Creative Problem Solving

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Outline

- Introduction
- Creativity styles
- Creativity tools
- Creative thinking
- Creative problem solving process
- Questions !

Why creativity?

Be creative because:

- Only simple problems are solved with simple solutions
- More complex problems requires new ideas
- It’s easy – everybody’s creative!
- Enhances pleasure in work

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The creative person

Mainly 3 types

- Engineers
- Artists
- Inventors

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Features needed

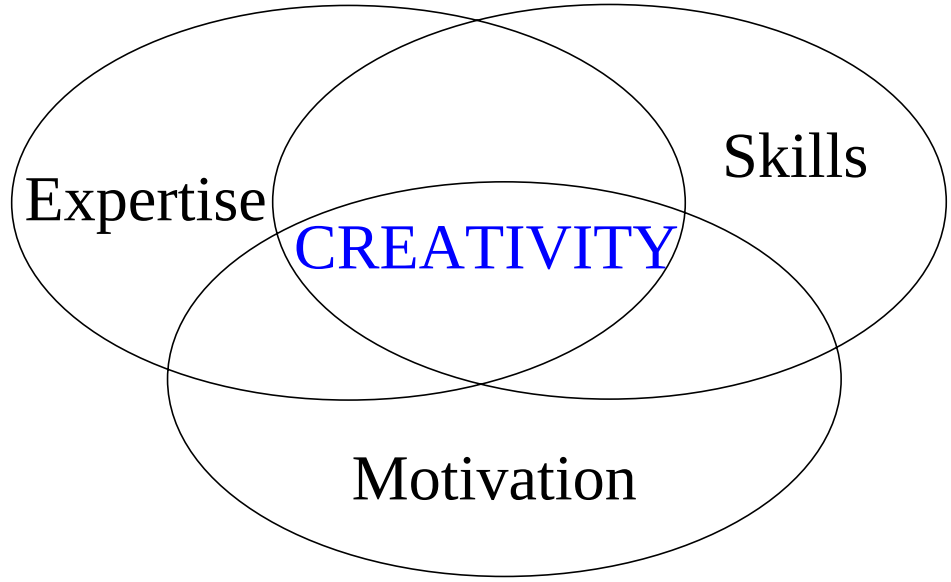

Fig. by T. AMABILE.

Creative styles

- Modifying
- Visioning
- Experimenting
- Exploring

Creative styles

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Usually one is dominant.

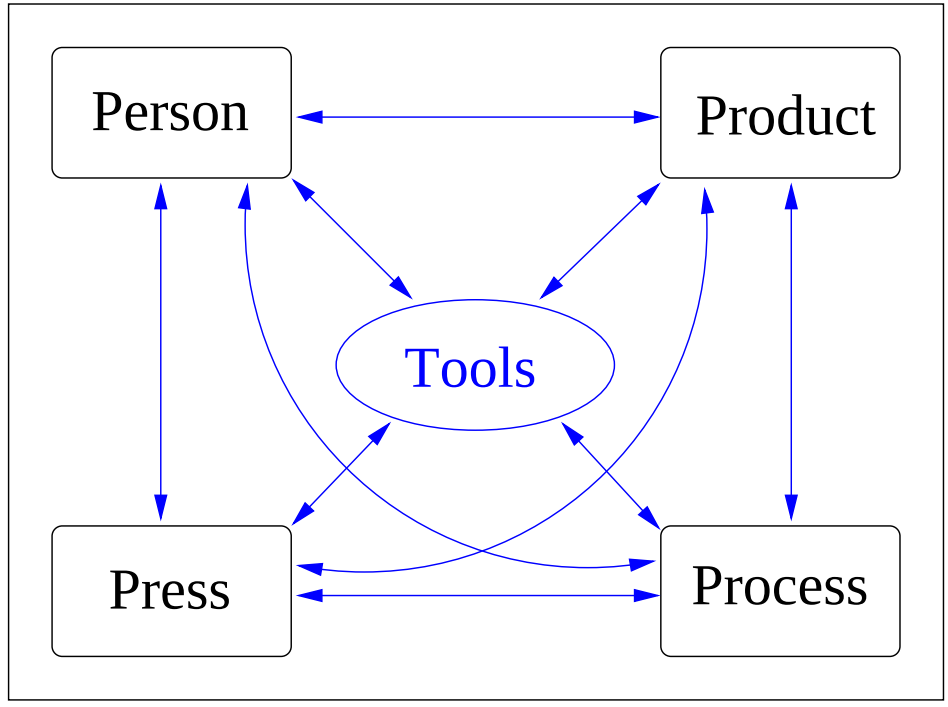
Creative problem solving

Short definition by Herrmann:

