Ex: Figural Form

Activities 2: Ten incomplete figures



The task is to add lines to the incomplete figures to make pictures out of them

10 minutes

Verbal Form

Scoring Components

- **Fluency** - the number of relevant ideas
- **Originality** - the statistical infrequent ideas
- **Flexibility** – the variety of ideas; different categories of ideas

Figural Form

Scoring Components

- **Fluency** - the number of relevant ideas
- **Originality** – the statistical infrequent ideas
- **Abstractness of titles** – based on descriptions
- **Elaboration** – Beyond the minimum details that would be necessary for the basic response
- **Resistance to Premature Closure** – based on gestalt psychology – degree of openness
- **Checklist of Creative Strengths:** →

13 criteria for check list of creative strengths

- **Emotional expressiveness** – shown in the drawings
- **Storytelling articulateness** – if there is a story implied or a relationship between or among object drawn
- **Movement or action** – motion lines, title implying action, position of body
- **Synthesis of figures** – stimuli encompassed in 1 object
- **Expressiveness of titles** – when emotions are expressed
- **Unusual or internal visualization** – perspective used
- **Humor** – satire, word plays, silliness, absurdities
- **Richness or colorfulness of imagery** – clear and exiting in appeal images (such as flavor, earthiness, touching, emotional)
- **Boundary breaking** – e.g., depth perception
- **Fantasy** – including fantasy from literature, TV and movies

Eastern Cultures

Convergent thinking

Holistic Approach: Synthetic

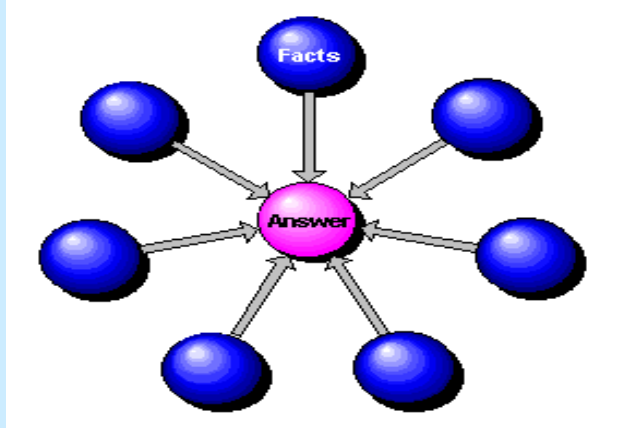
Scarce interaction during education and teaching

Emphasis on visuo-spatial activity

Memorization

Convergent Thinking

Convergent Thinking



Is the ability to find the best single answer to a problem

Is a process of selection. It is definite and goal oriented.

Mednick (1962)

Creativity is the ability to associate ideas which are remotely interconnected to each other

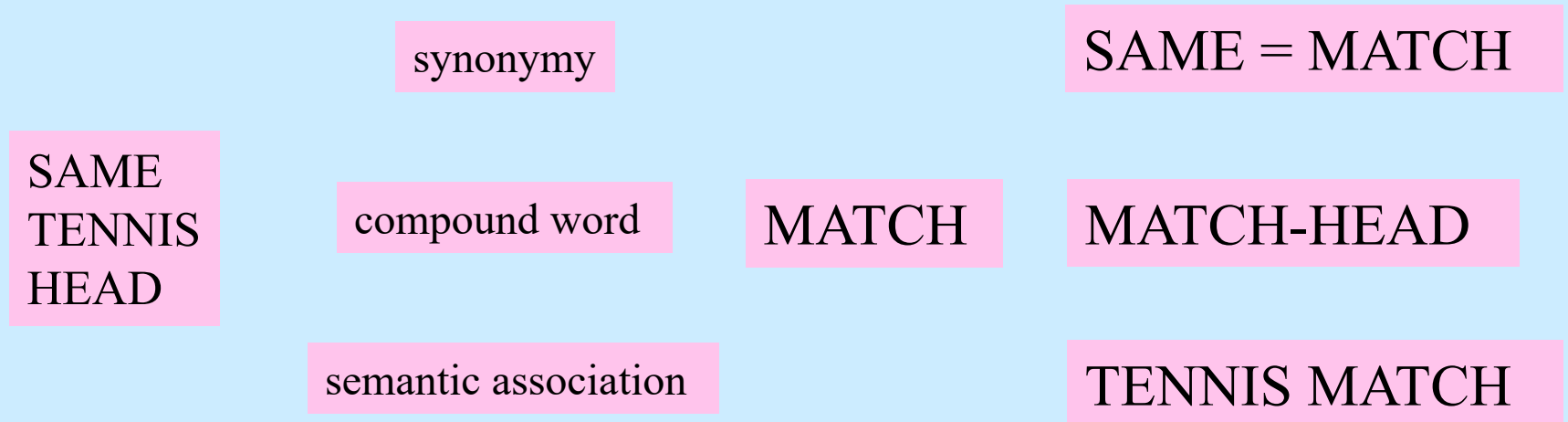
Serendipity: Two ideas are associated because of two objects, which may evoke them, are casually located in the same environment

