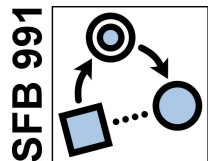


# Why frames

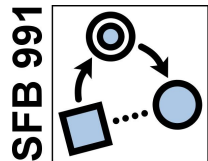
Introducing the Collaborative Research Centre 991  
„The Structure of Representations in Language, Cognition, and Science“

Sebastian Löbner, Coordinator

9th International Tbilisi Symposium on Language, Logic and Computation  
Kutaisi, 27 Sep 2011



1. Working hypothesis and goals of the CRC
2. Barsalou frames
3. Research perspectives
4. Projects in the CRC



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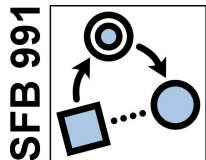
## 1. Working Hypothesis and Goal of the CRC

### Hypothesis

- There is a general format of concept representation.  
This format is found at the neural, cognitive, linguistic, and institutional level of concept formation.
- The general structure of conceptual representation is a modified and extended version of Barsalou frames.

### Goal

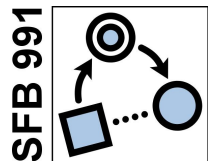
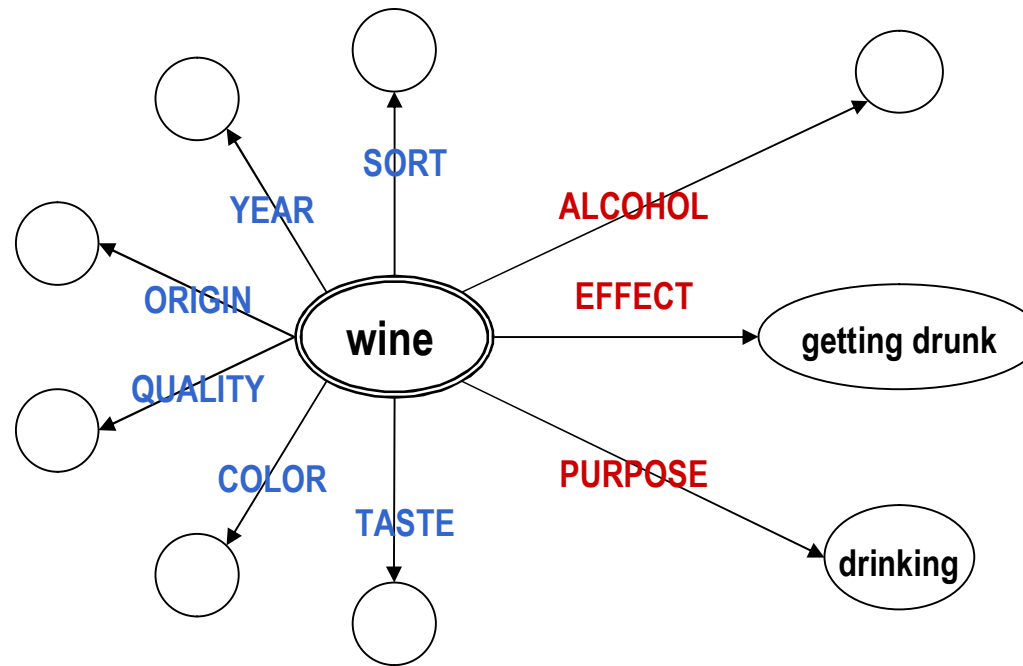
Development of a general **theory of concepts**: a comprehensive, empirically grounded formal theory of frames as conceptual representations.