- Challenge assumptions
- Recognise patterns
- See new patterns
- Take risks

Creative problem solving

The 4P+T model



Creative problem solving

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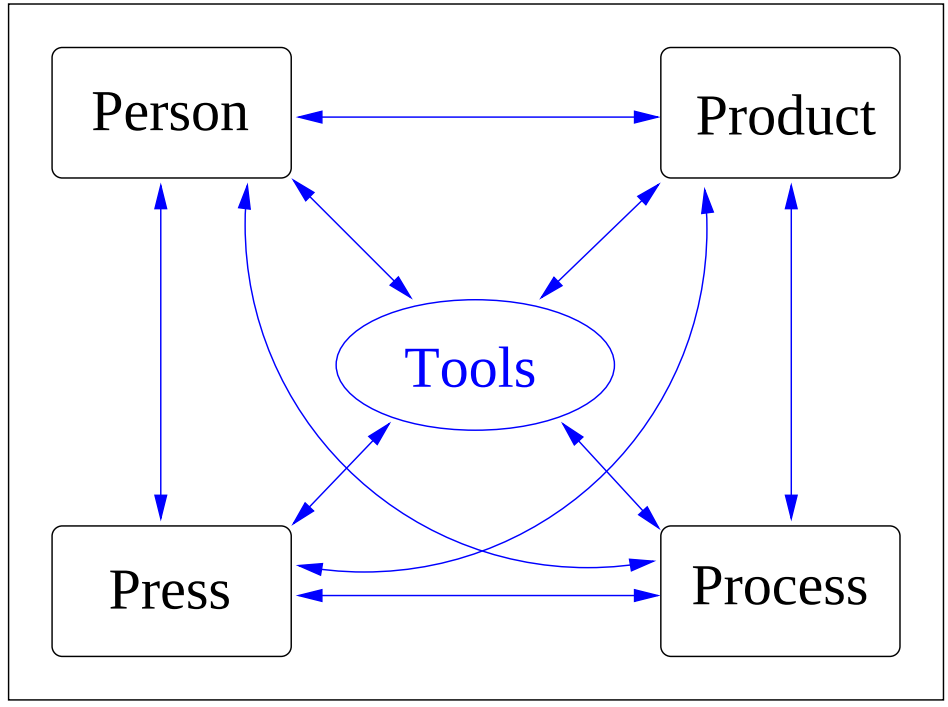

All items are connected. Solution is probably in one of the elements.

Creativity tools

Four popular tools:

- Fluency
- Flexibility
- Originality
- Elaboration

Creativity tools

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- Originality Picture stimulation
- Elaboration Mind mapping

Brain storming – for Fluency

Described by Osborn (1963). 4 rules apply:

1. No criticism!
2. Free–wheeling is allowed
3. The more the merrier
4. Combinations and improvements

The SCAMPER technique – Flexibility

Described by Elberle (1971). Elements:

- S ubstitue
- C ombine
- A dapt
- M odify/Magnify/Minify
- P ut to
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Provocative questions.

Picture Stimulation – A way to create Originality

The idea is to stimulate the generation of ideas by inputs. These can be:

- Pictures
- Objects
- Words
- Computer programmes

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Analogies/Metaphors.

Mind Mapping – A way of Elaboration

Made known by Buzan (1983).

1. Write subject in center of a sheet of paper
2. Draw lines to keywords or associations, situated radially around the center
3. Repeat the process at each key word.

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A visual and verbal tool.

Classification of Creative Tools

McFadzean (1998) classified creative tools according to:

- Paradigm preserving tools
  Uses free association (no forcing)
- Paradigm stretching tools
  Looking at the problem from new perspectives
- Paradigm breaking tools
  Uses fantasy to break old mind patterns

Paradigm Preserving Tools

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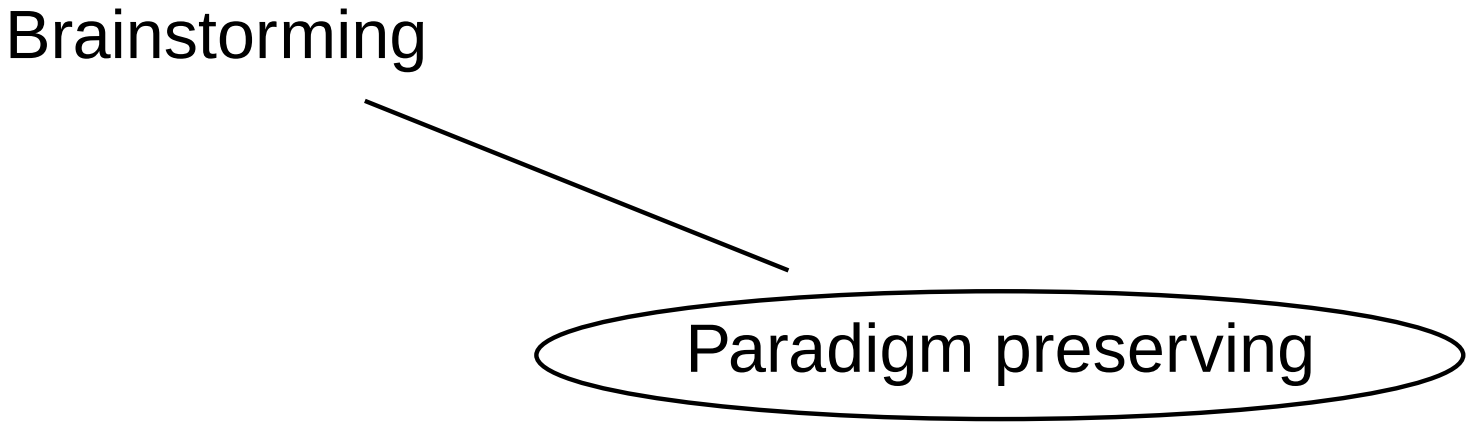
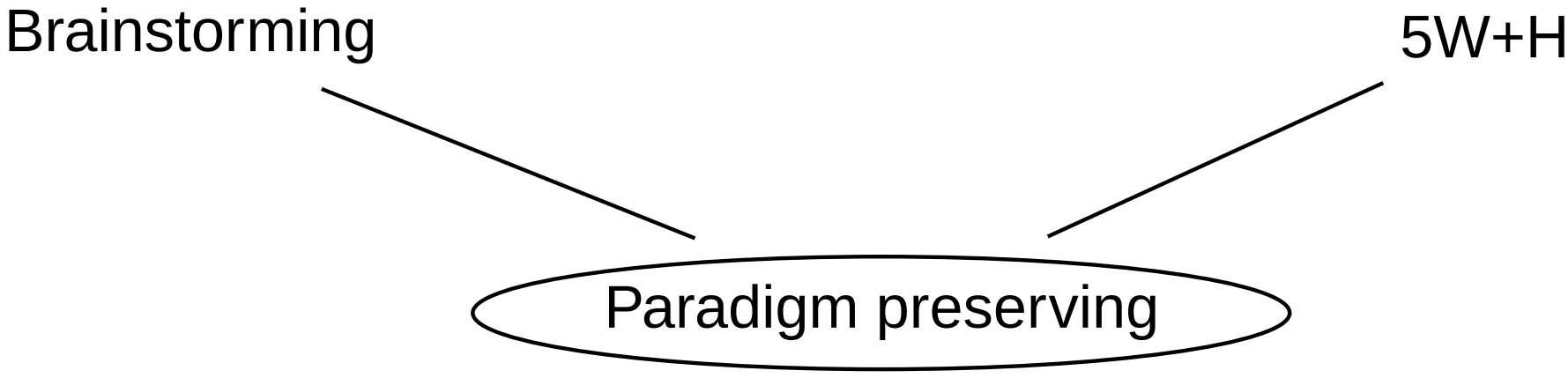


