

ОПЫТ КОРПУСНОГО МОДЕЛИРОВАНИЯ ФАКТОРОВ МЕТАФОРИЧНОСТИ НА ПРИМЕРЕ РУССКИХ ГЛАГОЛОВ

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

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Motivation



1

Metaphor in NLP

1.1

Lakoffian paradigm

Lakoffian paradigm

Top-down

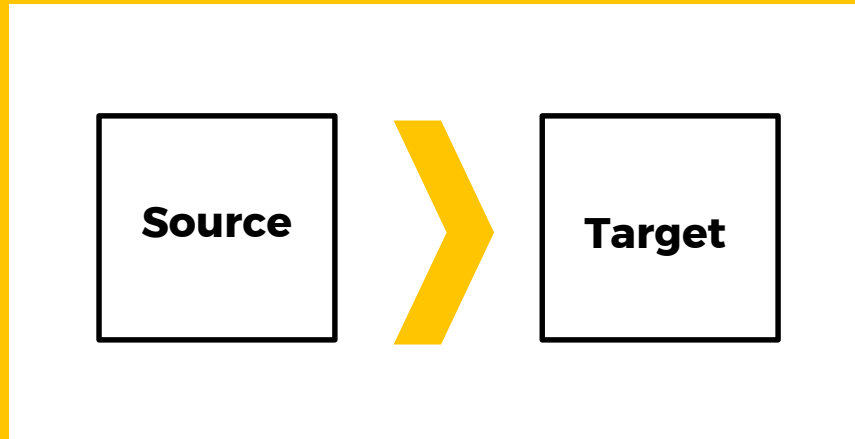
Pre-formulated conceptual metaphors



Linguistic metaphors

Lakoffian paradigm

Top-down



Lakoffian paradigm

Top-down

Pre-formulated conceptual metaphors



Linguistic metaphors



1.2

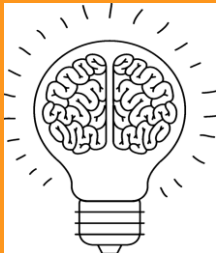
Resources in metaphor identification

