

**///ADAMA**  
**Identifying and Analyzing  
Metaphors**

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Intelligence Advanced  
Research Projects Activity

# Metaphors

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- Many expressions in human language are not literal, but are **metaphorical**, such as:

*“relationship roadblock”*

- Linguistic metaphors are derived from underlying conceptual metaphors
  - Cognitive structures which map a *source* concept to a *target* concept

*LOVE is a JOURNEY*

# Research Problems

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- **Identify which expressions in a document are literal, and which are metaphorical**
- **Given large amounts of textual data, automatically find the main conceptual metaphors people use**

# Who Cares?

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- **Information Retrieval**
  - “Relationship roadblock” is not about traffic.
  - Query “vicious people” should find “That guy is a shark.”
- **Human-Computer Interaction**
  - Understand more of what people say
- **Cultural Understanding**
  - Find similarities and differences between cultural conceptual metaphors

# Basic Ideas

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- Three levels of analysis

- Linguistic metaphors

*open job*

- Nominal analogies

*employment ~ door*

- Conceptual metaphors

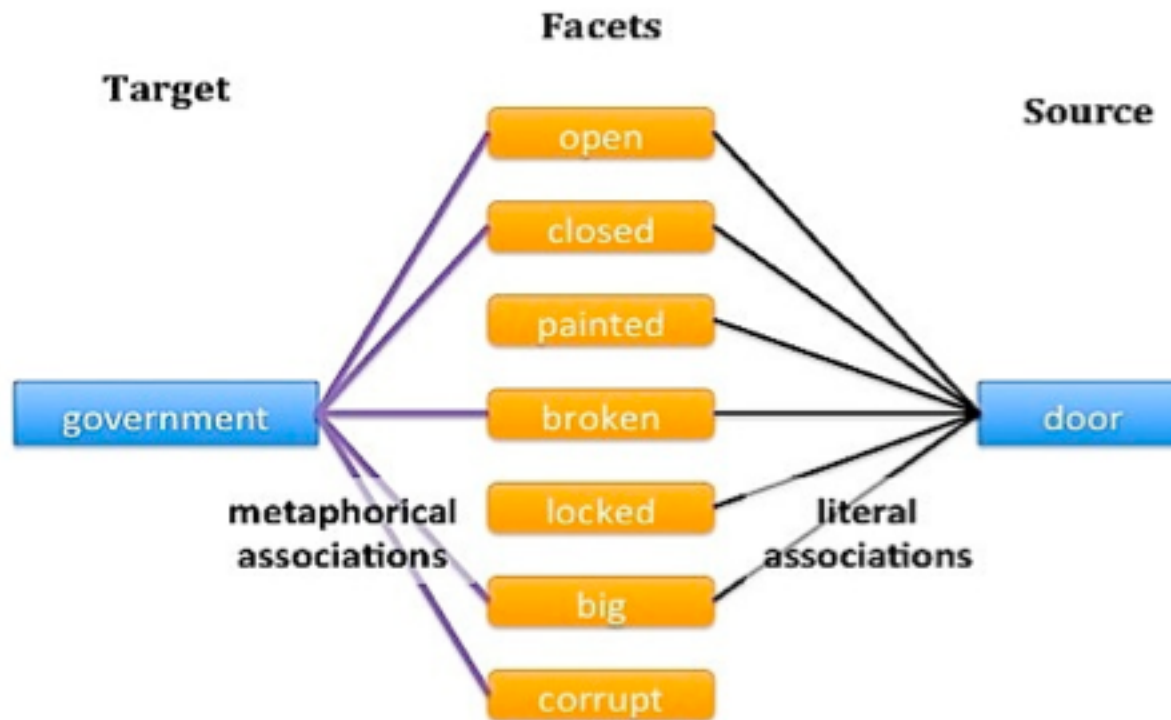
**WORK is a CONNECTION**

# Linguistic Metaphors

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- Classification is based on two focal words in the expression, **facet** and **target**
  - Type 1: Subject and complement of an identifying clause “My lawyer<sub>T</sub> is a shark<sub>F</sub>”
  - Type 2: A lexical verb and its direct object “He entered<sub>F</sub> politics<sub>T</sub>”
  - Type 3: An adjective and the noun it describes “open<sub>F</sub> government<sub>T</sub>”