Paradigm Preserving Tools



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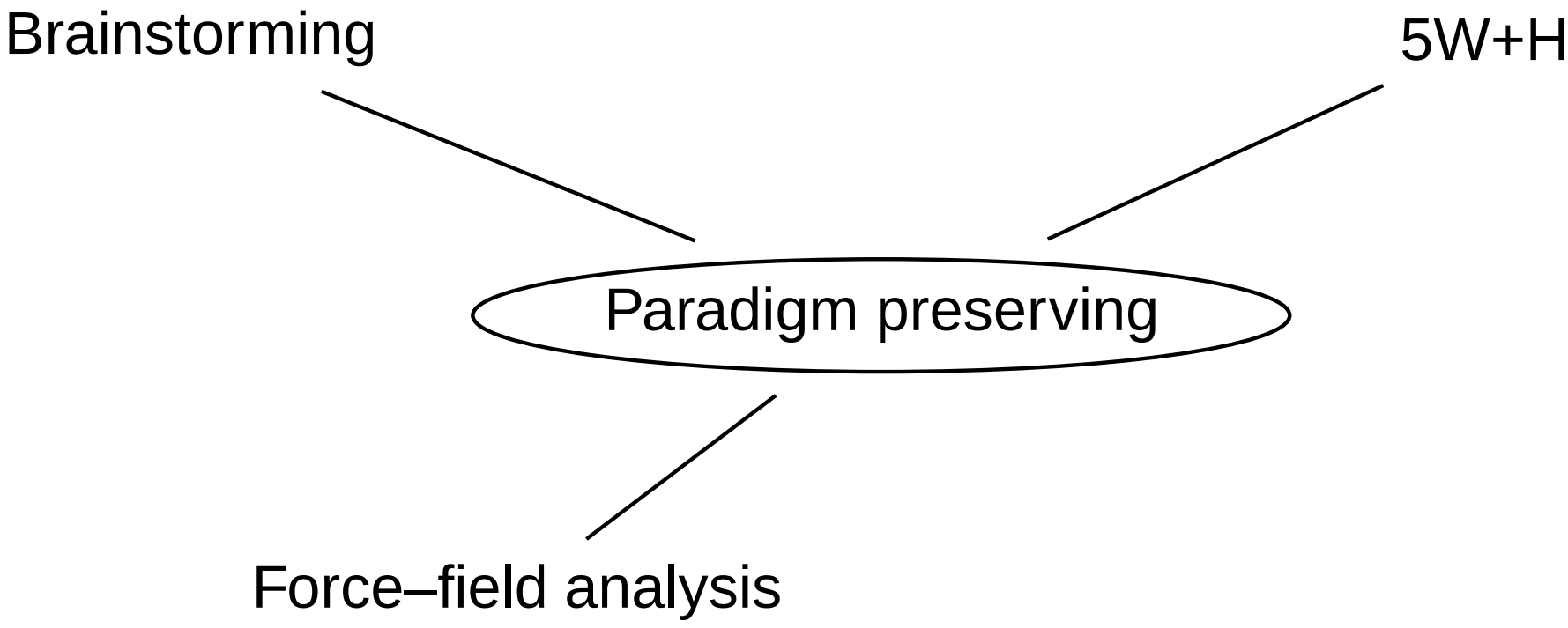