Hand-coded resources

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



- WordNet
- FrameNet
- MetaNet



MRC
Psycholinguistic
Database

VS



Distributional semantics

- Vector-space semantic representation
- Objectivity
- Broader coverage

1.2.1

MetaNet

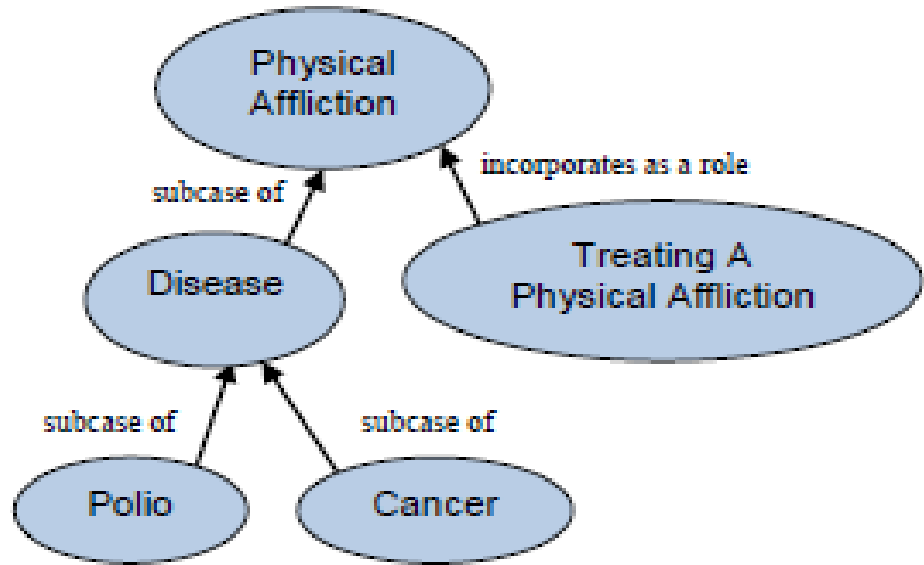
MetaNet

Dodge et al., 2015

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

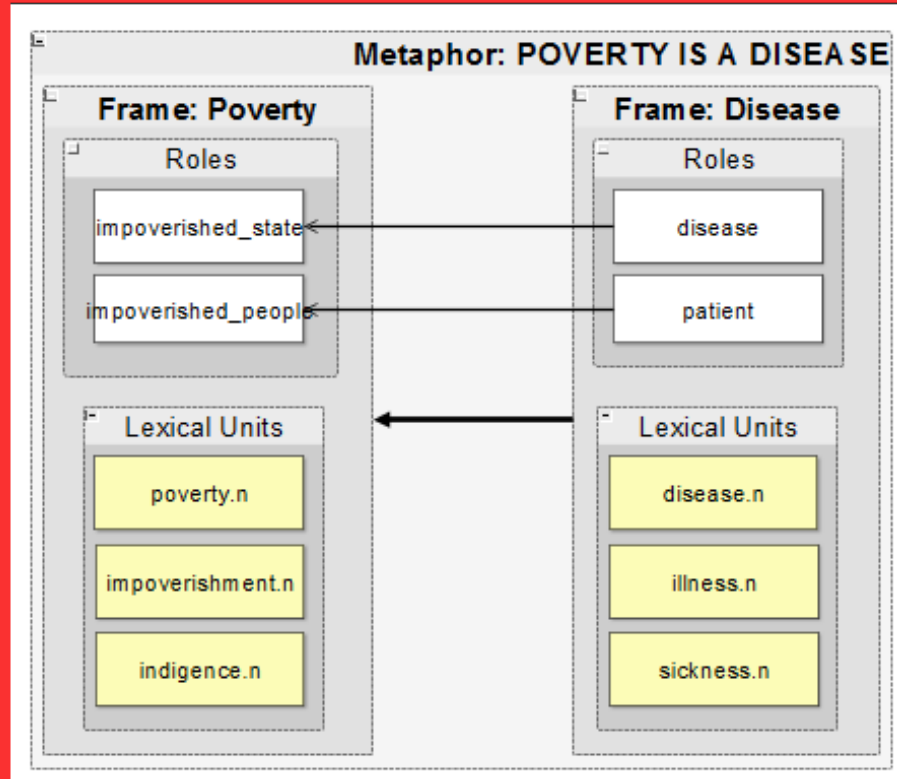
MetaNet

1. Repository of metaphors and frames



MetaNet

**Structure
within
frames**



MetaNet

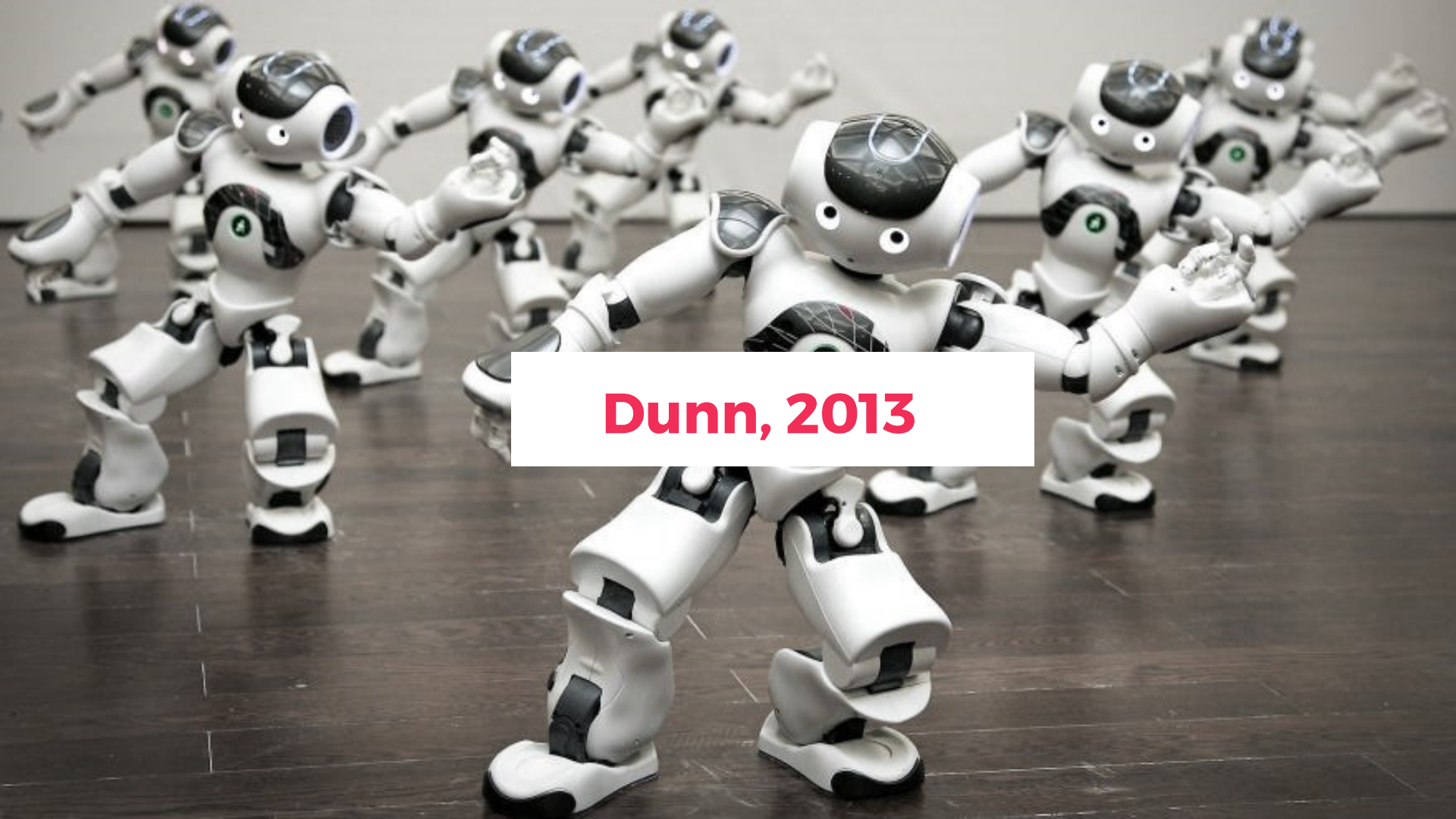
2.

