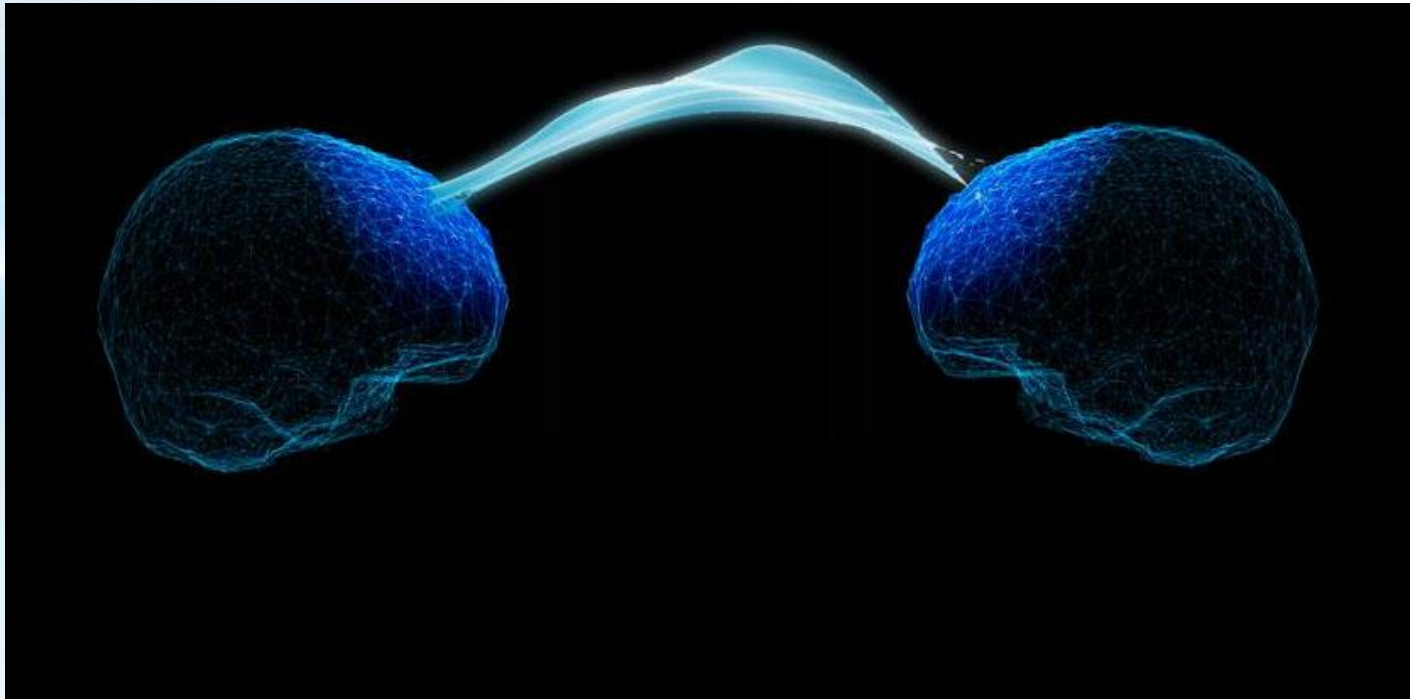# Cognition, creativity, language



Russian State University for the Humanities

Prof. Dr. Vera Zabotkina

# COGSCI'19

**Creativity + Cognition + Computation**

24 - 27 JULY 2019
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# The integration challenge facing the cognitive science

