A CORPUS-BASED STUDY
OF FACTORS AND MODELS
OF METAPHORICITY;
EVIDENCE FROM RUSSIAN VERBS

Yulia Badryzlova
National Research University
Higher School of Economics
Motivation
Metaphor in NLP
Lakoffian paradigm
Lakoffian paradigm

Top-down

Pre-formulated conceptual metaphors

Linguistic metaphors
Lakoffian paradigm

Top-down

Source \arrow{right} Target
Lakoffian paradigm

Top-down

Pre-formulated conceptual metaphors

Linguistic metaphors
1.2 Resources in metaphor identification
Hand-coded resources

- Violation of contextual restrictions
- Restrictions encoded in thesauri terms / numeric scales

VS

Distributional semantics

- Vector-space semantic representation
- Objectivity
- Broader coverage
1.2.1 MetaNet
MetaNet

Dodge et al., 2015

- Repository for deep semantic automatic metaphor analysis
- Multilingual
- Lakoffian paradigm: top-down
MetaNet

1. Repository of metaphors and frames
MetaNet

Structure within frames
## MetaNet

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-subj_S-verb</td>
<td>poverty infects</td>
</tr>
<tr>
<td>T-subj_S-verb-conj</td>
<td>poverty infects and maims</td>
</tr>
<tr>
<td>T-subj-conj_S-verb</td>
<td>homelessness and poverty infect</td>
</tr>
<tr>
<td>S-verb_T-dobj</td>
<td>escape poverty</td>
</tr>
<tr>
<td>S-verb_T-dobj-conj</td>
<td>escape despair and poverty</td>
</tr>
<tr>
<td>S-verb_Prep_T-noun</td>
<td>slide into poverty / pull up out of poverty</td>
</tr>
<tr>
<td>S-noun_of_T-noun</td>
<td>trap of poverty</td>
</tr>
<tr>
<td>T-noun_poss_S-noun</td>
<td>poverty's undertow</td>
</tr>
<tr>
<td>S-noun_prep_T-noun</td>
<td>path to poverty</td>
</tr>
<tr>
<td>T-noun_mod_S-noun</td>
<td>poverty trap</td>
</tr>
<tr>
<td>S-adj_mod_T-noun</td>
<td>burdensome poverty</td>
</tr>
<tr>
<td>T-noun_cop_S-noun-adj</td>
<td>poverty is a disease / poverty is burdensome</td>
</tr>
</tbody>
</table>
1.3 A comparative study of 4 state-of-the-art automatic metaphor identification systems
- Non-Lakoffian
- Selectional preference violation
- Normalized Google Distance
- Gaussian Mixture Models
to trip the light fantastic (=to dance)

During the Iraq war, he was a sparrow; he didn’t condone the bloodshed but wasn’t bothered enough to go out and protest.

summit (=a meeting or series of meetings between leaders of two or more countries)
2
- Non-Lakoffian
- Concretness / Abstractness
- Noun-adjective pairs
- Verbs: linear context

Turney P. D. et al., 2001
deep appreciation vs deep snow
powdered limestone… tends to absorb the sulfur vs absorb
MMWEC will have to absorb only $4 million in additional annual costs

Turney P. D. et al., 2001
- Lakoffian
- Both Source and Target are explicitly manifested
- Syntactically related word pairs
- Seed corpus, VerbNet
- Distributional semantic features

Shutova E., Sun L., Korhonen A., 2010
Verb-direct object: grasp theory, suppress memory
Subject-verb: tension mounted, ideology embraces

Shutova E., Sun L., Korhonen A., 2010
Lakoffian

Both Source and Target are explicitly manifested

No syntactic relation

Ontological Semantics

Dunn, 2013a
OVERVIEW

Metaphor: a computational perspective

Veale T., Shutova E., Klebanov, B.B., 2016
VU Amsterdam Metaphor Corpus
- Paradigm: bottom-up
- Metaphor in discourse
- Standardized and reliable tool
- High-quality empirical evidence about metaphor
- Yardstick – corpus-based dictionary

MIPVU
Vrije Universiteit
Metaphor Identification Procedure

Steen et al. 2010
Basic Meaning

...more **concrete**, **specific**, and **human-oriented** sense in contemporary language use
<table>
<thead>
<tr>
<th>BASIC</th>
<th>NONBASIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ be exposed to fire be destroyed by fire</td>
<td>▪ be at risk of failure because of a delay or an overdue deadline</td>
</tr>
<tr>
<td>▪ emit light or fire</td>
<td>▪ glitter with emotion or thought (eyes)</td>
</tr>
<tr>
<td>▪ be burning (oven etc.)</td>
<td>▪ be overcome by a strong emotion, passionately devote oneself to smth</td>
</tr>
</tbody>
</table>
NONBASIC meaning in context: Indirect Metaphor

... её глаза из-под платка горели страстью очереди.

‘... her eyes from under her shawl were glittering (=burning) with the passion for queueing.’
POSSIBLE PERSONIFICATION

- Paula’s stomach turned a somersault.
- … the bones of crippled fingers…
- … the rain came tumbling down…
- Labour hopes to transform the situation…
DIRECT METAPHOR

- He is like a favourite old coat.
Dunn, 2013
Metaphors are gradient, with some being much more metaphoric than others.

Metaphoric expressions receive their metaphoric meaning from different sources.

