

Creativity and design

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Agenda

- Creativity
 - Measuring creativity
 - Stuckness/fixation
 - Inspiration
 - Techniques
- Guest lecture by Lina Johansson about exhibitions at Norrköping visualization center c

Creativity

- Creativity

- Important to "have"

- Creativity – maybe many different things

- E. Paul Torrance "Creativity defies precise definition"(1988)

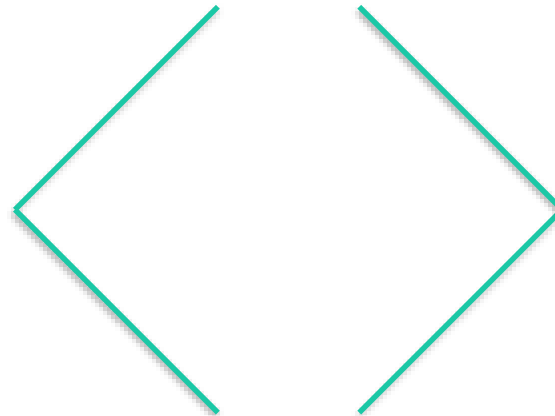
- ... hence, difficult to measure

- Can be trained (aspects of it anyway)

- Can be influenced by simple techniques

Creativity

- All types of people needed in design
 - Creativity is one of many qualities
- Design activities:
 - Ideation
 - Exploration
 - Composition
 - Evaluation/Assessment
 - Coordination