Philosophy

Psychology

Linguistics

Artificial Intelligence

Anthropology

Neuroscience
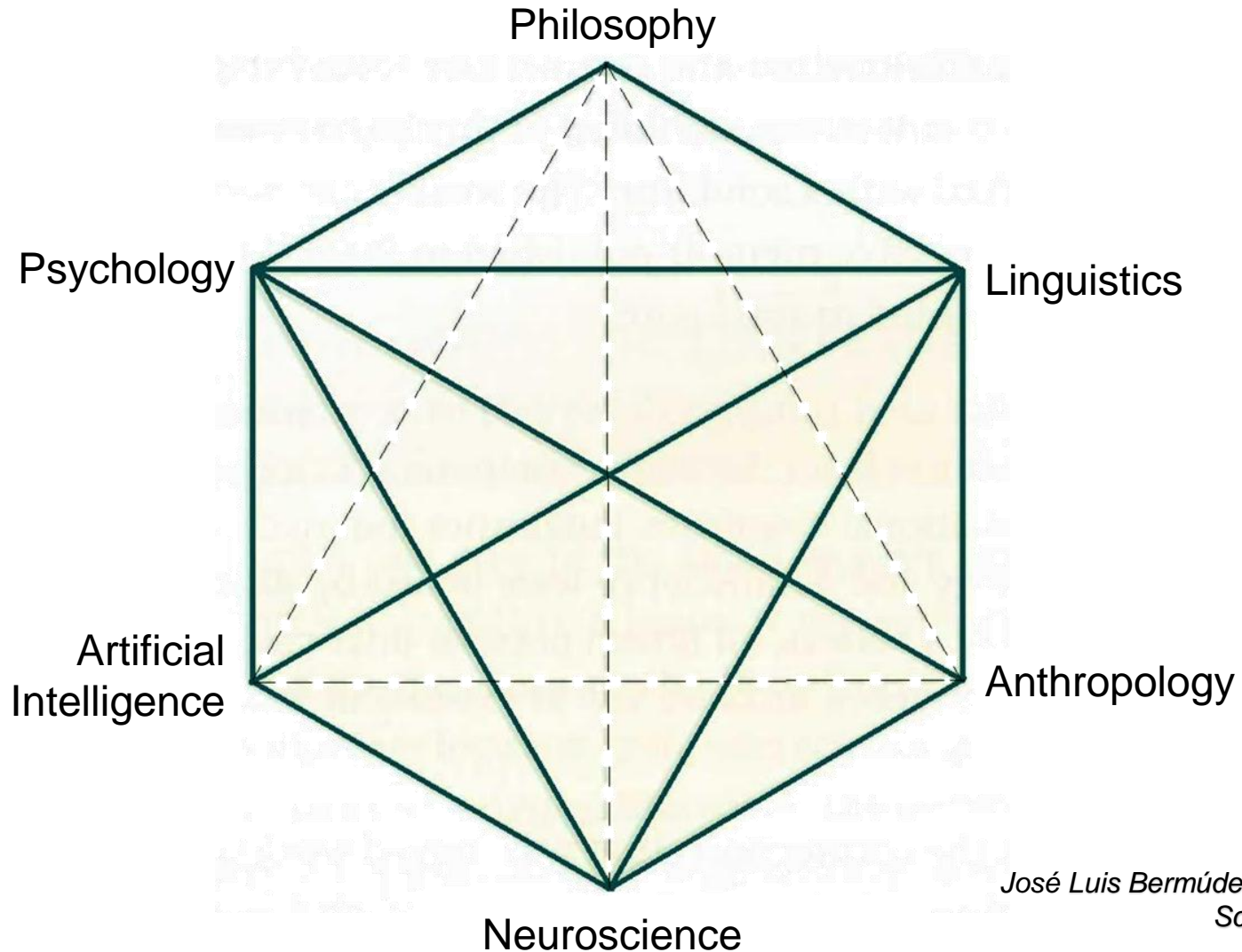
*José Luis Bermúdez, Cognitive Science, 2011*
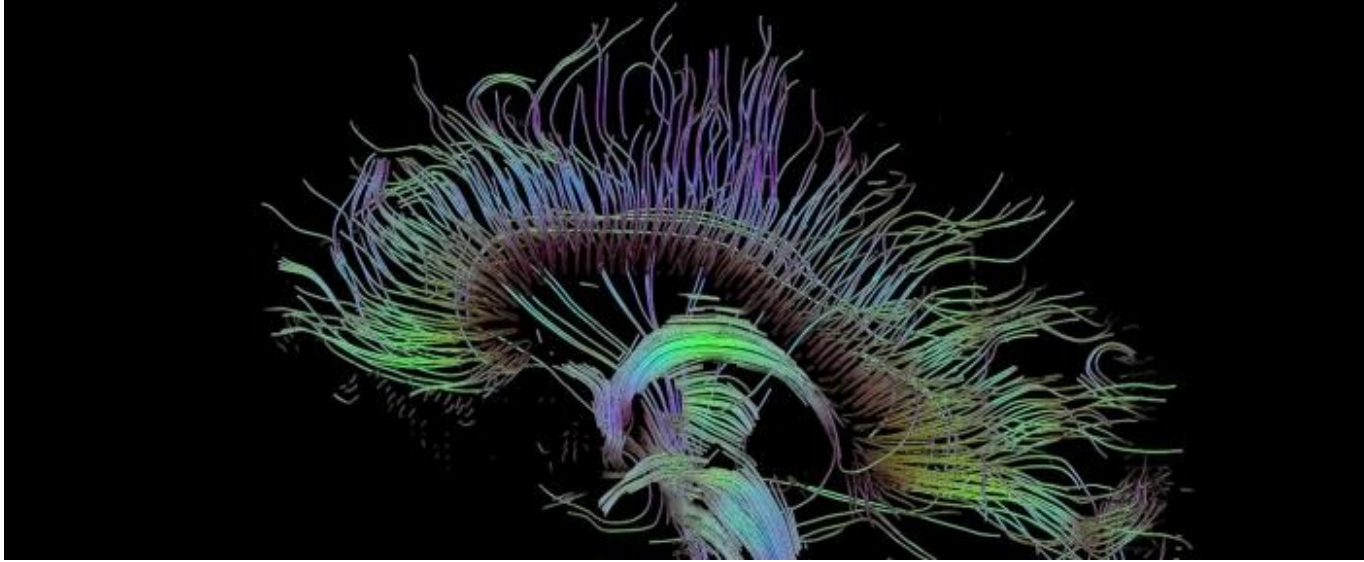
The integration challenge for cognitive science is the challenge of providing a unified **theoretical framework** for studying cognition, that brings together different disciplines studying the mind
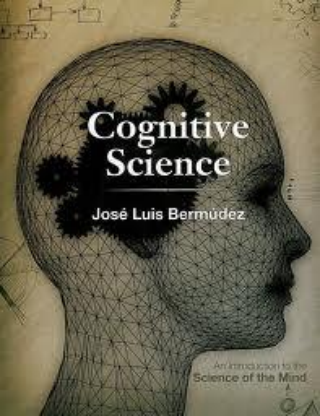
# Solutions to the integration challenge: a) Mental Architecture