Repository of metaphor constructions

T-subj_S-verb	poverty infects
T-subj_S-verb-conj	poverty infects and maims
T-subj-conj_S-verb	homelessness and poverty infect
S-verb_T-dobj	escape poverty
S-verb_T-dobj-conj	escape despair and poverty
S-verb_Prep_T-noun	slide into poverty / pull up out of poverty
S-noun_of_T-noun	trap of poverty
T-noun_poss_S-noun	poverty's undertow
S-noun_prep_T-noun	path to poverty
T-noun_mod_S-noun	poverty trap
S-adj_mod_T-noun	burdensome poverty
T-noun_cop_S-noun-adj	poverty is a disease / poverty is burdensome

1.3

**A comparative study
of 4 state-of-the art
automatic metaphor
identification systems**



Dunn, 2013



- Non-Lakoffian
- Selectional preference violation
- Normalized Google Distance
- Gaussian Mixture Models

Li L., Sporleder C., 2009

Li L., Sporleder C., 2010

- ✓ 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)

Li L., Sporleder C., 2009

Li L., Sporleder C., 2010

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

MMWEC will have to **absorb** only \$4 million in additional annual costs

Turney P. D. et al., 2001

3

- 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**

4

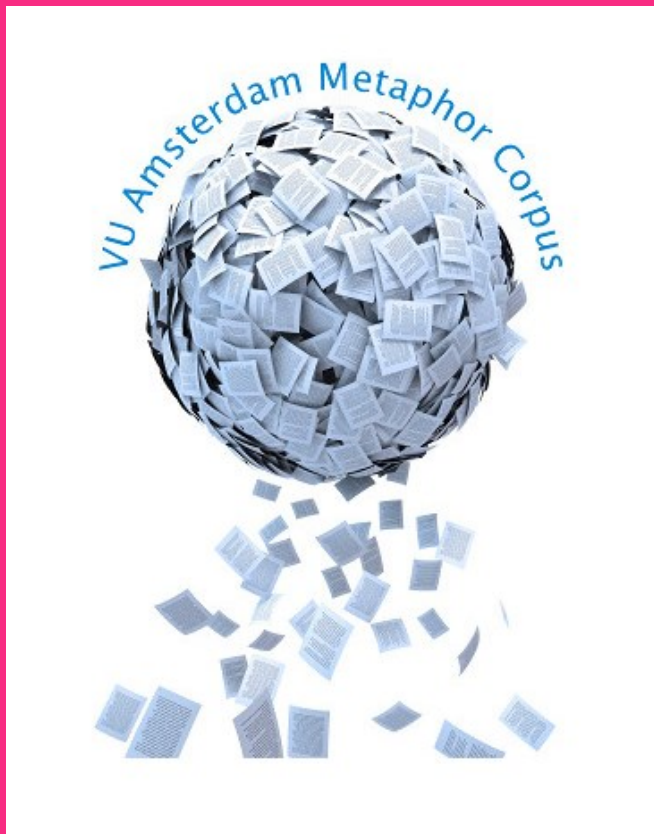
- Lakoffian
- Both Source and Target are explicitly manifested
- No syntactic relation
- Ontological Semantics