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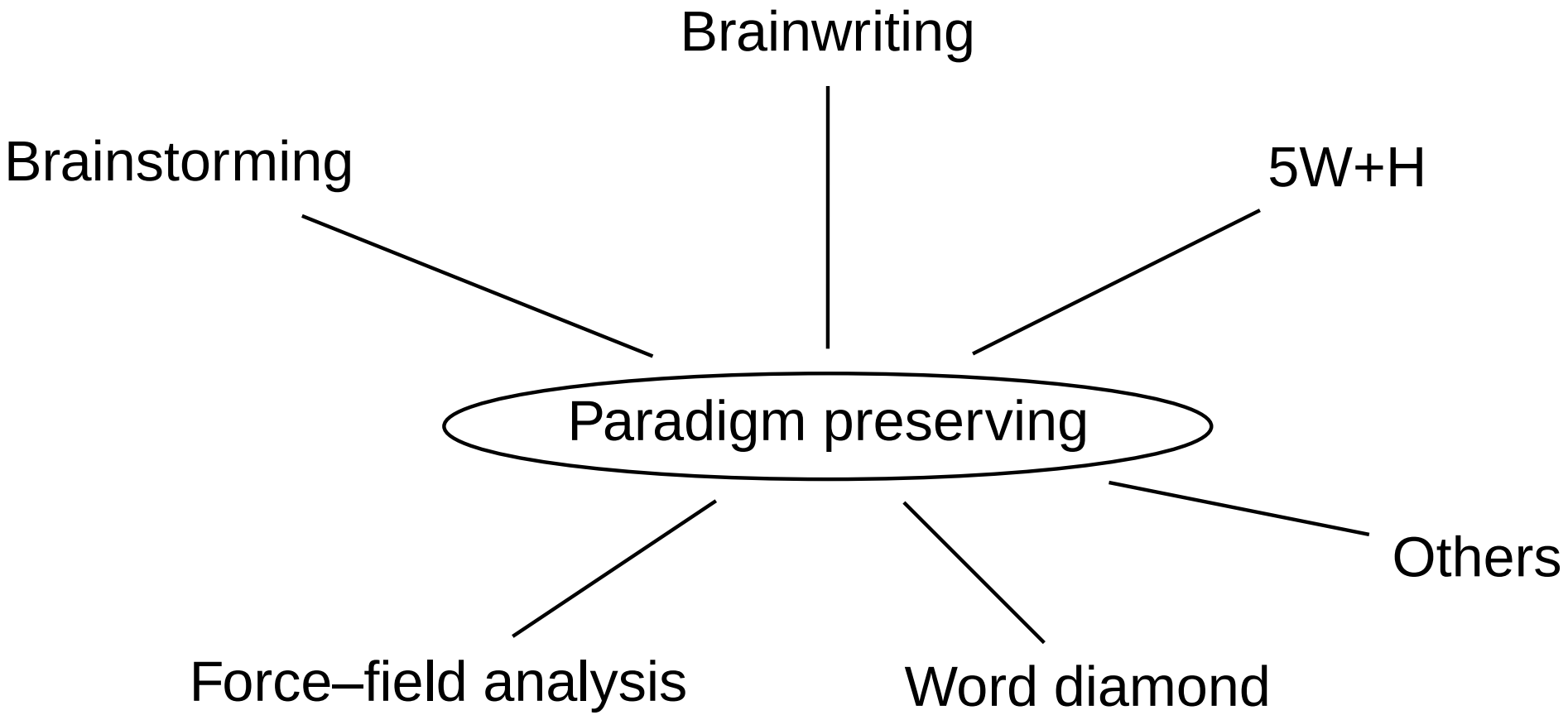

Paradigm Stretching Tools

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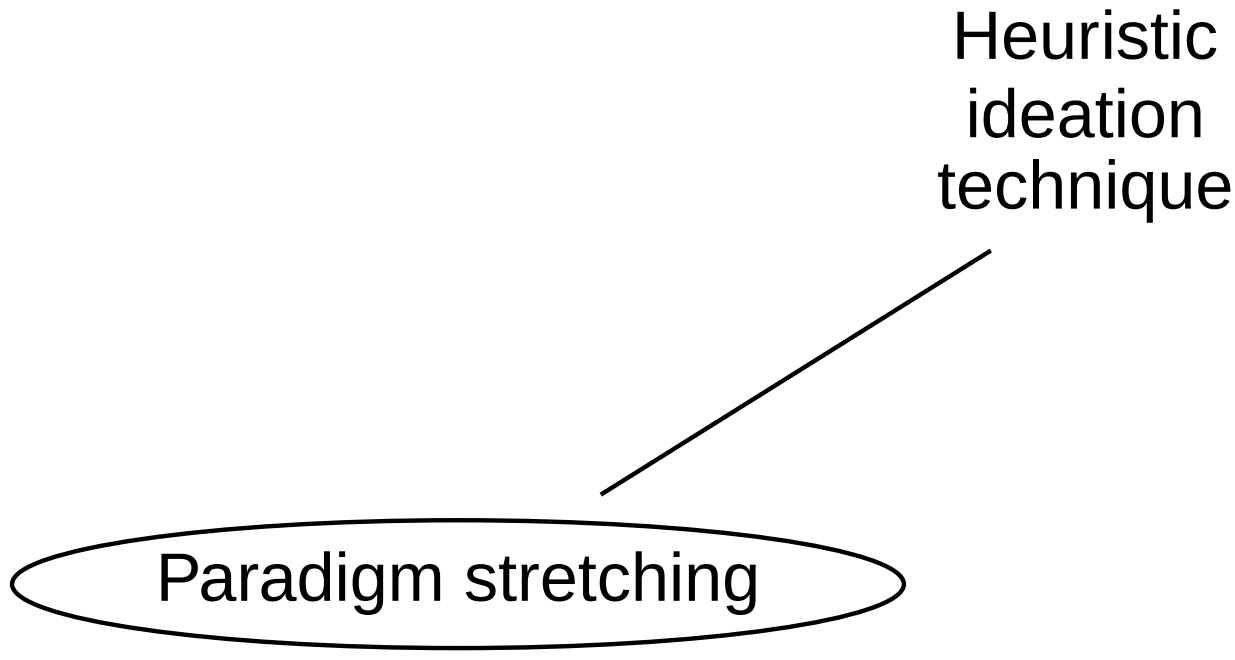