Disciplines and sub-fields of cognitive science differ across three dimensions:

- According to the type of cognitive activity being studied

- According to the level of organization at which that type of cognitive activity is being studied

- According to the degree of resolution of the techniques that are being used
(José Luis Bermúdez, Cognitive Science, 2011)

# b) Multiple levels of analyzing cognitive systems. David Marr's "Vision"

His analysis of vision is a top-down analysis of a cognitive system

1. Computational level:

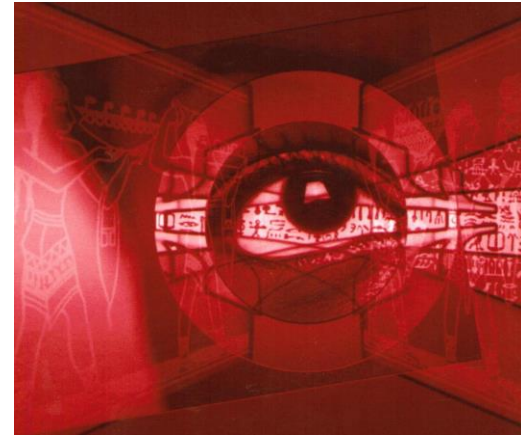   - the analysis of the particular type of

   task that the system performs

2. Algorithmic level:

   - explains how information-processing task can be algorithmically carried out

3. Implementation level:

   - shows how algorithm is actually implemented

The three levels differ in how abstract they are

# Metaphors we live by
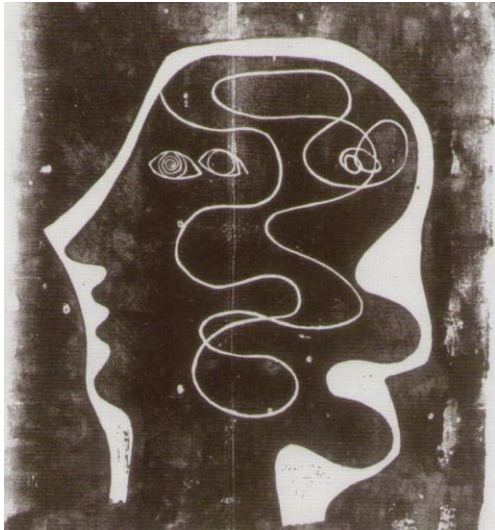
"The concepts that govern our thought are not just matters of the intellect. They also govern our everyday functioning, down to the most mundane details. Our concepts structure what we perceive, how we get around in the world, and how we relate to other people…

…Our **conceptual system** thus plays a central role in defining our everyday realities. If we are right in suggesting that our conceptual system is largely metaphorical, then the way we think, what we experience, and what we do every day is very much a matter of metaphor…"

(Lakoff & Johnson)

# Conceptual Metaphors (CM)

Conceptual metaphor (CM) as conventionalized cognitive structures are based on mapping relations from a source domain to a target domain, where the source domain concepts are taken to be "literal" (more concrete) and the target domain concepts are "figurative" (abstract)

Target Domain

Source Domain
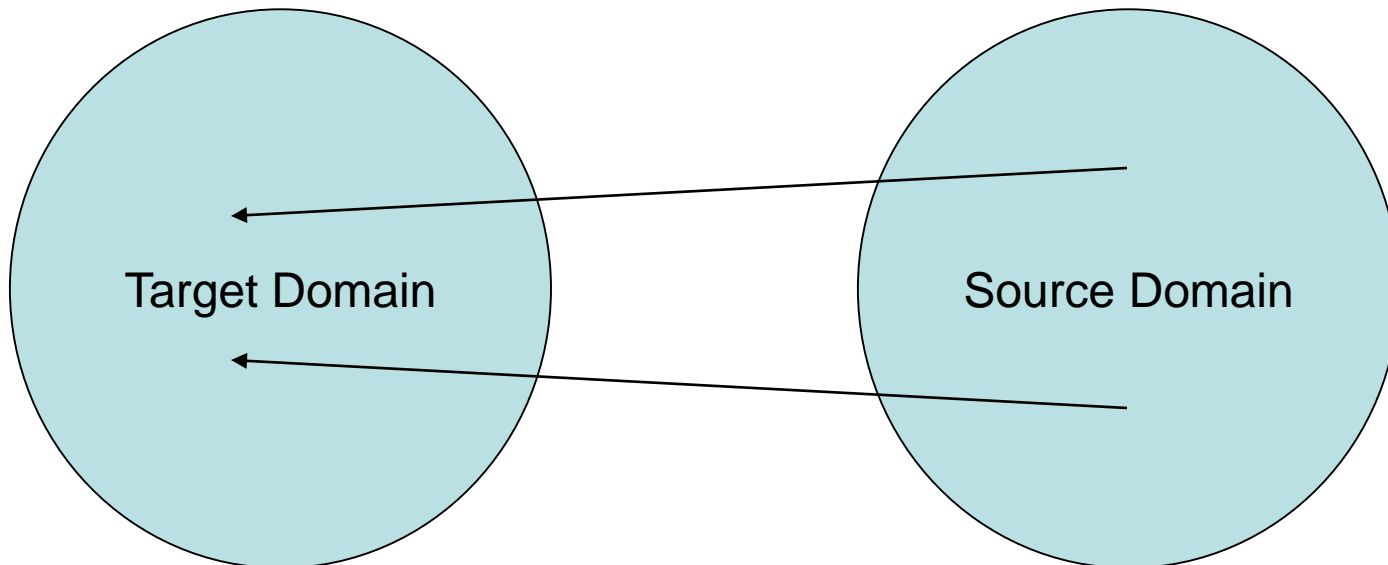
# Examples

- Universal: LIFE IS A JOURNEY, POLITICS IS WAR, ARGUMENT IS WAR.

- Culture-specific: TIME IS MONEY - save time, invest time, spend time, cf. valuable time, to live on borrowed time. In Korean culture – TIME IS HONOUR.

- New (XX c.): TIME IS A SOLID STRUCTURE - time slot, time slice, time frame.