Dunn, 2013a

OVERVIEW

Metaphor: a computational perspective

Veale T., Shutova E., Klebanov, B.B., 2016



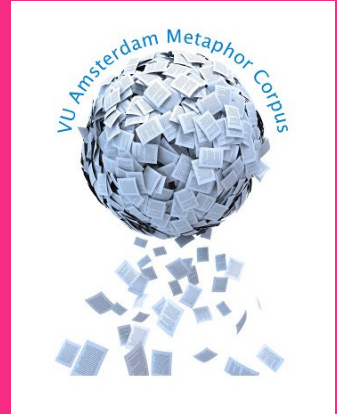
1.3.1

VU Amsterdam Metaphor Corpus

MIPVU

Vrije Universiteit
Metaphor Identification
Procedure

- Paradigm: bottom-up
- Metaphor in discourse
- Standardized and reliable tool
- High-quality empirical evidence about metaphor
- Yardstick – corpus-based dictionary



Steen et al.
2010

Basic Meaning

...more **concrete**, **specific**, and **human-oriented**
sense in contemporary language use

гореть 'to burn'

BASIC

- be exposed to fire be destroyed by fire
- emit light or fire
- be burning (oven etc.)

NONBASIC

- be at risk of failure because of a delay or an overdue deadline
- glitter with emotion or thought (eyes)
- be overcome by a strong emotion, passionately devote oneself to smth

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.'*

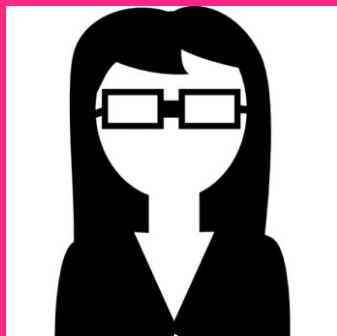
POSSIBLE PERSONIFICATION

- Paula's stomach **turned a somersault** .
- ... the bones of **crippled** fingers...
- ... the rain **came** tumbling down...
- Labour **hopes** to transform the situation...

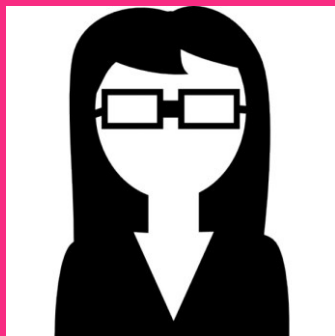
DIRECT METAPHOR

- He is like a favourite old coat.

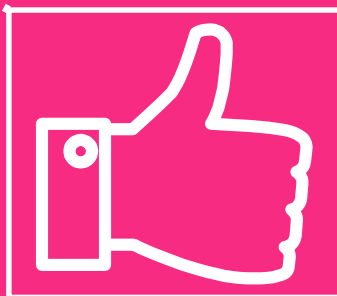
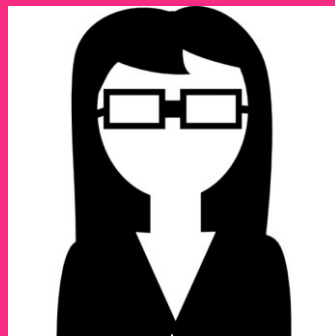
≈