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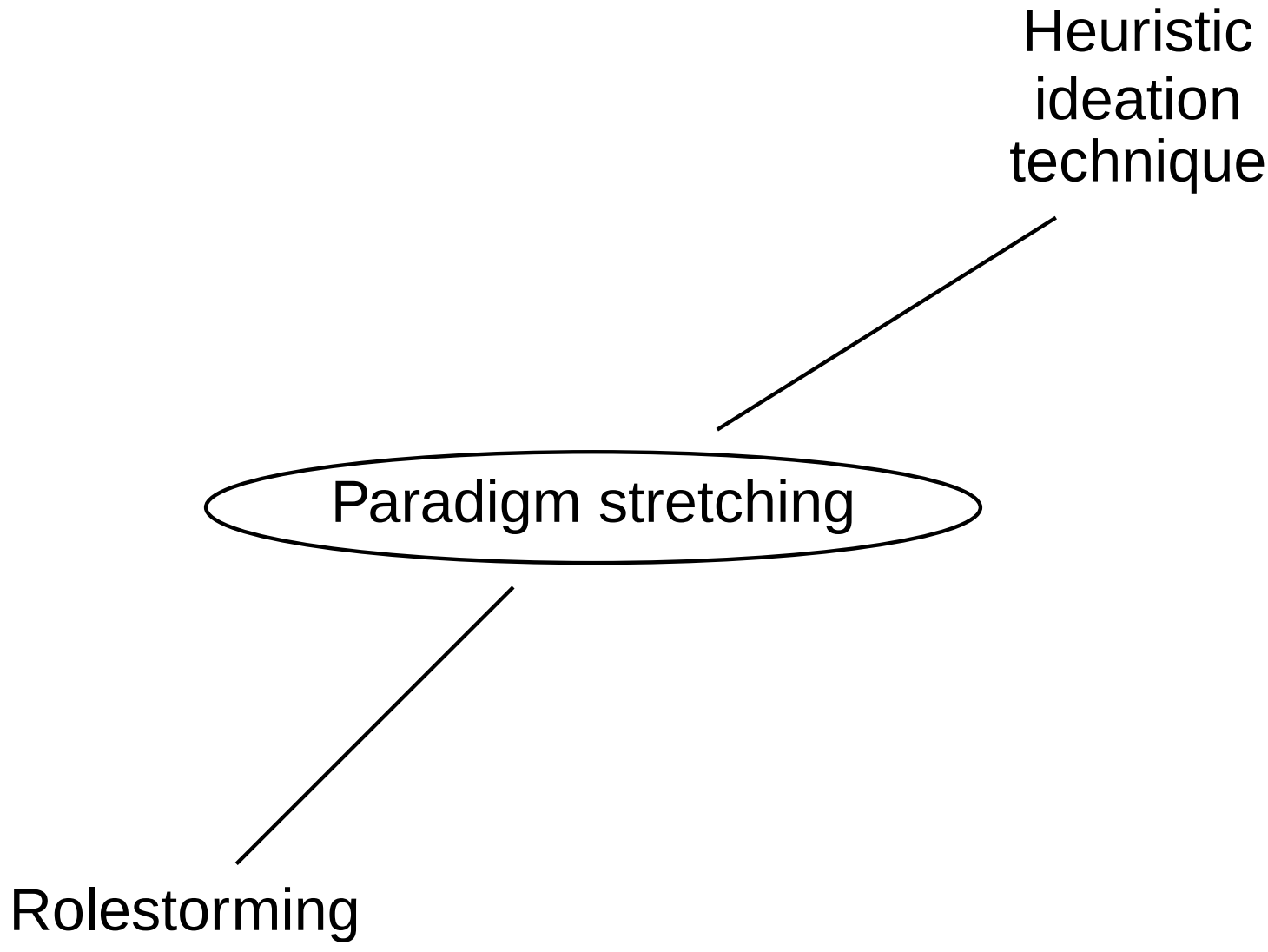

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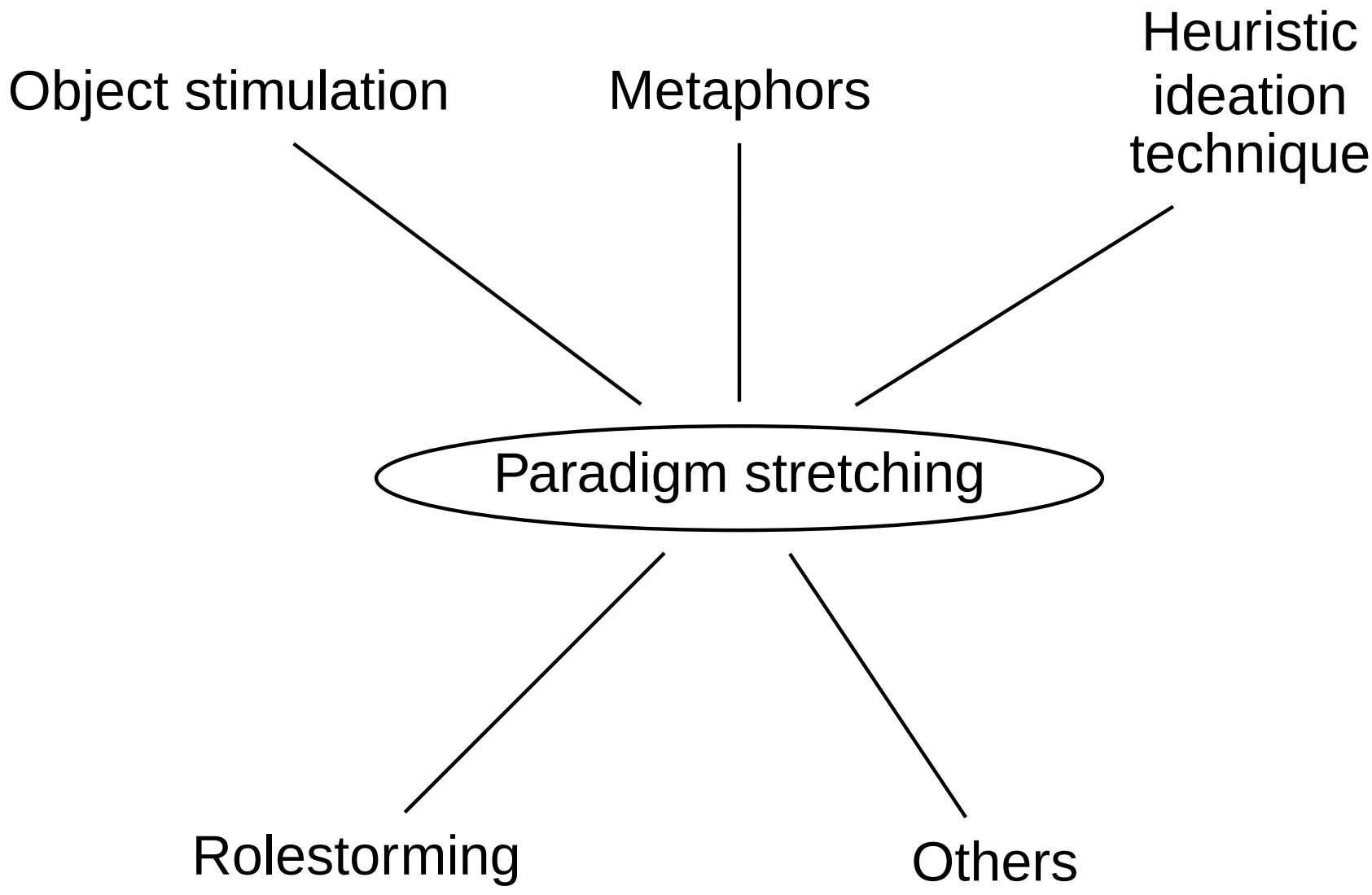