    EARTH IS A GREEN HOUSE, EARTH IS A GLOBAL VILLAGE, EARTH IS A LIFE-BOAT - life-boat ethics

  WORLD IS A GLOBAL CASINO - to play the green card
  cf. with traditional LIFE IS A GAMBLE - to take our chances, the odds are against us, to have an ace up one's sleeve

# Embodied Cognition



Conceptual metaphors can be decomposed into combinations of simpler metaphors and ultimately to **"primary" metaphors**, which don't decompose further.

Primary metaphors are motivated by **embodied experiences** coming together regularly. For example, when children are held affectionately by their parents, the experience of affection correlates with the experience of warmth, leading to the conceptual metaphor Affection is Warmth (Lakoff, 2012).
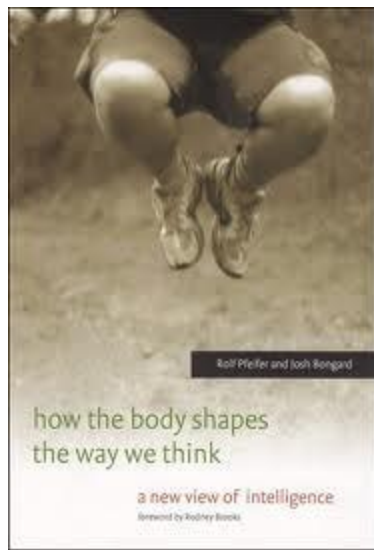
# Embodied Cognition

Metaphors for emotions arise from the internal body states.

For example, in anger, skin temperature and blood pressure rise. Thus, anger can be conceptualized as the heat of a fluid that releases pressure:

"his blood was boiling", "he let off steam".

(Lakoff, 2012)

# Analogy

Analogy as a universal mental operation that lies at the basis of CM (Kubryakova, 2010). In accessing new information humans create mental models by proceeding from existing knowledge.

- Johnson-Laird's theory of **mental models:** based on the experienced situation, the speakers build analogous representations from which they can infer implicit information.

- Jean Piaget: during individuals' active information processing he\she integrates new information into their existing assimilating schemata.

CMs are frame-to-frame mappings, with the roles of the source frame mapping to corresponding roles of the target frame.

The mappings are not necessarily one-to-one. There are cases where not all the roles fillers are mapped, and other cases where metaphorical roles are *added to the target domain*.

# Cognitive Mechanisms of Linguistic Creativity

*"Words strain*

*Crack and sometimes break, under the burden,*

*Under the tension, slip, slide, perish,*

*Decay with imprecision, will not stay in place,*

*Will not stay still"*

T.S. Eliot
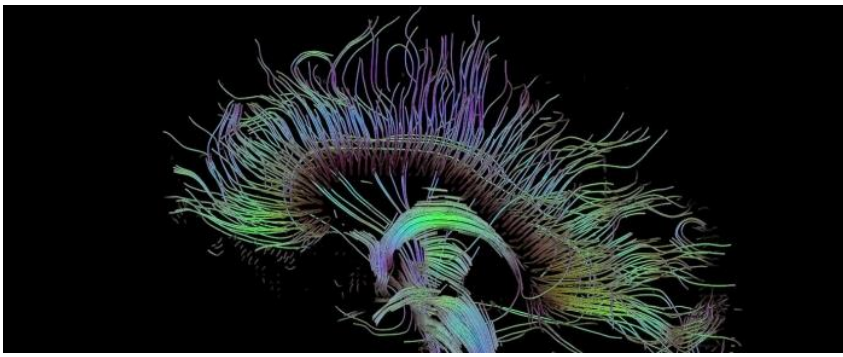
# Outline

- Introduction

- Language system creativity vs language users` creativity

- Latest developments in the creativity studies

- Human creativity as combination of previously unconnected mental representations

- Deviation, analogy and inference as three basic mechanisms of creativity

- Three types of deviation: pragmatic, semantic, conceptual

- The limits of creativity

- Conclusions

# Latest developments in the creativity studies

- Creativity is a modern concept and a modern value (Mason 2003; Reckwitz 2017)

- Three dichotomies along which we define, measure and enhance creativity (Glaveanu & Kaufman 2019)

      - creativity : individual and/or social?