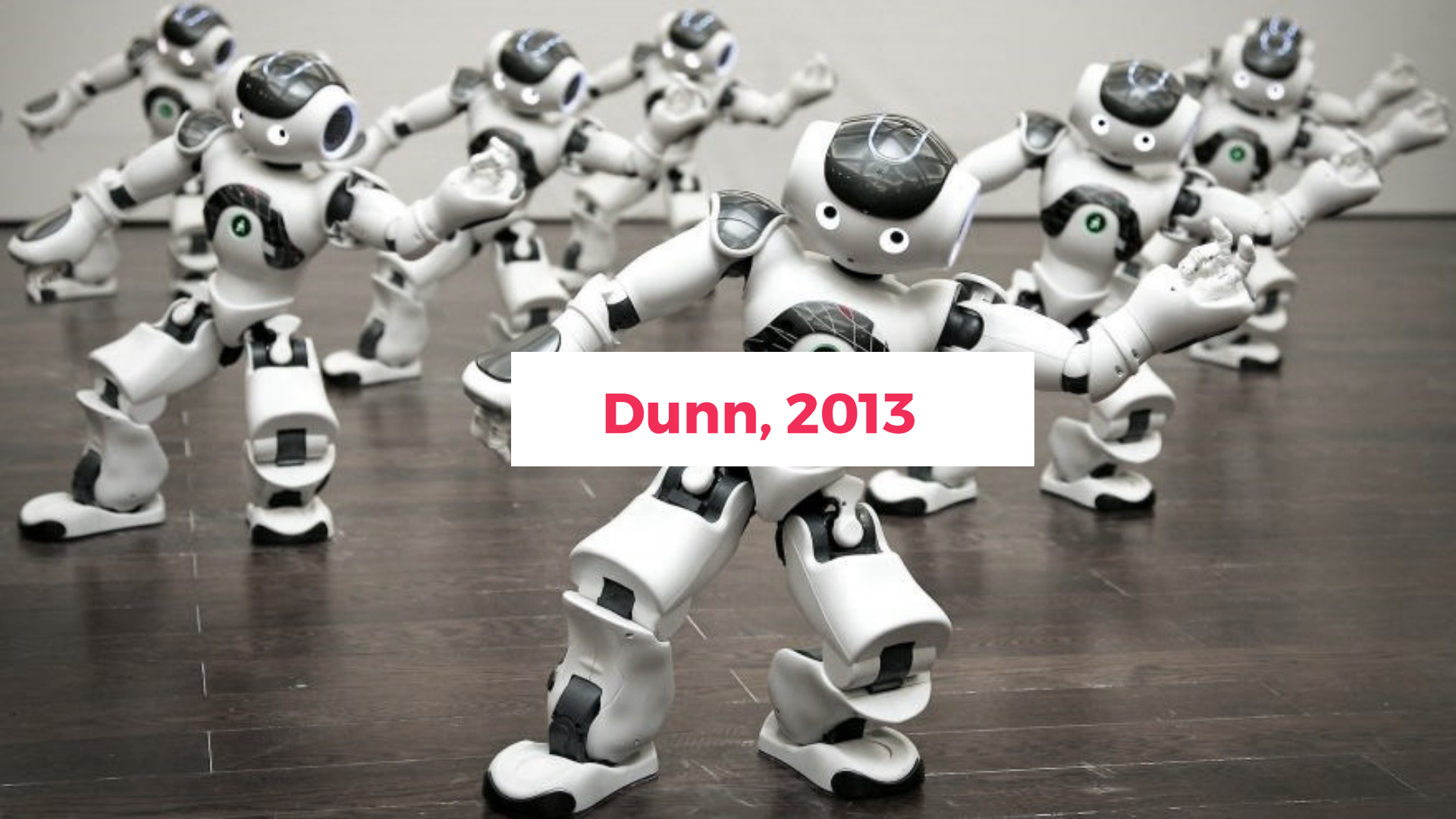


≈



≈





Dunn, 2013

AGREEMENT

0.259-0.293

Metaphors are **gradient** with some being much more metaphoric than others

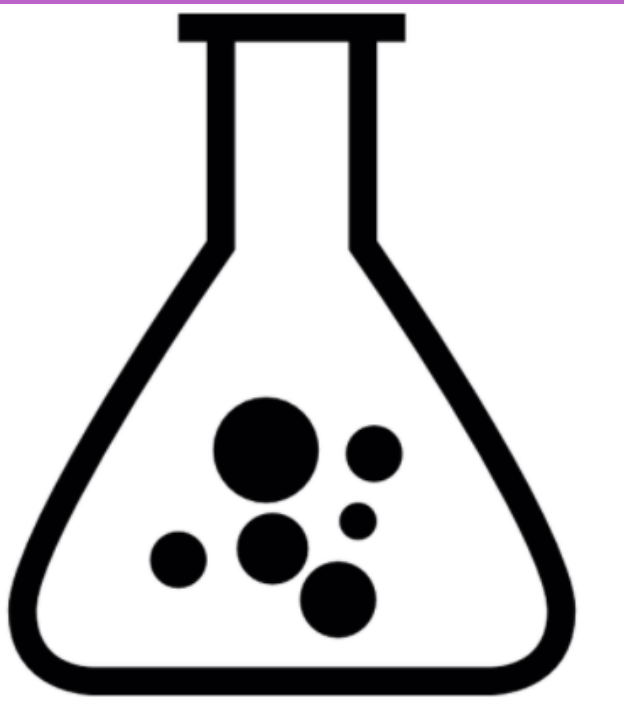
Metaphoric expressions receive their metaphoric meaning from **different sources**

The metaphoricity of an utterance depends on its **saturation** with metaphoric material



**Effective metaphor
identification in NLP**

Synthetic approach



2

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 \leftrightarrow Abstract
- metonymic shifts
- newly attested meanings
- morphologically motivated forms
- semantic shifts
- participation in idioms

4. METAPHORIC COMPLEXES

2.1

METAPHOR CATEGORIES

INDIRECT METAPHOR



NBM

... (ее) глаза из-под платка горели страстью очереди.