Paradigm Breaking Tools

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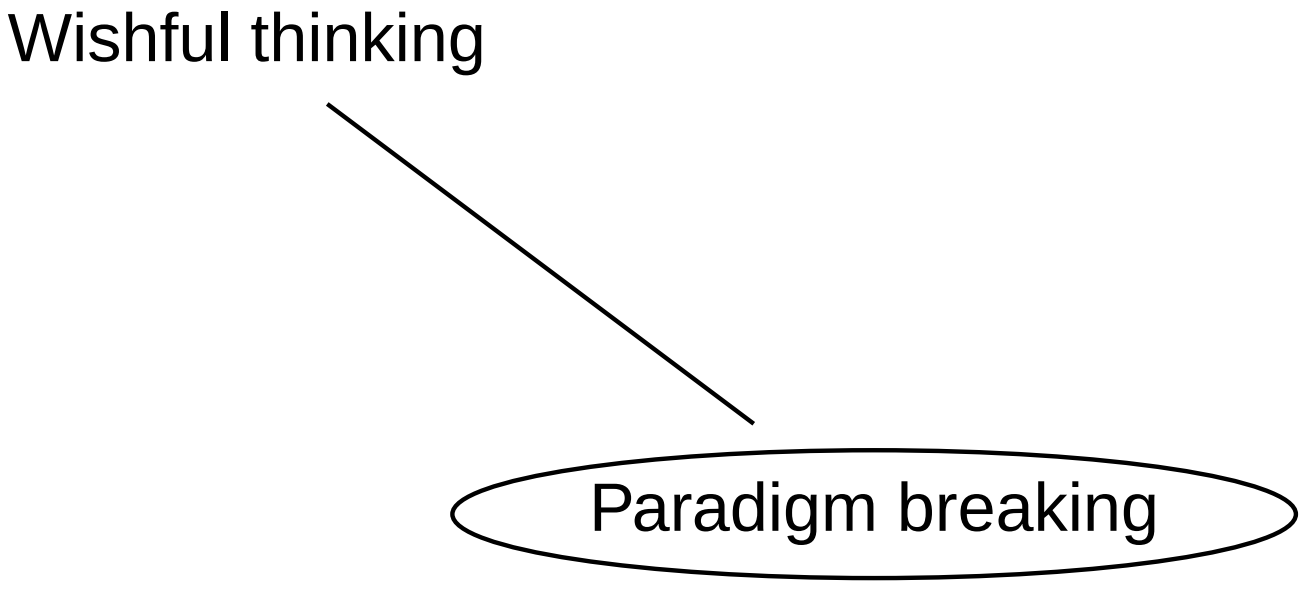