      - creative artifacts: novelty and/or value?

      - creative action: ideas and/or action?

- The studies of creativity across humanities, social sciences, neuroscience

- How the adoption of sociolinguistics lens may contribute to our understanding of creativity (Swann & Deumert 2018)

# Latest developments in the creativity studies

- Collaborative creativity (adaptive, responsive to previous texts and practices embedded in discursive activity around relationships and identities (Tannen 2007; Garter 2009; Swann et al. 2011; Jones 2012; Deumert 2011)

- Team creativity (Reiter-Palmon & Leone 2019)

- 'Language as messy' (Jones 2016)

- Studies of creativity in neuroscience (fluid intelligence vs crystallized intelligence, their role in creativity of language user).

# Dichotomy 'language system creativity' VS 'language users` creativity'

- Triad **language-creativity-cognition** and the interrelation between language use with the cognitive and linguistic structures.

- Analysis of how language system responds to the needs of verbalizing new concepts, on the one hand, and how the language user is creatively involved in the new concept/word formation, on the other

# Dichotomy 'language system creativity'
# VS
## 'language users` creativity'

- Creativity is based on confrontation, deviation and novel combination of existing mental representations. Human creativity requires the combination of previously unconnected mental representations, constituted by patterns of neural activity (Thagard and Steward 2010).

- New meaning of a word originates from the creative novel use of a traditional word in a non-typical linguistic environment.

- Analysis of how novel/creative individual pragmatic inferences are developing into a new meaning of lexeme (cf.Traugott and Dasher 2002).

# Creativity-Cognition-Language Thought vs Word

"Thought is not expressed by language but takes place in it" (Vygotsky, 1983, v. 2, p. 356).

"Those processes of thought and speech show unity but not identity" (Vygotsky, 1982, p. 355).

According to Vygotsky word meanings are infused with / or constituted by concepts without which they are limited to a primitive nominative function. The development of word meanings involves movement from 'primitive forms of generalization to higher and more complex forms'.

*"I wanted to pronounce the word,*

*But that word I had forgotten,*

*And the bodyless thought returned*
*to the palace of shadows"*

Osip Mandelstam

# Deviation as the key cognitive mechanism of creativity

- Three types of deviation: **semantic** ("sign - referent" relation), **pragmatic** ("sign - user" relation) and **conceptual** (relations between conceptual structures of original and new meanings).

- The deviation in "sign - user" relation as The first step in the development of a new meaning.

- The new meaning of a word appears as a result of instantaneous deviation in individual use in the novel linguistic environment.

# Cognitive mechanism of inference in the perception/understanding of a new meaning

## Three stages in new meaning development

- The novel individual invited pragmatic inference (the speaker/writer as if invites the listener/reader to infer the nuances of the new creative meaning which arose due to deviated use of a word in a novel, non-typical context)

- Generalised (conventionalized) invited inference shared and adopted by more than one speaker with strengthened pragmatic impact (Traugott and Dasher, 2002)

- A new coded meaning of a word

**Utterance-type meaning**
**Conventionalizing of IINs as GIINs**

**SP/W  -  AD/R constraints on weighting  of IINs**
**(preferred  uses, saliency, relevance, subjectivity, etc.)**

**Utterance  - token meaning**
**SP/W exploits  IINs innovatively**
**in associative stream of speech**

Stage I *Coded meaning*  >  Stage II *New coded meaning*
*(semantisation)*

L  $M_1$  L  $M_1 + M_2$

$C_a$  $C_a$  $C_b$

**Model of the Invited Inferencing Theory of Semantic Change**

# Three stages of the meaning development of adj. "aggressive"(interpreneral,energetic)

- Individual invited inference 1930. An advertisement in a Vancouver newspaper asked for an 'aggressive clothing salesmen'

- Generalized invited inference 1956. A similar ad in Winnipeg suggested that 'only aggressive men need apply' (Morrish, 1999)

- New coded meaning with its own conceptual structure 1970-s (record in the dictionary)

# **The limits of creativity**
# **What are the limits of deviation?**

The limits/constrains of deviations are imposed by the conceptual structure of the original meaning of the word.