# Identify Nominal Analogies



# Conceptual Metaphors

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- **In the third and final step, nominal analogies are clustered into conceptual metaphors**
- **Cluster nominal analogies such that**
  - **Source and target noun clusters are conceptually coherent AND**
  - **The implied conceptual metaphor is plausible and supported by corpus statistics**



# Conceptual metaphors

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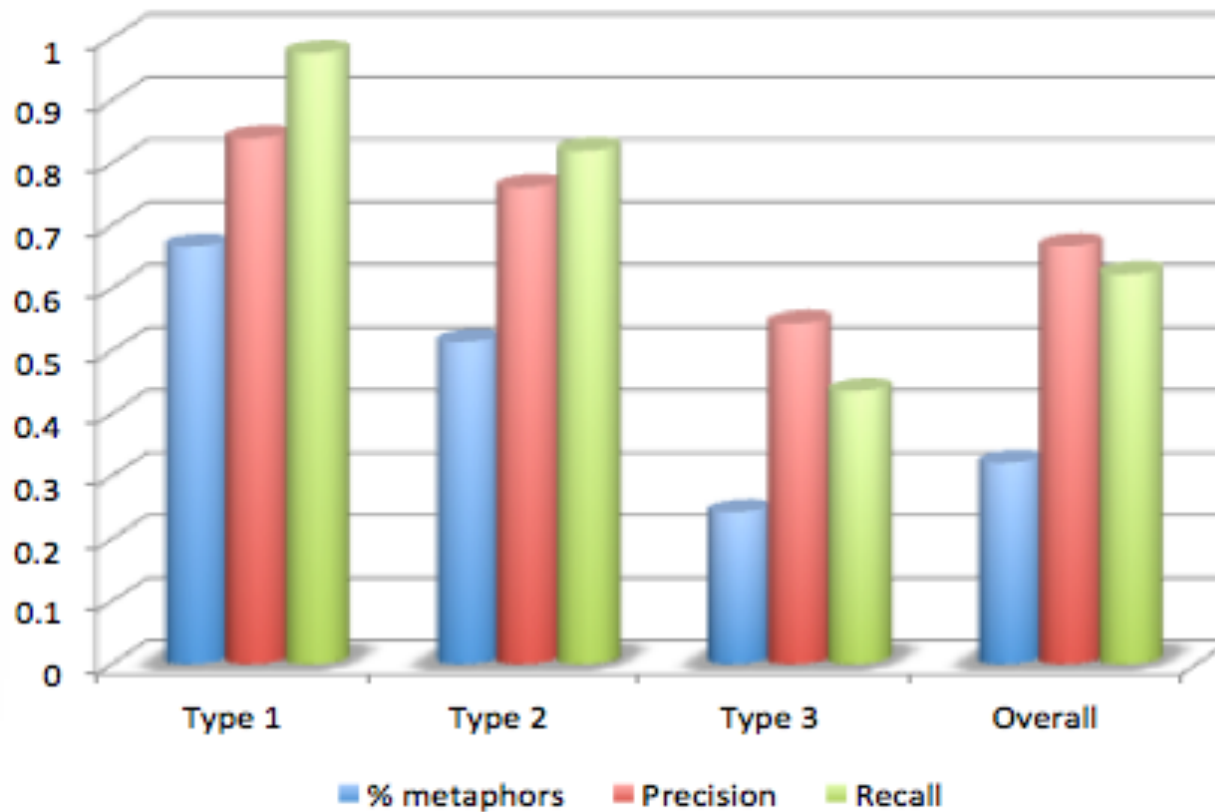
- **Constraints**
  - Source cluster must be more concrete than the target cluster
  - The larger the concreteness gap, the better
  - The more concrete the source cluster, the better
  - The more shared facets overall in the nominal analogies, the better
  - The stronger the nominal analogies, the better
  - The more nominal analogies, the better

# Linguistic Metaphor Experiments

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- Reuters RCV1 corpus, used small number of target terms
- 342,000 texts, used first sentence
- Automatically extracted Type 1,2,3 metaphors using the Stanford Parser
- 4 research assistants annotated data – high inter-rater agreement