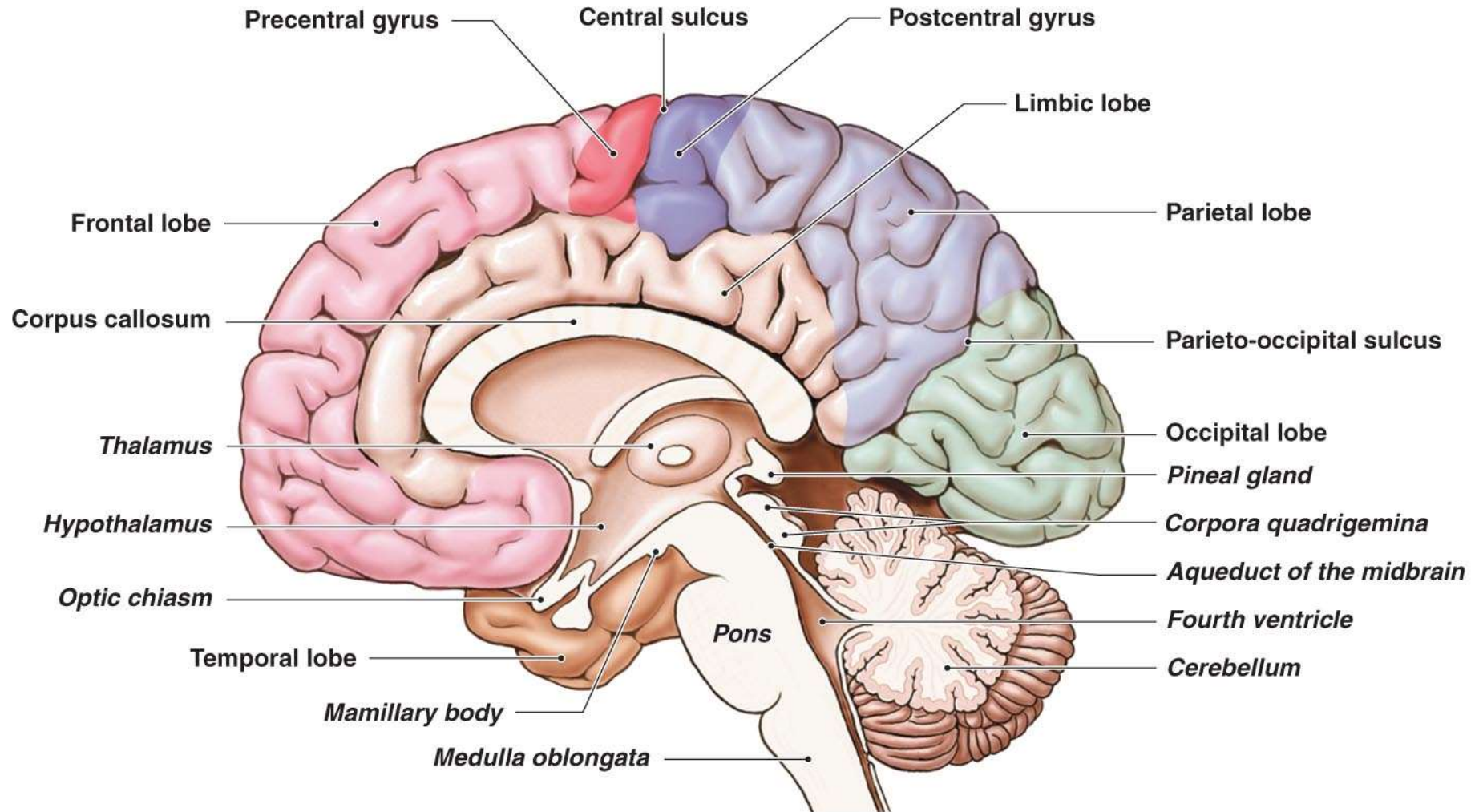
Creativity

- Ways of understanding creativity
 - When there are no preexisting plans or solutions you need creativity (survival definition – Torrence, 1988)
 - Creativity as one of the activities we can dedicate ourselves to
 - Nothing ”special” about creativity
 - Creativity as the use of the brain’s associative ability

Creativity

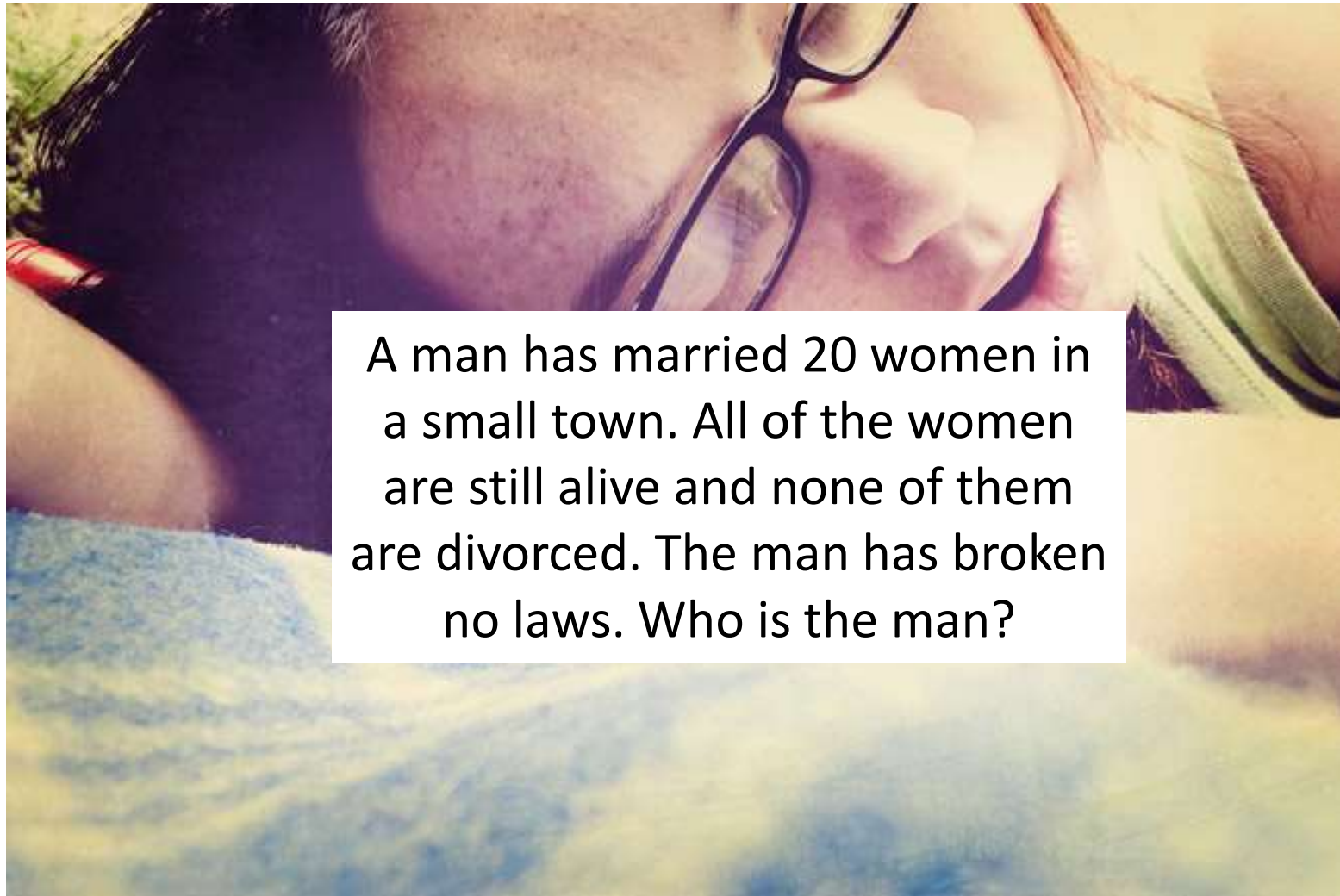
- Creativity and the brain
 - The cerebral cortex coordinates signals and handles complex functions
 - Thalamus filters, and regulates, flow of information
 - Sensory information to the cerebral cortex
 - Control of voluntary movements
 - Connected to the amygdala and hippocampus (adds emotional value)