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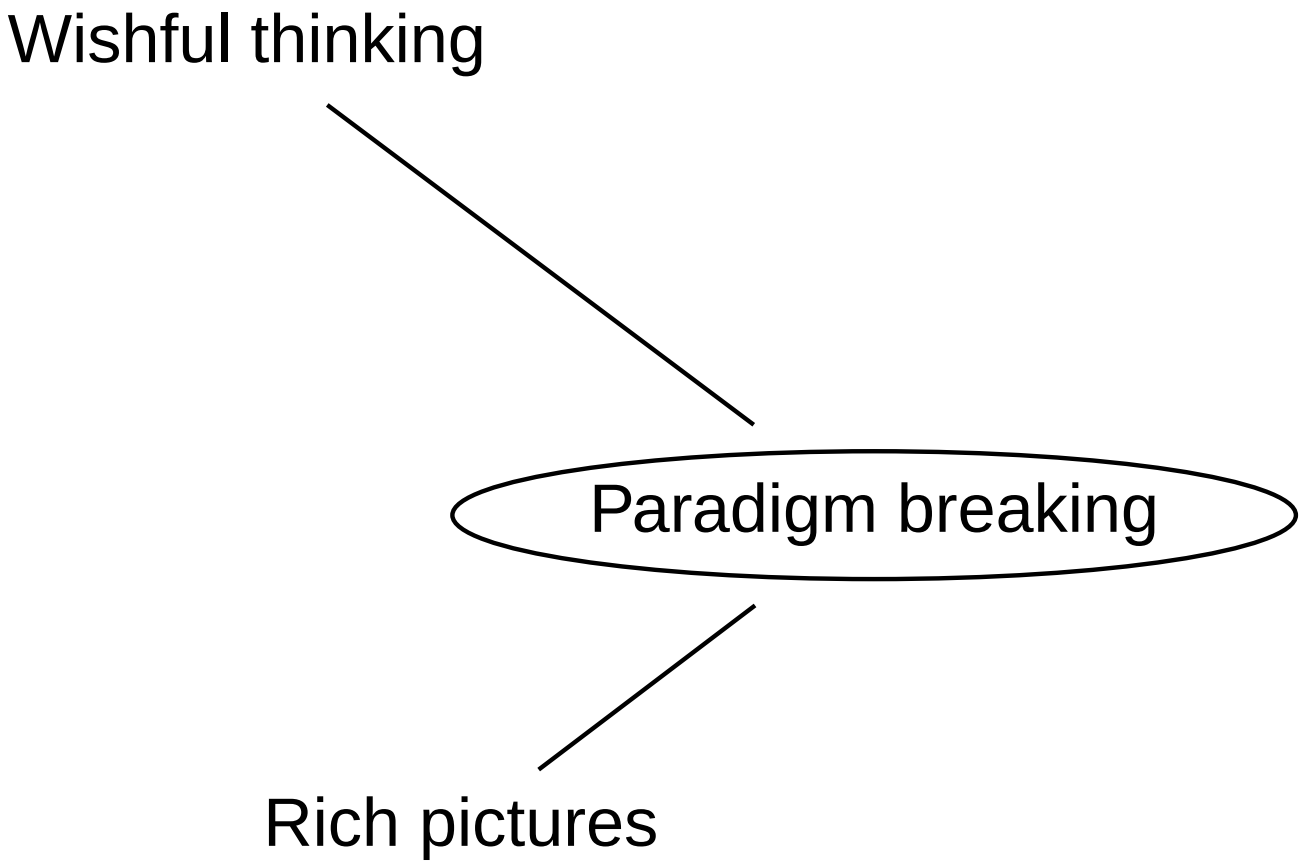

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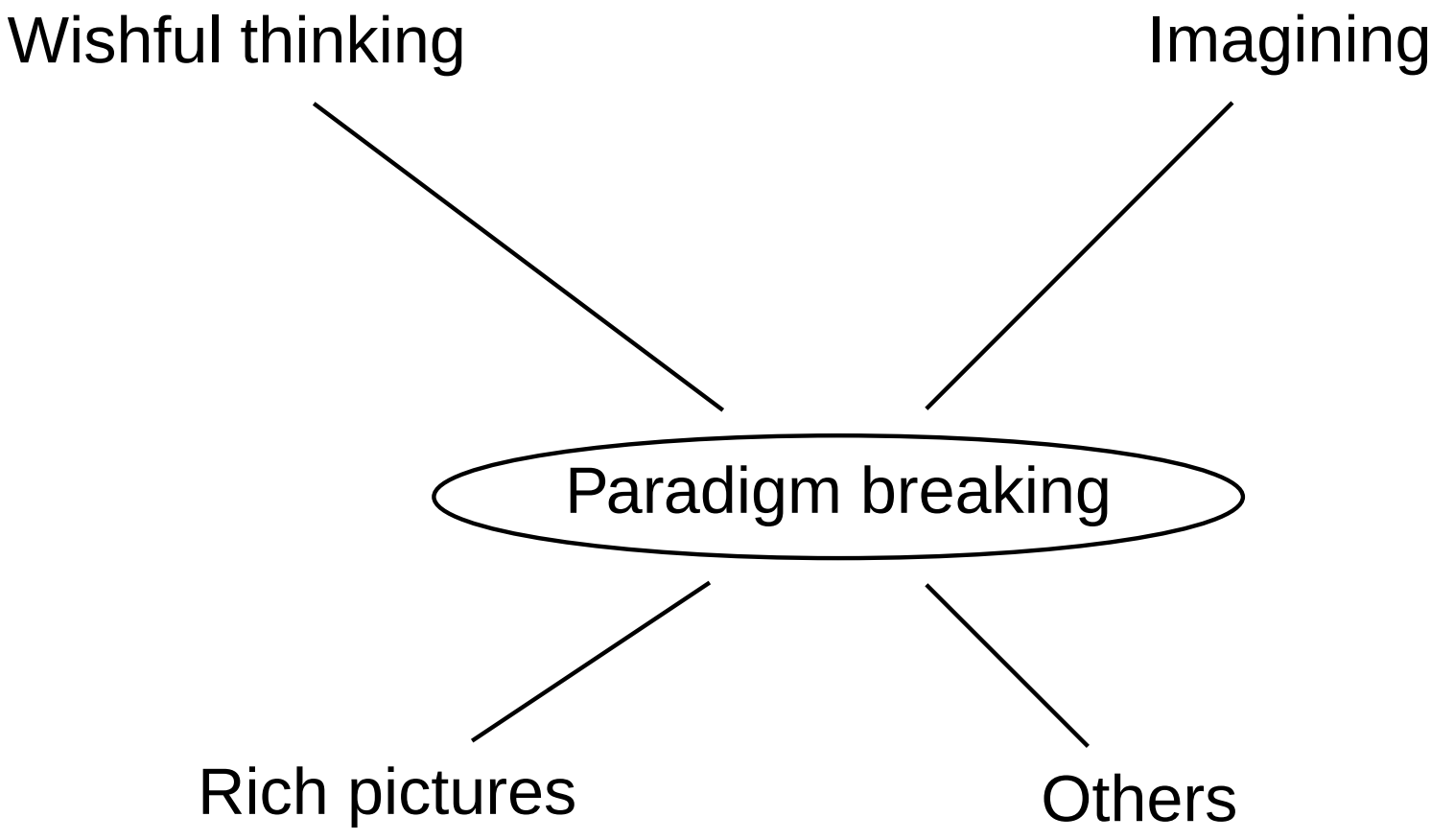