*'... her eyes from under her shawl were glittering
(=burning) with the passion for queueing.'*

... Директором и Генеральным конструктором назначают Валентина Глушко,

NBM

горящего желанием поставить победную точку в давнем споре с Королевым ...

‘...Valentin Glushko ... was burning with the desire to put a triumphant period on his long-lasting stand-off with Korolev.’

Обком партии поручал Сафронову под личную ответственность

GRAPH CUE

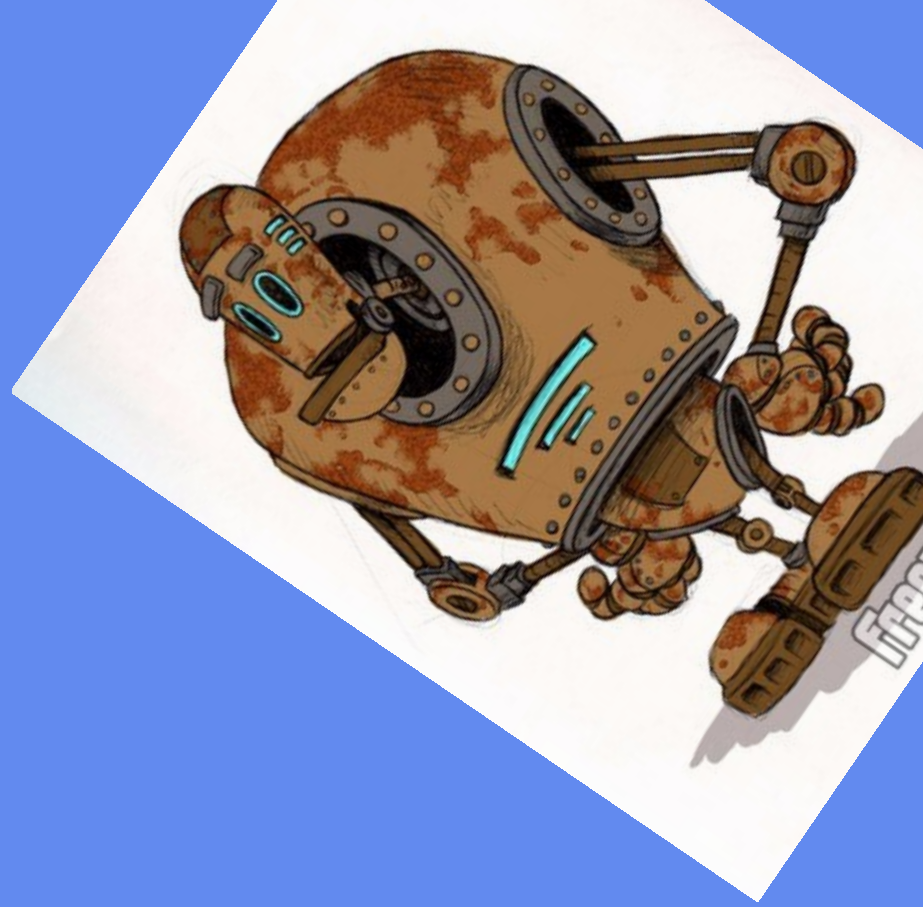
NBM

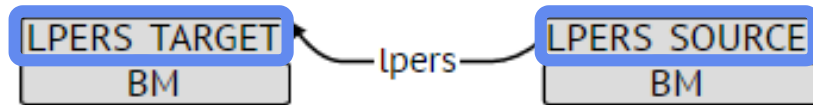
наиболее важные, часто "горящие" объекты ...

'The party committee entrusted Safronov... with the most important, often "burning" projects.

PERSONIFICATION

Lexicalized Personification





Но, несмотря на все меры ухода, ржавчина понемногу съедает старые мечи.

‘... rust gradually eats (=erodes) old swords.’

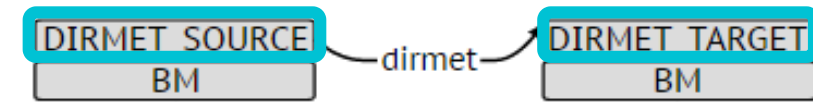
Metaphoric Personification



'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





А голова у нее [птицы] красная-красная, так и горит! - пылко вскричал младший.