Similarities: Two ideas are associated because of the similarities of their properties or the stimuli they evoke

Mediation: Two ideas are associated because of the mediation of another ideas, which is connected with both of them.

Mednick's Remote Associate Task

Each item consists of three words that can be associated with a solution word in a number of ways



Recently, Bowden & Jung-Beeman (1998; 2003) referred to this task in a more consistent way: the solution word is always related to the triad words in the same way, that is forming a compound word.

AGE/MILE/SAND

STONE

STONE-AGE, MILESTONE and SANDSTONE).

Worm up the basic concept

Tour Eiffel



Tokyo Tower



Amabile (1996)

Creativity depends on personality factors

Independence from external judgements

Self-esteem

Attraction for complexity

Aesthetic approach to life

Capacity to take risks

Consensual assessment technique:

a product or behavior is creative if appropriately chosen
observers agree for that

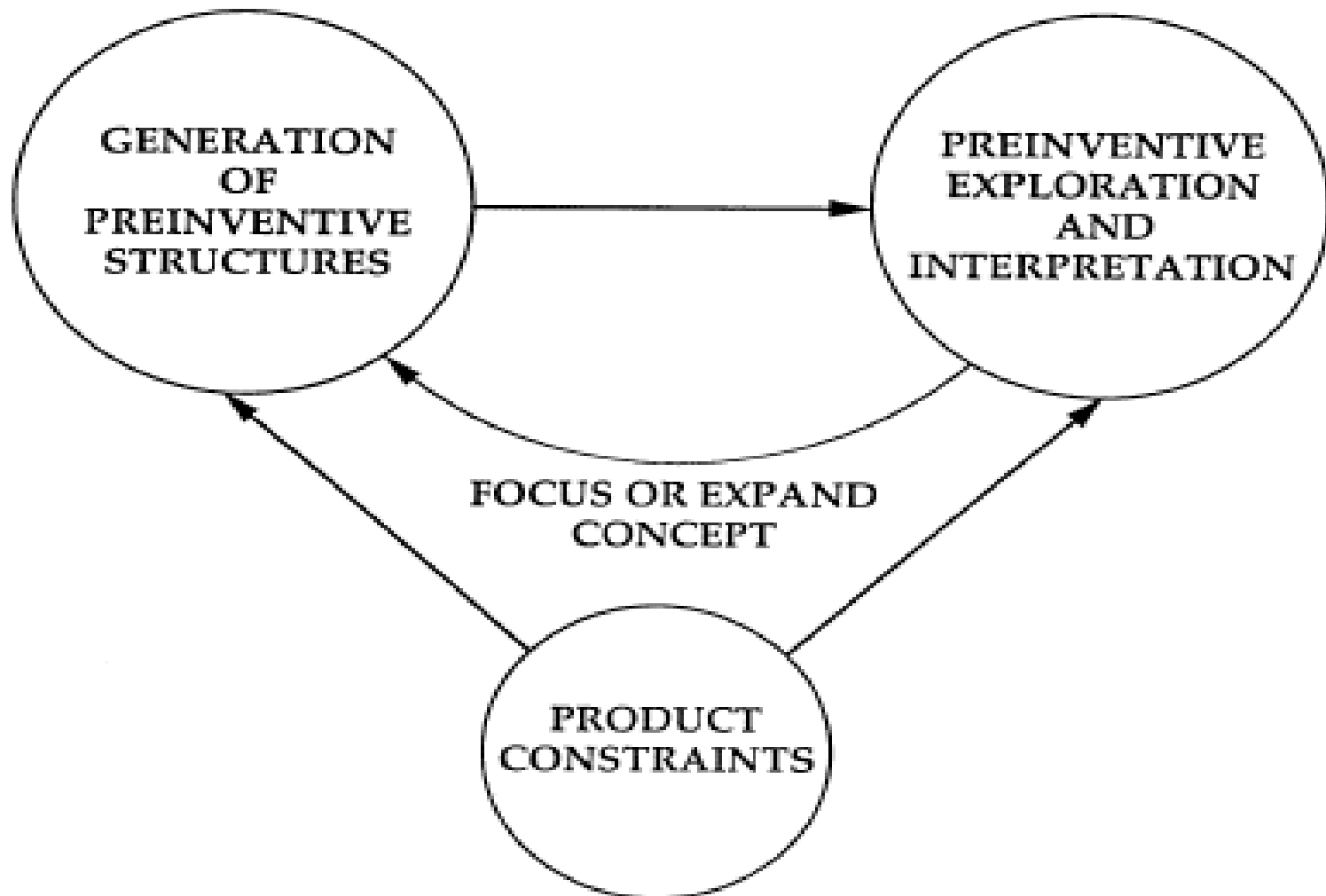
**Western societies are more
individualistic
than Eastern societies**