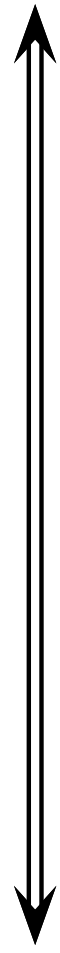
The Continuum

McFadzean (1998):

Paradigm preserving

Paradigm stretching

Paradigm breaking



O'Dell (2001):

More structured

Less structured

Creative Thinking

- Divergent thinking
  - Create many alternatives
  - Avoid destructive criticism
  - Break paradigms if necessary
- Convergent thinking
  - Find structure
  - Be systematic
  - Focus on the most promising ideas

Example (software development)

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Inexperienced:

- One (obvious) idea
- Start programming

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- Construct the original idea
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Excellent product

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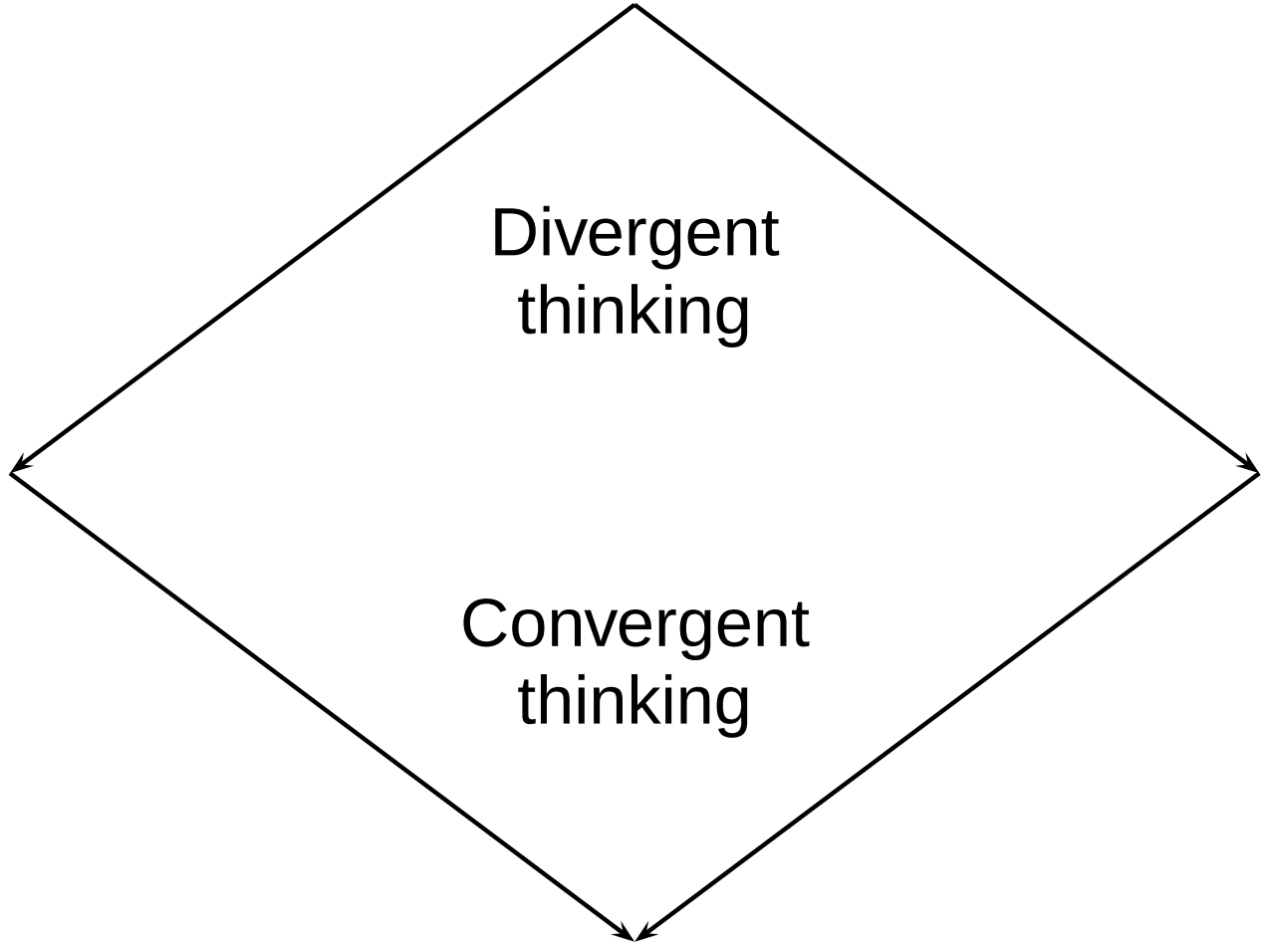

Creative Problem Solving Process

Osborn (1953) described in “Applied Imagination” guidelines for solving problems creatively. Later researchers constructed the CPS-model based on these guidelines:

- Mess finding
- Fact finding
- Problem finding
- Idea finding
- Solution finding
- Acceptance finding

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Barriers to Creativity

- Perceptional locks
- Emotional locks
- Cultural locks
- Enviromental locks
- Intellectual locks

Awaking Creativity

- Break away from routines
- Get inspiration from everyday events
- Use creative thinking (diverge and converge)
- Daydream
- Serendipity, i.e. the ability to discover by chance

Example (3M post-it)

Inspiration, creativity and serendipity were central in the development of 3M post-it.

- Spencer Silver from 3M were trying to find a strong adhesive (1970)
- However, the adhesive became extremely weak
- Silver's project seemed to be a complete failure
- Suddenly, Arthur Fry from 3M realized that the adhesive together with paper were perfect for markers and notes (1980)

Conclusion

BE CREATIVE!