'That head of hers [the bird's] is so red!' It's ablaze all over'

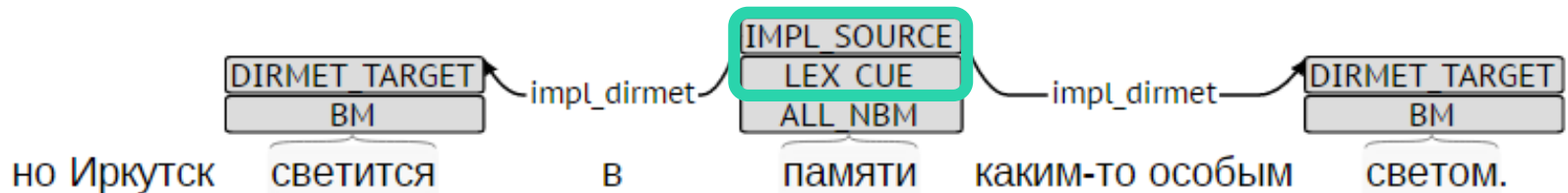
2.2

METAPHOR CUES

Lexical Cue



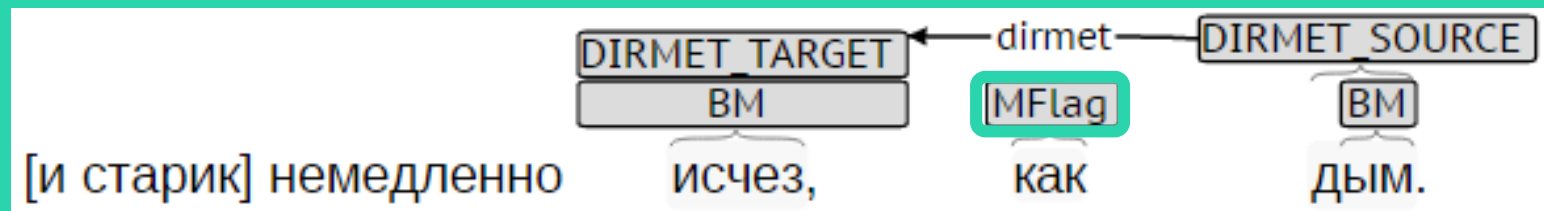
Многое, случившееся куда позже, давно позабыто,



'... the city of Irkutsk is glowing in my memory with some kind of special glimmer.'

Metaphor Flag

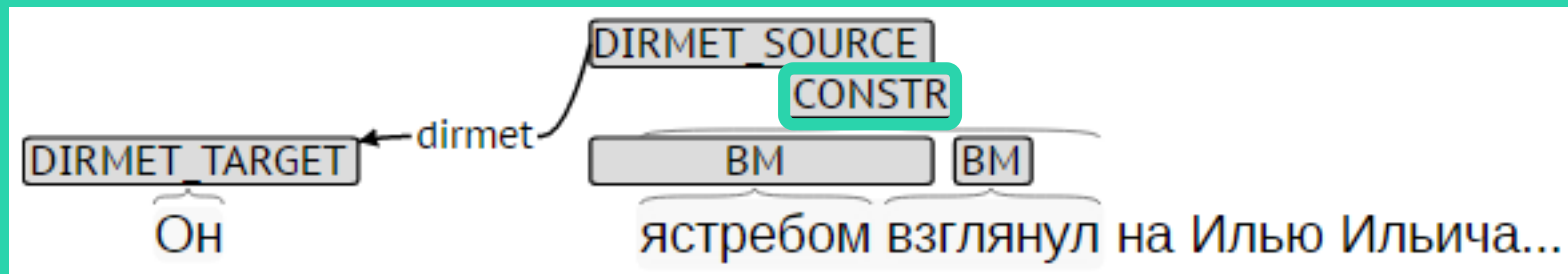




'... [the old man] immediately disappeared like smoke.'

Morphological Cue





'He hawkishly glanced at Ilya Ilyich.'