# Linguistic Metaphor Experiments

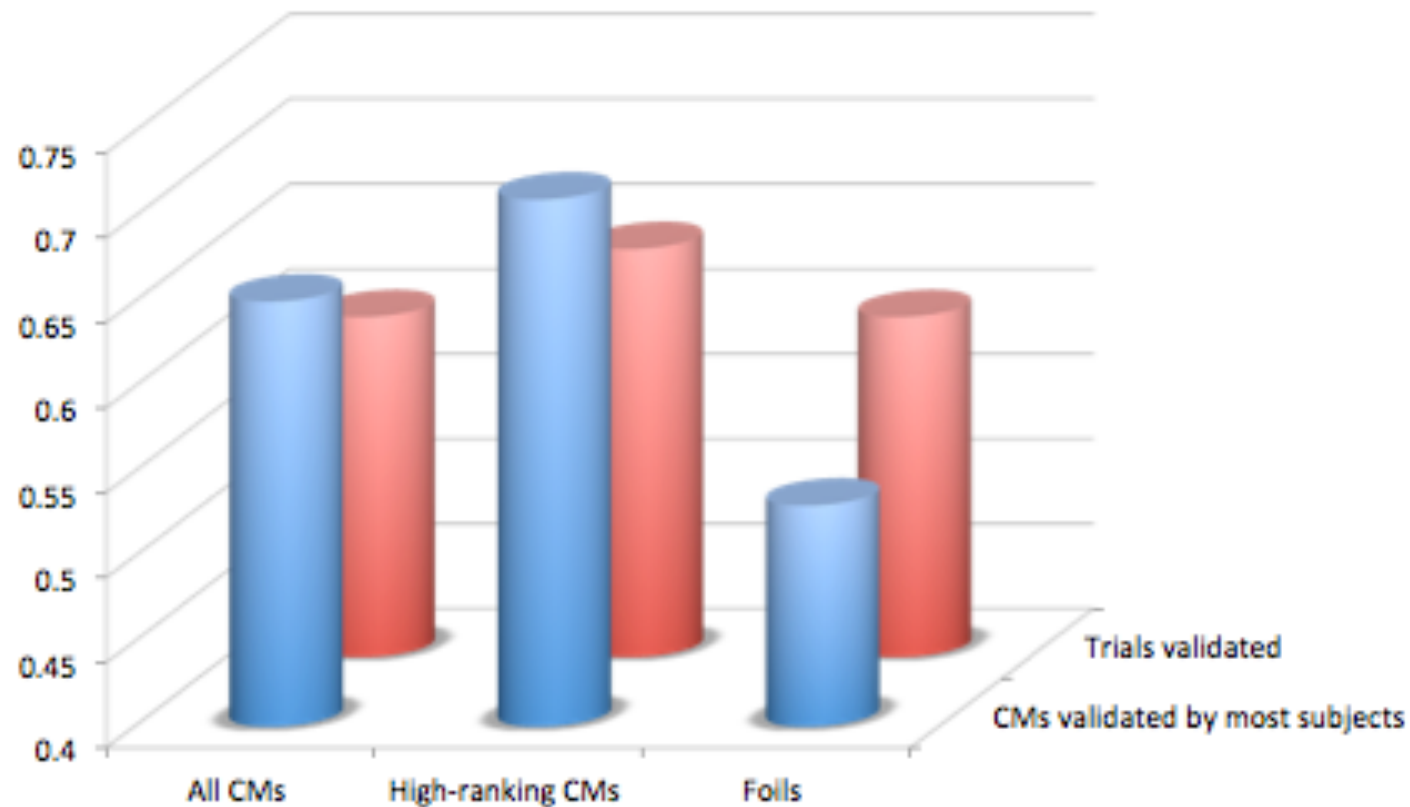


# Conceptual Metaphor Experiments

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- **Conceptual metaphors related to government**
- **21 naïve subjects, fluent in English**
- **Given conceptual metaphors and randomly generated foils**

# Conceptual Metaphor Experiments



# Other Projects

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- **Identify anonymous authors (or their age, gender, personality) based on how they write**
- **Summarize biomedical research articles to make it easy for physicians to use latest research to treat patients**
- **Increase efficiency of NLP for scalability**

# Contact

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