Westerns are more extrovert

Easterns are more introvert

The Geneplore Model

Finke, Smith & Ward (1992)



The model in details/1

Two distinct processing

- Generative phase consists of construction of preinventive forms.
- In exploratory phase individual tries to interpret these preinventive forms in meaningful ways.
- Creative thinking initiates a '**geneplore cycle**' in which preinventive forms are continually generated, regenerated, and modified.

The Model in details/2

- Number of cycles determined by desired extent of conceptual refinement or expansion of finished product.
- Both generative and exploratory phases can be affected by **product constraints**.
- These can include constraints on product **type** as well as product **function**.
- Restrictions on product *category* may benefit creative thinking, while similar restrictions on product *type* may constrain it.

Generative processes

Memory retrieval

Association

Synthesis

New concepts

Transfer of knowledge

Category reduction (e.g., rose as a flavor generator)

Exploratory processes

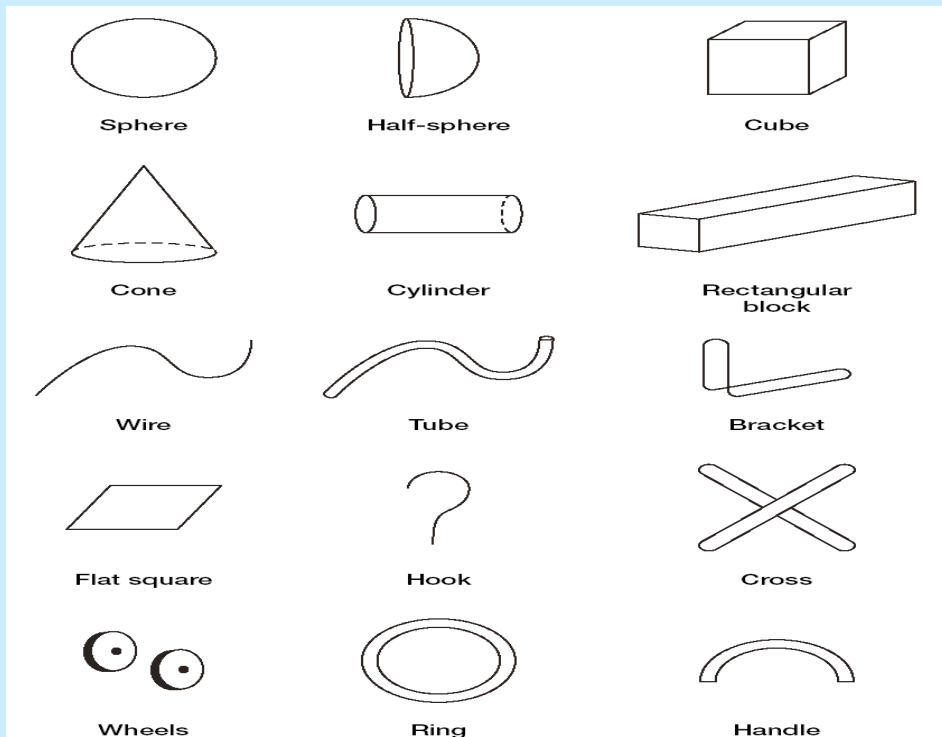
Modification of pre-inventive structures