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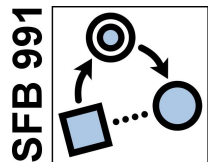
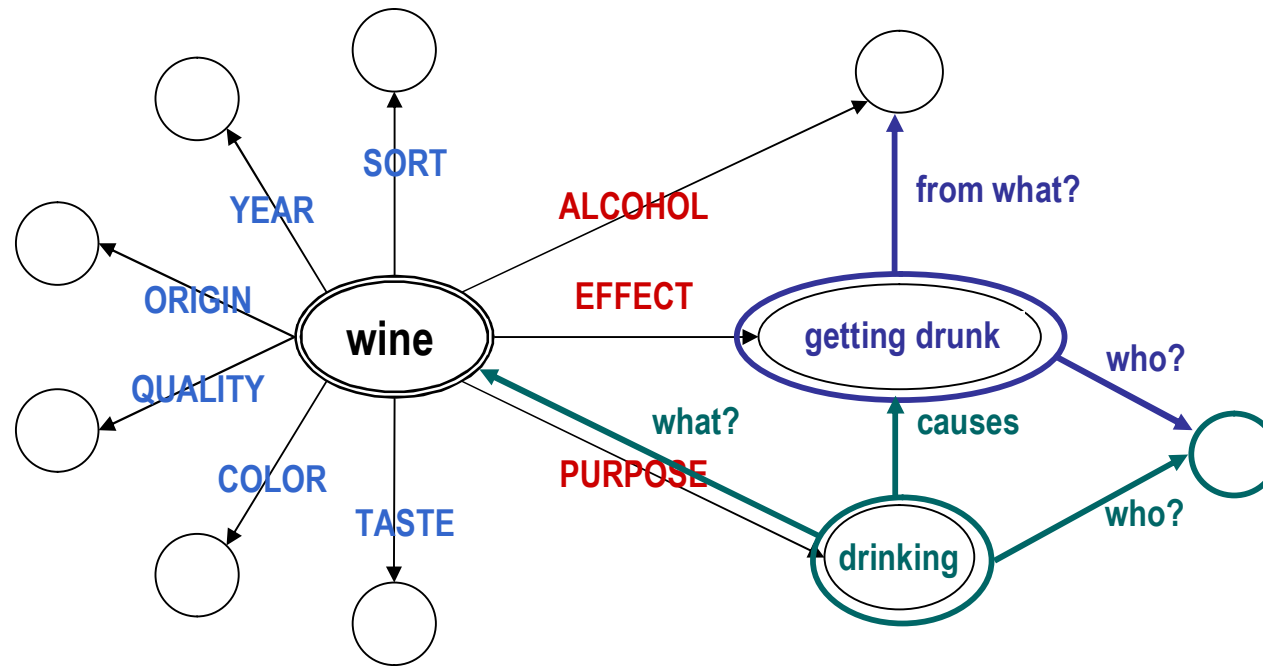
## 2. Barsalou Frames

### 2.1 Example



## 2. Barsalou Frames

### 2.1 Example

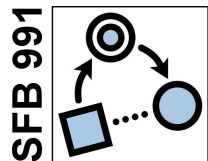


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## 2. Barsalou Frames

### 2.2 Essential structural properties?

- **Unlimited recursion and embedding**
- **Uniqueness of the frame referent**
- **Uniqueness of the attributes of a node**  
The attributes of a node are mutually different
- **Uniqueness of attribute values**  
Attributes are partial functions



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## 2. Barsalou Frames

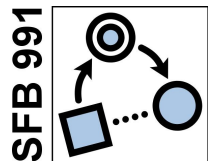
### 2.3 Why Barsalou Frames?

- **Expressive power** combined with **nontrivial constraints**
- **Empirical evidence** from experimental cognitive science
- **Evidence from linguistics**

Syntax: Syntactic structures exhibit the essential frame properties

Semantics: Case frames

Lexicon: Emergence of abstract attribute vocabulary

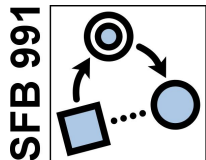


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### 3. Perspectives of research

#### 3.1 For linguistics

- Modeling lexical meanings
- Grounding lexical meanings in cognition
- Exploring the syntax semantics interface deeper into lexical meanings
- Grounding semantic composition in lexical decomposition  
Exploring semantic composition from an autonomous semantic perspective
- Exploring the interface between the linguistic lexicon and world knowledge
- Applying frames in computational linguistics





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### 3. Perspectives of research

#### 3.2 Beyond linguistics

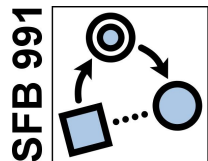
- Neuro-cognitive science: grounding verb meanings in the sensorimotor system
- Philosophy: grounding noun meanings in actions (“affordances”)
- Selected sciences: conceptual analysis of paradigm changes in terms of scientific frames
- Mathematics: formal mathematical theory of frames and frame spaces

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### 3. Perspectives of research

#### 3.3 Components of a theory of frames (selective)

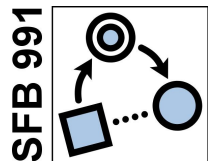
- **Model-theoretic semantics** for frames
- Frames for different **types of concepts**
- **Dynamic frames** for actions and events:  
capturing temporality, causality, and modality
- **Operations and relations** concerning frames
  - conceptual shifts, including metonymy and metaphor
  - frame composition



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## 4. Three groups of projects

- A Foundations of a frame theory of concept representations**  
mathematics – computation – psycholinguistics – philosophy
- B Dynamic concepts**  
verb meanings – processes – paradigm changes  
legal terms – psychiatric disorders
- C Nominal concept types and type shifts**  
grammatical typology – corpus statistics – processing – diachrony  
conceptual combinatorics



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**Thank you for your attention!**

For detailed information, please, visit our homepage:

**<http://www.sfb991.uni-duesseldorf.de/>**