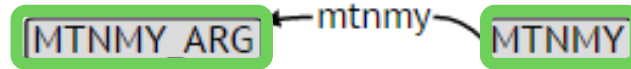
2.3

FACTORS OF METAPHORICITY

Metonymic Shift



Юля Чепалова так увлеклась борьбой с полькой, что прозевала рывок



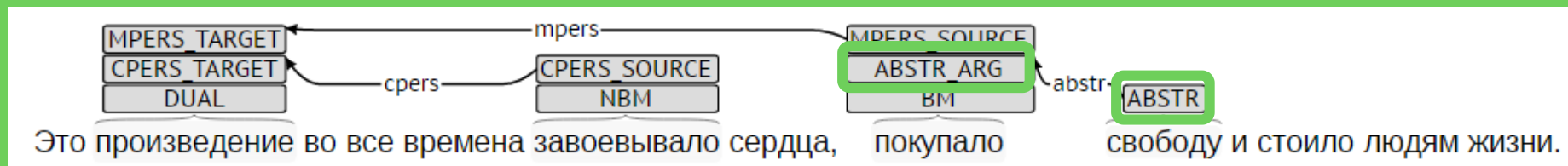
могучей чешки и ... в итоге упустила золотую медаль.

'[the skier]... let the gold medal escape.'

**SHIFT OF SEMANTIC
CLASS:**

CONCRETE \leftrightarrow 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



SEM SHIFT

ВМ

В годы юности Ильи Ильича девушки бегали в домотканых сарафанах - и нравились.

'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



NEW MEANING

NBM

... на сайты, заподозренные в связях с экстремистами, сбрасываются послания на арабском, подписанные "Абдуллой Ахмедом".

'Messages in Arabic... are dropped (=sent) to the websites suspected of connections with extremists...'

PARTICIPATION IN IDIOMATIC EXPRESSIONS



IDIOM

DUAL

Не успел Илья Ильич рта раскрыть, как мускулистые мальчишки из стажеров мягко вытолкнули его за дверь и щелкнул замок.

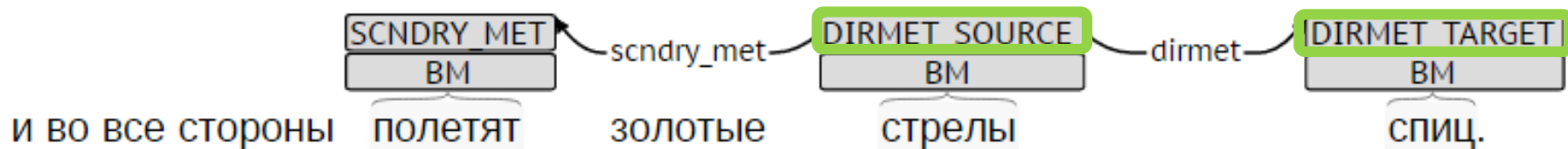
‘Hardly did Ilya Ilyich have time to open his mouth, the muscly boys... pushed him out of the door...’

3.4

METAPHORIC COMPLEXES

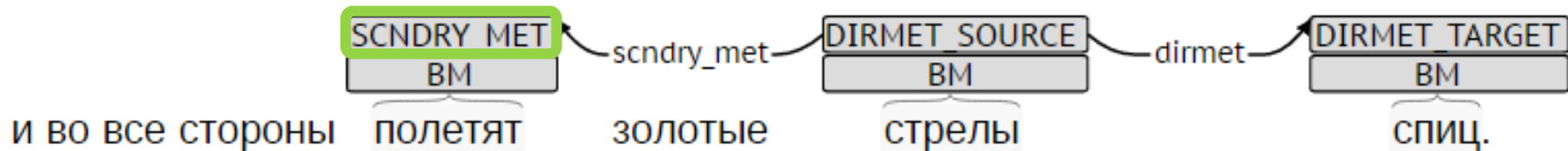


[... я чувствовал щекочущий упор верткой педали под ступней, зуд в ладонях, вспотевших на горячих резиновых рукоятках руля, миг - и деревья послушно замелькают мимо меня, и заскользят под колесом их тени,]



‘... and in the next instant the golden arrows of the [bicycle] spokes will be going off everywhere.’

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‘... 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.'



3

Results

METAPHORIC

51,44%

NONMETAPHORIC

48,56%

VUAMC

18,68%

None	NBM		
	39,42	BM	Total
ABSTR_ARG	2,05	11,07	13,12
SEM_SHIFT	3,12	7,42	10,54
CPERS_SOURCE	5,59	2,05	7,64
DMET_SOURCE, SCNDRY_MET	1,83	4,19	6,02
CONSTR	5,7	0	5,7
MTNMY_ARG	2,15	3,12	5,27
LPERS_SOURCE	3,66	1,51	5,17
IDIOM	2,58	0	2,58
MPERS_SOURCE	0,76	1,62	2,38
NEW_MEANING	1,72	0,22	1,94
DMET_SOURCE	0,22	0,86	1,08
TERM	0,54	0,11	0,65



THANK YOU