Functional inference

Interpretation

The Creative Synthesis Task

- Verbal presentation of the names of 3 components randomly selected from 15.
- Two minutes to mentally combine the components into an object or device.
- Productions had to be interpreted within one of eight object categories.

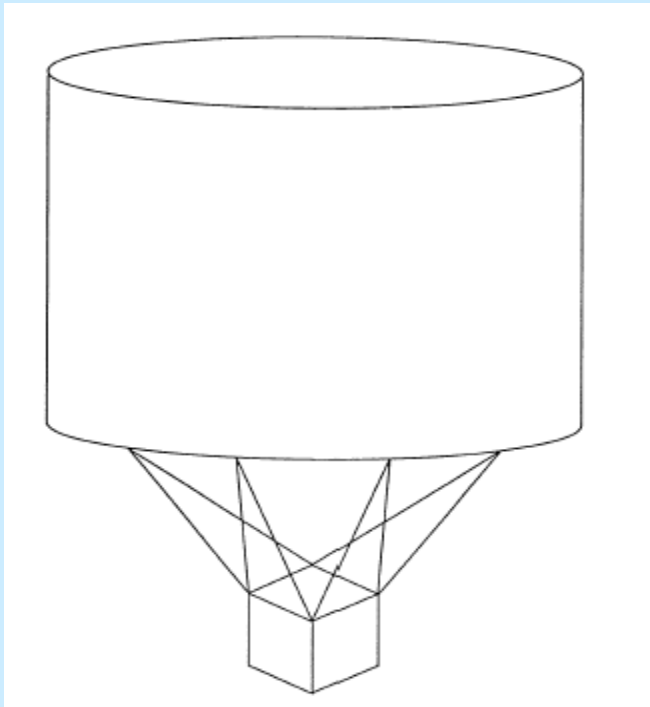


From Finke (1990)

CATEGORY	EXAMPLES
Furniture	Chairs, tables
Personal Items	Jewellery, glasses
Transportation	Cars, boats
Scientific Instruments	Measuring devices, telescopes
Appliances	Fridge, cooker
Tools & Utensils	Screwdriver, spoon
Weapons	Guns, knives
Toys & Games	Baseball bat, dolls

From Finke (1995)

Example: Cylinder, Wire, Cube



“Tension Wind Vane”
(Scientific Instrument)

- All productions are rated by independent judges for practicality and originality on five-point scales.
- An object with an average practicality rating of at least 4.5 was classified as a **practical invention**.
- A practical invention with an average originality rating of at least 4.0 was further classified as a **creative invention**.

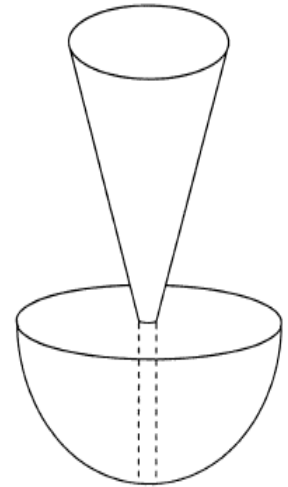
Preinventive Forms

Forms may be more likely to contain unexpected emergent properties than forms created with specific object categories or functions in mind.