A midsagittal view showing the inner boundaries of the lobes of the cerebral cortex
(Structures outside of the cerebrum are labeled in italics.)



Creativity

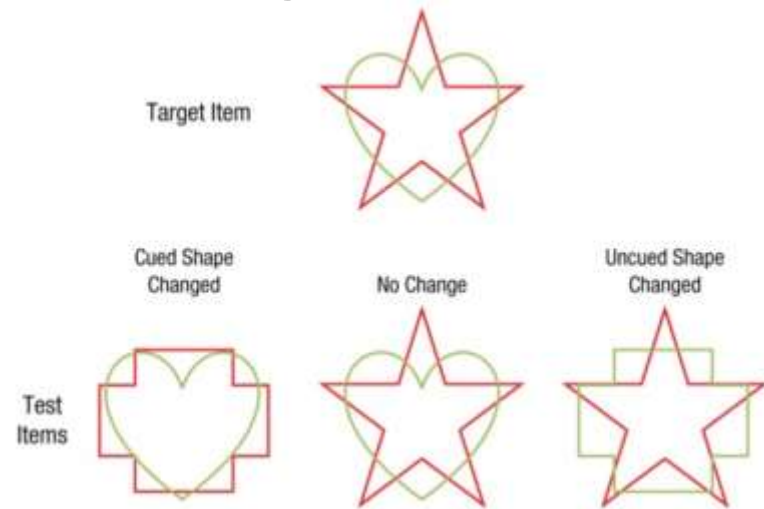
- Creativity and the brain
 - The cerebral cortex coordinates signals and handles complex functions
 - Thalamus filters, and regulates, flow of information
 - Less D2-receptors in thalamus means larger flow (less self-censorship)



A man has married 20 women in a small town. All of the women are still alive and none of them are divorced. The man has broken no laws. Who is the man?

