

# L114 Word Meaning and Discourse Understanding

## Session 6: Figurative Language

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## 1 Phenomenology

- Logical Metonymy
- Regular Metonymy
- Metaphor
- Idioms

## 2 Automatic Approaches

- Logical Metonymy
- Regular Metonymy
- Metaphor

## Types of Figurative Language

- **Hyperbole** (*mile-high ice cream cone.*)
- **Simile** (*She is **like** a rose.*)
- **Metonymy**
  - **Creative** (*The **ham sandwich** is waiting for his check.*)
  - **Regular** (*All eyes were on Germany, but **Berlin** seemed unwilling to lead the Union.*)
  - **Logical** (*a **fast** plane*)
- **Metaphor** (*He **shot down** all my arguments.*)
- **Idiom** (*He has a **bee in his bonnet**.*)
- **Irony, Humour** (*Beauty is in the eye of the beer-holder*)

# Logical Metonymy

- Due to Pustejovsky (1991, 1995)
- Additional meaning arises for particular verb-noun and adjective-noun combinations in a systematic way
- Verb (or adjective) semantically selects for an event-type argument, but syntactically selects for a noun.
- The event is however predictable from the semantics of the noun.

## Examples of Logical Metonymy

- *Mary finished her beer.*  
*Mary finished **drinking** her beer.*
- *easy problem*  
*difficult language*  
*good cook*  
*good soup*

# Metonymy

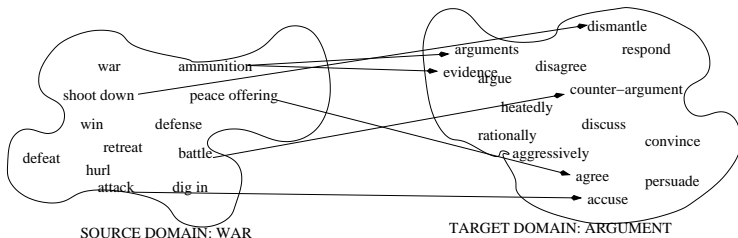
- Use one expression as placeholder for another
- Very frequent phenomenon in language
- Regular metonymy follows schemes:
  - *Press-men hoisted their notebooks and their **Kodaks**.*  
(PRODUCT-FOR-PRODUCER)
  - *After **Lockerbie**, people were more careful about saying that.*  
(LOCATION-FOR-EVENT)
- Creative metonymy is hard to recognise automatically, because it depends on the understanding of the entire situation (AI bottleneck).

# Metaphor

Express one entire concept/situation in terms of another concept/situation (including all other participants, properties and events of that situation).

Lakoff and Johnson (1980): Conceptual Metaphor Theory

- Mapping between two cognitive domains (source and target)
- Usually, source domain is more concrete/evocative



## Metaphor: ARGUMENT is WAR

- Parties **go into battle** *about how high to push the bar for skills*
- Villagers **launch fight** *to save their primary school from closure*
- how to **defend** *yourself against stupid arguments*



## Metaphor: FEELINGS are LIQUIDS

- *A simple phone call had managed to **stir up** all these feelings.*
- *Now here I was, **seething** with anger*
- *is a kind of **pressure valve** for the release of **pent-up** nervous energy*
- *... provide an **outlet** for creativity ... Just ignore the **turbulent** feelings and turn your attention towards ...*

## Mixed Metaphor

Combination of two incompatible metaphorical mappings:

- *biting the hand that rocks the cradle*
- *it would somehow bring the public school system crumbling to its knees.*
- *She's been burning the midnight oil at both ends.*
- *He took to it like a fish out of water.*
- *He wanted to get out from under his father's coat strings.*  
(riding on coat tails + cling to mother's apron strings + hide behind your mother's skirts)
- *If we can hit that bullseye then the rest of the dominoes will fall like a house of cards... Checkmate.*

Zapp Brannigan (Futurama)

# Dead metaphor

**Dead metaphor:** The image that the metaphor invokes has been established in the language, and is therefore typically not perceived as metaphor.