# Conceptual derivation through deviation

Cognitive inference taking place between the conceptual structure of the original meaning and the new one (M1(C1) M2(C2)).

From the point of view of cognitive structure we can speak about ad hoc concepts, which can appear via narrowing or widening.

# Conceptual widening (generalization), e.g. aggressive

x x            C2   x

of

x  x      C1            x x

'disposed to

        xx              x

the noun

 xx              xx

term
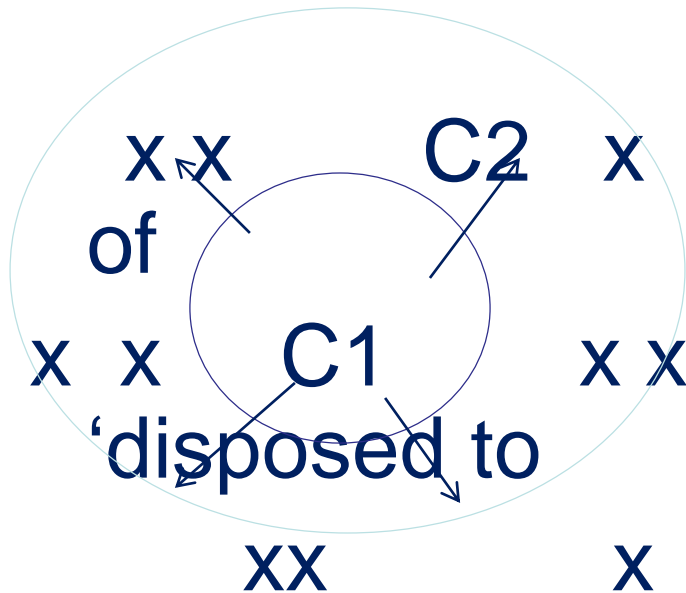
The original meaning of

'aggressive'                    –
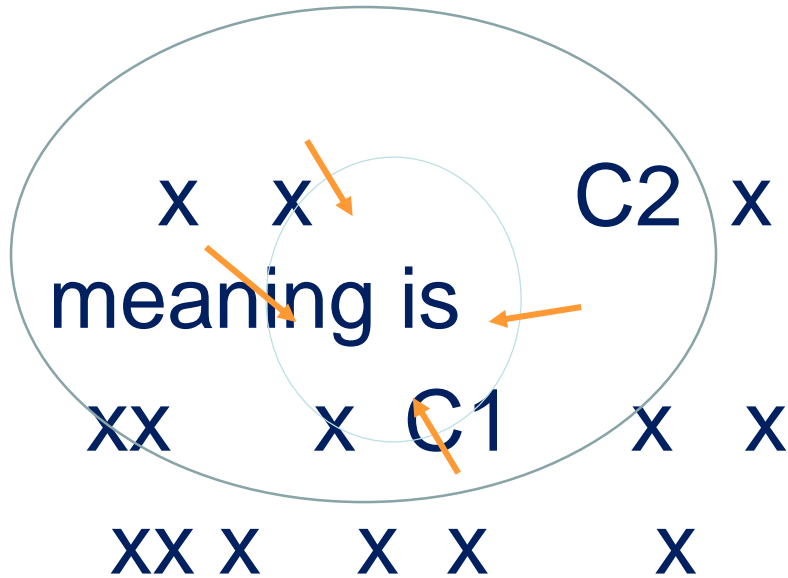
attack others', from