Measuring creativity

- Creativity and the brain
 - Too good attention can limit the ability to solve some problems (insight problems)
 - Children are better at discovering irrelevant information



Measuring creativity

- Examples:
 - “thinking divergently,
 - making associations,
 - constructing and combining broad categories, or
 - working on many ideas simultaneously.”
- and “noncognitive aspects of creativity such as
 - motivation (e.g., impulse expression, desire for novelty, risk-taking), and
 - facilitatory personal properties like
 - flexibility,
 - tolerance for independence, or
 - positive attitudes to differentness.”

(Cropley, 2000)

Measuring creativity

- Types of tasks
 - Riddles (convergent thinking)
 - Divergent production
 - Creative thinking
 - Associative ability

Measuring creativity

- Riddles
 - Measures convergent thinking
 - Verbal
 - Mathematical
 - Spatial

Measuring creativity

- Riddles
 - Measures convergent thinking

- **Verbal**

- Mathematical

- Spatial

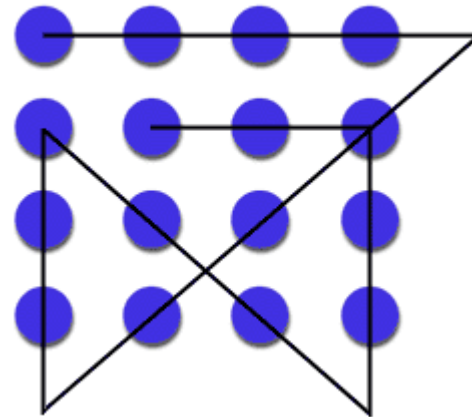
A police officer had a brother but the brother did not have a brother. How can that be?

Measuring creativity

- Riddles
 - Measures convergent thinking
 - Verbal
 - **Mathematical** If $\frac{1}{2}$ of 5 is 3, what is $\frac{1}{3}$ of 10 if the same proportions apply?
 - Spatial

Measuring creativity

- Riddles
 - Measures convergent thinking
 - Verbal
 - Mathematical
 - **Spatial**
 - "traditional problems"
 - Insight problems:
 - There is often a moment where you suddenly "realise" the answer



Measuring creativity

- Riddles
- Divergent production
 - Alternative uses test (Guilford)
 - 2 minutes

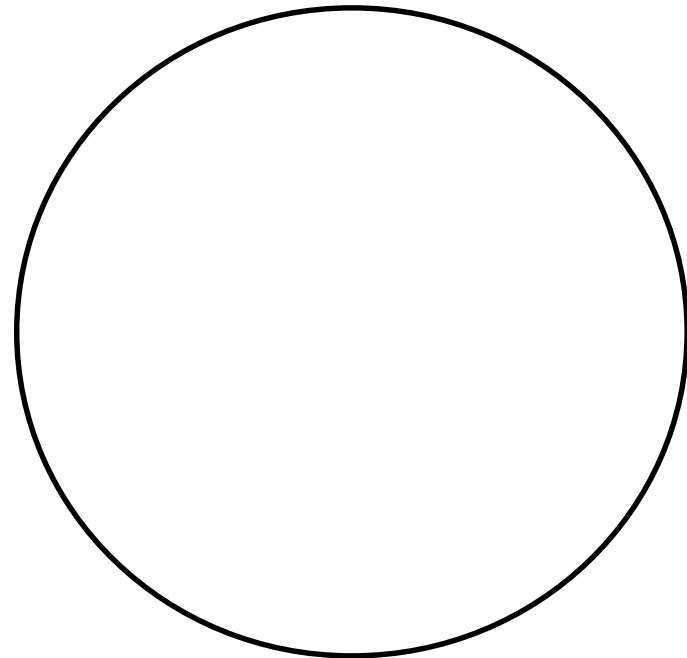


Measuring creativity

- Riddles
- Alternative uses test (Guilford)
- Measures divergent thinking
 - Fluency – how many?
 - Originality – how unusual?
 - Flexibility – how many domains?
 - Elaboration – how much detail in the answer?