The metaphoricity of an utterance depends on its saturation with metaphoric material.
Effective metaphor identification in NLP  Synthetic approach
Annotation Experiment
- SynTagRus
- Minor Academic Dictionary
  - 100 verbs (freq. 19-25)
  - Total: 2036 occurrences
1. METAPHOR CATEGORIES

- Indirect Metaphor
- Personification
- Direct Metaphor

2. METAPHOR CUES

- Graphic
- Morphologic
- Lexical
3. FACTORS OF METAPHORCITY

- shift of semantic class of the argument: Concrete<->Abstract
- metonymic shifts
- newly attested meanings
- morphologically motivated forms
- semantic shifts
- participation in idioms
4. METAPHORIC COMPLEXES
2.1 METAPHOR CATEGORIES
INDIRECT METAPHOR
‘… her eyes from under her shawl were glittering (=burning) with the passion for queueing.’
‘…Valentin Glushko … was burning with the desire to put a triumphant period on his long-lasting stand-off with Korolev.’
‘The party committee entrusted Safronov… with the most important, often “burning” projects.
Lexicalized Personification
‘... rust gradually eats (=erodes) old swards.’
Metaphoric
Personification
‘From the time immemorial it [our planet] goes around the sun, and this mechanism, wound up by the nature herself, will never stop.’
DIRECT METAPHOR
‘That head of hers [the bird’s] is so red!’ It’s ablaze all over.”
2.2 METAPHOR CUES
Lexical Cue
‘… the city of Irkutsk is glowing in my memory with some kind of special glimmer.’
Metaphor Flag
‘… [the old man] immediately disappeared like smoke.’
Morphological Cue
‘He hawkishly glanced at Ilya Ilyich.’
2.3 FACTORS OF METAPHORICITY
Metonymic Shift
‘[the skier]… let the gold medal escape.’
SHIFT OF SEMANTIC CLASS: CONCRETE ↔ ABSTRACT
‘This work of art at all times used … to buy freedom…’
MORPHOLOGICALLY MOTIVATED FORMS
ИСЧЕРПАТЬ

NBM  deplete, exhaust smth
NBM  use smth up
NBM  complete smth, bring smth to an end
NBM  come to an end, be used up'

ЧЕРПАТЬ

BM  scoop, extract liquid or loose substances (usu. from below or deep)
SEMANTIC SHIFT
‘In Ilya Ilyich’s early years young women used to run in (=wear) homespun dresses…’
БЕГАТЬ
Rapidly or hastily walk somewhere from somewhere

НОСИТЬ
Put smth on, decorate oneself according to the current fashion.
NEWLY ATTESTED MEANINGS
‘Messages in Arabic… are dropped (=sent) to the websites suspected of connections with extremists…’
PARTICIPATION IN IDIOMATIC EXPRESSIONS
‘Hardly did Ilya Ilyich have time to open his mouth, the muscly boys… pushed him out of the door…’
3.4 METAPHORIC COMPLEXES
‘... and in the next instant the golden arrows of the [bicycle] spokes will be going off everywhere.’
‘… and in the next instant the golden arrows of the bicycle spokes will be going off everywhere.’
‘From the time immemorial it [our planet] goes around the sun, and this mechanism, wound up by the nature herself, will never stop.’
'From the time immemorial it [our planet] goes around the sun, and this mechanism, wound up by the nature herself, will never stop.'
'From the time immemorial it [our planet] goes around the sun, and this mechanism, wound up by the nature herself, will never stop.'
Results
METAPHORIC: 51.44%  
NONMETAPHORIC: 48.56%
<table>
<thead>
<tr>
<th>Category</th>
<th>NBM</th>
<th>BM</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>39.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABSTR_ARG</td>
<td>2.05</td>
<td>11.07</td>
<td>13.12</td>
</tr>
<tr>
<td>SEM_SHIFT</td>
<td>3.12</td>
<td>7.42</td>
<td>10.54</td>
</tr>
<tr>
<td>CPERS_SOURCE</td>
<td>5.59</td>
<td>2.05</td>
<td>7.64</td>
</tr>
<tr>
<td>DMET_SOURCE, SCNDRY_MET</td>
<td>1.83</td>
<td>4.19</td>
<td>6.02</td>
</tr>
<tr>
<td>CONSTR</td>
<td>5.7</td>
<td>0</td>
<td>5.7</td>
</tr>
<tr>
<td>MTNMY_ARG</td>
<td>2.15</td>
<td>3.12</td>
<td>5.27</td>
</tr>
<tr>
<td>LPERS_SOURCE</td>
<td>3.66</td>
<td>1.51</td>
<td>5.17</td>
</tr>
<tr>
<td>IDIOM</td>
<td>2.58</td>
<td>0</td>
<td>2.58</td>
</tr>
<tr>
<td>MPERS_SOURCE</td>
<td>0.76</td>
<td>1.62</td>
<td>2.38</td>
</tr>
<tr>
<td>NEW_MEANING</td>
<td>1.72</td>
<td>0.22</td>
<td>1.94</td>
</tr>
<tr>
<td>DMET_SOURCE</td>
<td>0.22</td>
<td>0.86</td>
<td>1.08</td>
</tr>
<tr>
<td>TERM</td>
<td>0.54</td>
<td>0.11</td>
<td>0.65</td>
</tr>
</tbody>
</table>
THANK YOU