'aggression' – a military

first     found     in
seventeenth   century   and   meaning

# Conceptual narrowing (specialization), e.g. adult

x   x         C2  x         The original meaning is

xx       x  C1       x   x         'physically mature'.
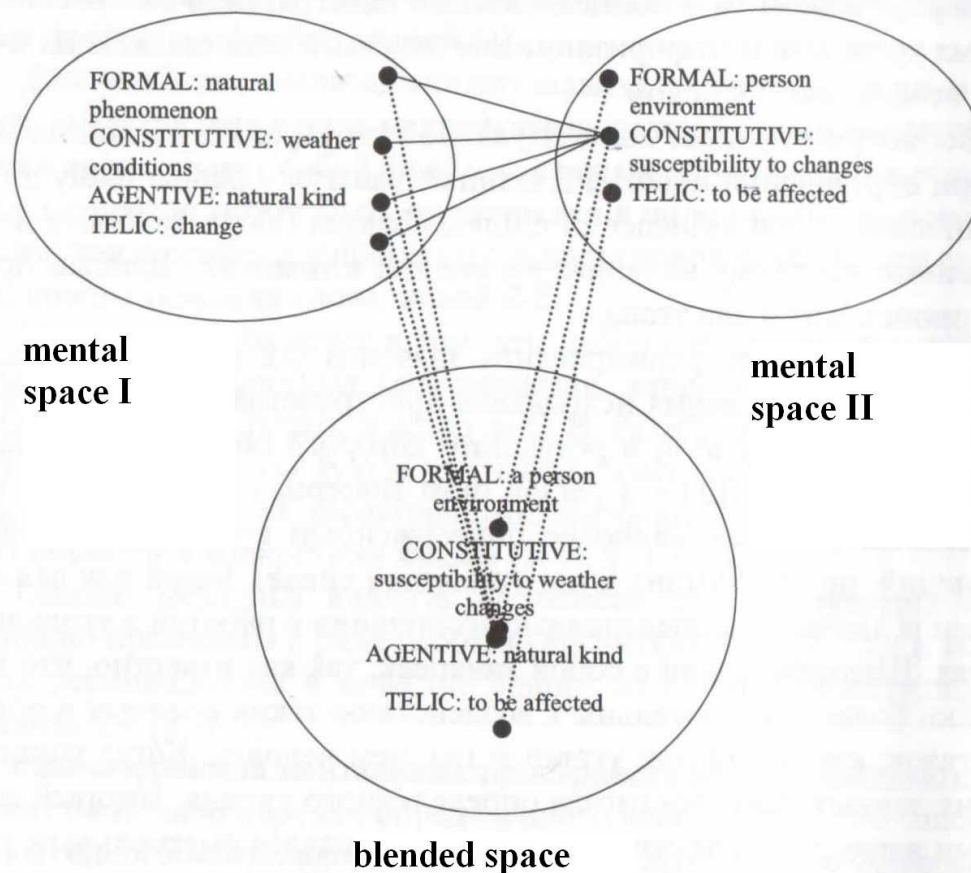
xx x    x  x         x         The conceptual feature

'sexually explicit'  has been added.

# Conceptual blending as a mechanism of creativity



The Model of Conceptual Integration
"climate canary"

FORMAL: natural phenomenon
CONSTITUTIVE: weather conditions
AGENTIVE: natural kind
TELIC: change

FORMAL: person environment
CONSTITUTIVE: susceptibility to changes
TELIC: to be affected

mental space I

mental space II

FORMAL: a person environment
CONSTITUTIVE: susceptibility to weather changes
AGENTIVE: natural kind
TELIC: to be affected

blended space

The theory of conceptual blending is opposed to the algorithmic approach to lexical meaning. Conceptual blending is not algorithm-based, but intuition-based.

*"So foul a sky can clear not without a storm. Pour down thy weather"*

(Shakespeare, King John)

# Conclusion

- The main cognitive mechanisms may be represented as a multi-level and multi-dimensional system. The three key mechanisms: deviation-analogy-inference and combination of previously unconnected mental representations. Analogy serves the main stimuli of creativity.

- New meaning of a word originates from the creative non-typical novel use of a traditional word in a non-typical linguistic environment.

- Three types of deviation have been analysed: pragmatic, semantic and conceptual.

- For the pragmatic invited inference to become semanticised as a new coded meaning it has to go through the process of conventionalisation, which normally lasts from twenty to forty years.

- The mechanisms of semantic changes is based on conceptual derivation involving concept-narrowing and concept extension, conceptual metaphors.

- Creativity in metaphors is based on activation of conceptual features with highest inferential potential.

- Inference actually becomes new reference as a result of intricate interplay between creativity and conventionality.

# Thank you!

**Vera Zabotkina**

Prof. Dr.

Vice-rector for International Cooperation

Director of the Center for Cognitive Programs and Technologies

Russian State University for the Humanities

[rggu.com](rggu.com)

cognitive.rggu.ru

[zabotkina@rggu.ru](mailto:zabotkina@rggu.ru)