- *I simply cannot **grasp** this idea.*
- *This really made an **impression** on me.*

We think of it as now being contained in the “lexicon” (real or mental lexicon). This is opposed to creative, situational metaphor, which requires active resolution to understand.

# Idioms

- Minimal semantic constituents which consist of more than one word.
  - *pull somebody's leg*
  - *be off one's rocker*
- Definition: the meaning of an idiom cannot be inferred as a compositional function of the meaning of its parts.

## Syntactic Variability Tests:

- ?*Arthur has a bee, apparently, in his bonnet.* (insertion)
- ?*Arthur kicked the large bucket.* (modification)

## Idiom or dead metaphor? Rephrasing Test

Rephrasing of a **dead metaphor** results in similar semantics:

- *They tried to sweeten the pill.*

≈

*They tried to sugar the medicine.*

- *We shall leave no stone unturned in our search for the culprit.*

≈

*We shall look under every stone in our search for the culprit.*

This is not the case for **idioms** (due to their non-compositional semantics):

- *John pulled his sister's leg* ≠ *John tugged at his sister's leg*
- *Arthur kicked the bucket* ≠ *Arthur tipped over the water receptacle*

## Idioms: crosslingual issues

Level of translatability of idiom into another language is unpredictable. This is closely related to the issue of compositionality.

- “*donner sa langue au chat*” (give your tongue to the cat)
- “*appeller un chat un chat*” (call a cat a cat)

# Automatic Approaches

- Logical Metonymy: Lapata and Lascarides (2003)
- Regular Metonymy: Markert and Nissim (2006)
- Metaphor: Shutova et al (2010)

# Logical Metonymy: Lapata and Lascarides (2003)

- $a \text{ fast } \left\{ \begin{array}{l} \text{landing?} \\ \text{taxiing?} \\ \text{flying?} \end{array} \right\} \text{ plane}$
- $I \text{ enjoyed } \left\{ \begin{array}{l} \text{reading?} \\ \text{writing?} \\ \text{eating?} \end{array} \right\} \text{ the book}$
- What is missing for full automatic recognition is the implicit verb (*fly(ing)* and *read(ing)*).
- Cooccurrences of *plane-fly* and *fly-fast* and *like-reading* and *read-book* in corpus can give us the answer.
- Probabilistic model used collects counts for the two associations **separately**.



# Logical Metonymy: the adjective model

$$P(a, e, n, rel) = \frac{f(a, e)f(rel, e, n)}{f(e)N}$$

Verbal predicate  $e$  is modified by adverb  $a$ , bearing argument relation  $rel$  to head noun  $n$ .

$f(a, e)$ : look for “flies fast”

$f(rel, e, n)$ : look for “plane flies” and “flies a plane”

$f(e)$ : look for “flies”

# Logical Metonymy: the adjective model

Frequency: verbs modified by <i>fast</i> .				Frequency: verbs taking <i>plane</i> as argument.			
f(fast,e)		f(fast,e)		f(SUBJ,e,plane)		f(OBJ,e,plane)	
go	29	work	6	fly	20	catch	24
grow	28	grow in	6	come	17	board	15
beat	27	learn	5	go	15	take	14
run	16	happen	5	take	14	fly	13
rise	14	walk	4	land	9	get	12
travel	13	think	4	touch	8	have	11
move	12	keep up	4	make	6	buy	10
come	11	<b>fly</b>	4	arrive	6	use	8
drive	8	fall	4	leave	5	shoot	8
get	7	disappear	4	begin	5	see	7

## Regular metonymy: Markert and Nissim (2006)

- Country and organisation names are classified as metonymical or not

### Countries:

- *Or have you forgotten that America did once try to ban alcohol and look what happened!*
- *At one time there were nine tenants there who went to America.*

### Organisations:

- *How I bought my first BMW.*
- *BMW and Renault sign recycling pact.*

## Regular Metonymy: method and results

Markert and Nissim (2006):

- Manually annotate large training corpus (1,000 examples of each from the BNC)
- Good human agreement
- Supervised learning problem: use grammatical information as features
- Roughly 20% of country names are used metonymically, and 33% of organisation names.