Measuring creativity


























- Alternative uses test (Guilford)
 - 2 minutes



Measuring creativity

- Alternative uses test (Guilford)

Use the circles as a prompt for drawing. Draw for two minutes.

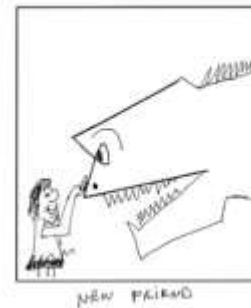
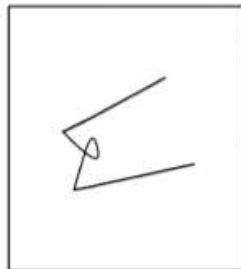
Anna	 face	 face	 face	 face	 face	highest fluency most responses
Benji	 face	 wheel	 ball			highest flexibility most types of responses
Carol	 wheel	 wheel	 ball			
Darlène	 bomb	 balloon				highest originality most unusual responses
Eric	 face	 face	 face			highest elaboration most detailed responses

Measuring creativity

- Riddles
- Alternative uses test (Guilford)
- Torrence test of creative thinking (Torrence)
 - More points for storytelling, complexity and innovativeness etcetera.

Measuring creativity

- Torrence test of creative thinking (Torrence)



Measuring creativity

- Riddles
- Alternative uses test (Guilford)
- Torrence test of creative thinking (Torrence)
- Remote Associates Test (RAT)
 - More "creative" problemsolving than riddles often are
 - Cream, Age, Tea



Stuckness



Stuckness

- What prevents idea generation?
 - Mental sets
 - Routines
 - Fixation
 - Ideas are replaced by information from memory
 - Solutions are blocked by information you recently encountered
 - Priming/negative transfer
 - Fear

Stuckness

- In sum:
 - Automatic processes take over or gets in the way
 - Implicit (subconscious) assumptions can limit
 - Description/previous understanding of a problem frames what you believe is a relevant solution
 - Is used to create riddles and creativity tests

If $1/2$ of 5 is 3, what is $1/3$ of 10 if the same proportions apply?

Inspiration

- Overcoming design fixation (according to designers)
 - Disecting physical products (precedents)
 - Working individually
 - Doing something else for a while
 - Using methods or heuristics
 - Lateral thinking
 - Frame shifting
 - TRIZ, scamper, etcetera

(Crilly, 2015)

Inspiration

- Understanding the process
 - Returning on several different occasions (incubation; Smith, 1995)
 - Domain knowledge matters
 - Practice being creative (creativity is domain specific)
 - Practice specific tasks (Baer, 1996)
 - Critique important
 - Brainstorming
 - Groups that tolerate disagreement do better on creativity tasks

Inspiration

- Cognition and meta-cognition
 - Fixations can be sub-conscious
 - Knowledge about the existence of fixations, and reminders can decrease effects of fixation (Crilly, 2015)
 - Set yourself up to create variation
- Switch between cognition and meta-cognition
 - How am I approaching the situation right now? What strategies am I using? Have I tried this before? What are my options?

Methods/techniques

- Lateral thinking (de Bono)
 - Horizontal fantasy instead of vertical logic
 - Random entry
 - Provoke, exaggerate, dream, flip, distort etcetera
 - Why, Why, Why (go deeper into the issue)
 - Disprove: take a commonly accepted truth and try to argue for the opposite
 - Switch between lateral and rational processes

Methods/techniques

- SCAMPER
 - Substitute
 - Combine
 - Adapt
 - Modify
 - Put to another use
 - Eliminate
 - Reverse

Inspiration

- Errors of thought
 - Design is not about inventing something new
 - No thoughts are unique
 - We are a part of a time, culture and environment
 - Succeeding with an idea is something else
 - Entrepreneurship (Online Pizza)
 - Luck important
 - You don't run out of ideas

The End

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