An experiment was carried out to test this hypothesis:

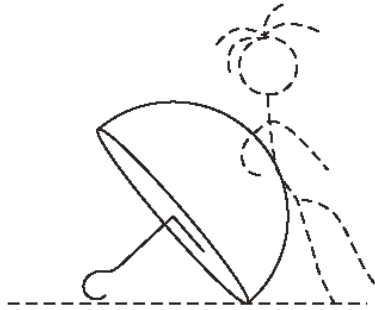
Stage 1: participants are given one minute to mentally synthesise a *pre-inventive form* from three randomly selected components.

Stage 2: participants randomly presented with one of the eight basic object categories, and have one minute to interpret their pre-inventive form as a practical object or device within that category.

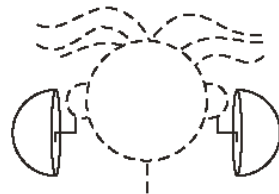


“Contact Lens Remover”

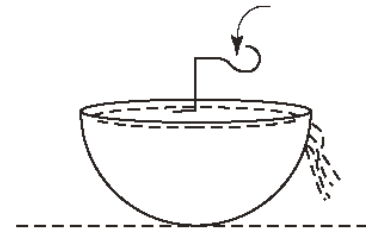
Preinventive Forms and Interpretation



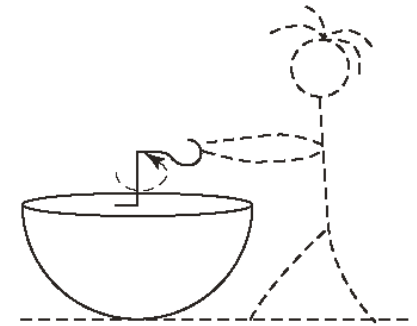
(a) Lawn lounger



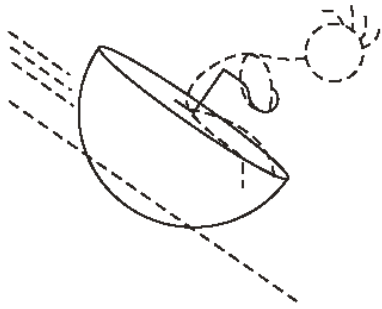
(b) Global earrings



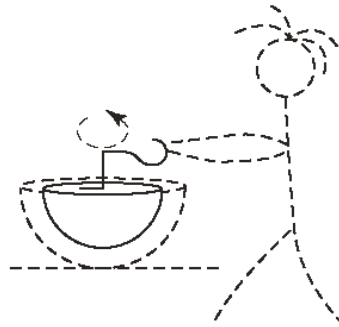
(c) Water weigher



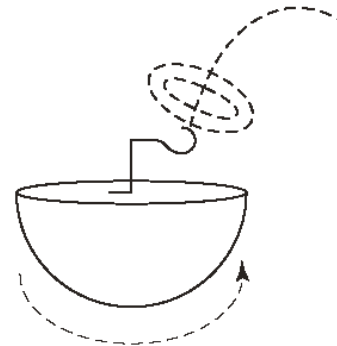
(d) Portable agitator



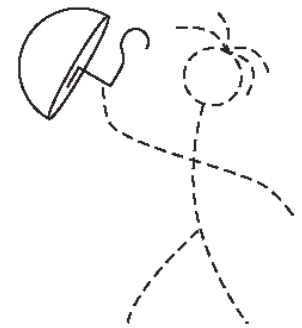
(e) Sled



(f) Rotating masher



(g) Ring spinner



(h) Slasher basher

How a preinventive form that was constructed from the half-sphere, wire, and handle can be interpreted in terms of each of the eight categories (Finke, 1995).

**What about India:
East or West?**

Thanks for your attention