## Metonymy: Features and results

### Features:

- Grammatical function (subj, premod, gen, obj, PP, pred, subjpassive, iobj, other)
- Number, definiteness of determiner
- Lexical head

### Results:

- 87% correct for country names (EMNLP 2002 paper)
- 76% correct for organisations (IWCS 2005 paper)

## Automatic Approaches to Metaphor Recognition

- Selectional restrictions of metaphorically used word in literal interpretation are violated (Wilks 79)
- is-a metaphors violate WN-hyponymy relation: *all the world is a stage* (Krishnakumaran and Zhu, 2007)
- Or use manually created metaphor-specific knowledge bases (Martin 1980; Narayanan 1999; Barnden and Lee 2002).

## A Symbolic Approach to Metaphor Interpretation

SLIPNET (Veale and Hao 2008) relates two concepts via definitions, allowing for deletions, insertions and substitutions.  
Goal: to find a connection between source and target concepts.

Example:

*Make-up is a Western Burqa*

**make-up** =>

- typically worn by women
- expected to be worn by women
- must be worn by women
- must be worn by Muslim women

**burqa** <=

# Metaphor Recognition (Shutova et al. 2010)

- Start from seed set including a metaphorical verb (verb in source domain; e.g., *stir excitement*)
- Task: find other sourceVerb–targetNoun pairs (*swallow anger*)
- **Step 1:** Collect all subjects and arguments that occur with the seed sourceVerb.
  - Most of these are sourceNouns (*soup*; non-metaphors), but some are targetNouns (*anger*).
- **Step 2:** Clustering the nouns according to their semantics by verb association (cf. last lecture)
  - The targetNoun cluster is the most “abstract” cluster
  - Half the job done; we now need to find more sourceVerbs.
- **Step 3:** Go back from sourceNoun clusters
  - Now cluster the verbs they cooccur with
  - The cluster which has the seed verb in it is the sourceVerb cluster.



## Metaphor Recognition – Examples

### Target domain N cluster

*desire hostility anxiety passion  
excitement doubt fear anger  
curiosity enthusiasm impulse  
instinct emotion feeling suspi-  
cion rage*



### Source domain V cluster

*gulp drain stir empty pour  
sip spill swallow drink pol-  
lute seep flow drip purify ooze  
pump bubble splash ripple  
simmer boil tread*

## Task 2: Metaphor Interpretation by literal paraphrase

Input: *A carelessly **leaked** report*

Output: *A carelessly **disclosed** report*

- Find lexically similar candidates for replacement (standard distributional semantics approach)
- Use a Resnik-type selectional restriction filter to filter out metaphorical expressions (those that have low selectional restriction strength), so that only literal ones are left over.

$$A_R(v, c) = \frac{1}{S_R(v)} P(c|v) \log \frac{P(c|v)}{P(c)}$$

## Shutova et al: Paraphrasing Example

	Initial ranking		SP reranking	
hold back truth	-13.09	contain	0.1161	<b>conceal</b>
	-14.15	<b>conceal</b>	0.0214	keep
	-14.62	suppress	0.0070	suppress
	-15.13	hold	0.0022	contain
	-16.23	keep	0.0018	defend
	-16.24	defend	0.0006	hold
stir excitement	-14.28	create	0.0696	<b>provoke</b>
	-14.84	<b>provoke</b>	0.0245	elicit
	-15.53	make	0.0194	arouse
	-15.53	elicit	0.0061	conjure
	-15.53	arouse	0.0028	create
	-16.23	stimulate	0.0001	stimulate
	-16.23	raise	~0	raise
	-16.23	excite	~0	make
-16.23	conjure	~0	excite	

## Summary

- Logical Metonymy can be solved by individual associations of implicit verb with explicitly mentioned lexical items
- Problem with Lapata/Lascarides (2003): word senses all conflated
- Regular Metonymy can be solved by supervised classification with features similar to supervised WSD.
- Metaphors can be recognised by seed clustering and paraphrased by lexical similarity and selectional restrictions.
- Shutova et al.'s system: precision is high ( $\sim 80\%$ ), but recall is very low (0.25%)