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METHODOLOGICAL CHALLENGES IN QUANTITATIVE AND QUALITATIVE RESEARCH ON POLISH **POLYSEMY**

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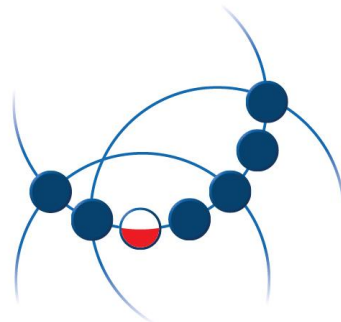
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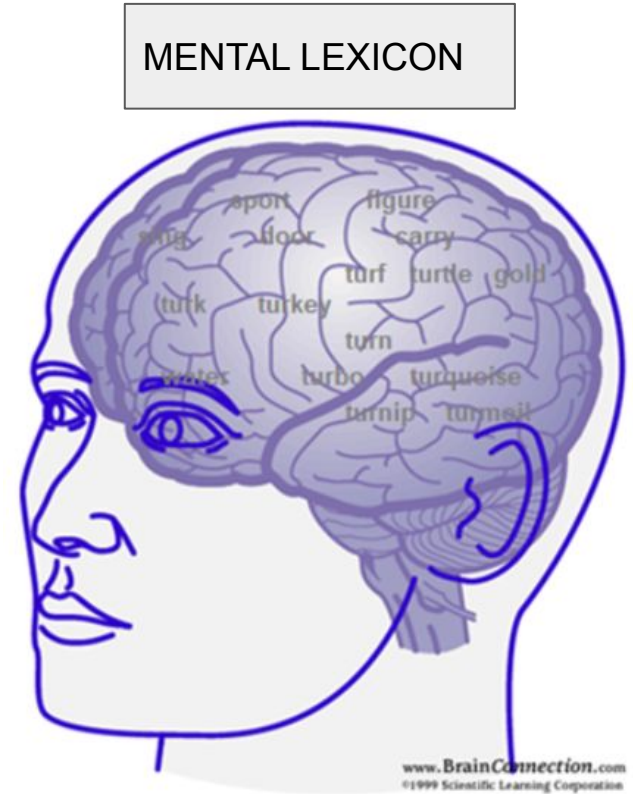
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Common Language Resources and
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MOTIVATION AND GOAL

This project is a contribution to a recent line of psycho- and neurolinguistic research on the representation of ambiguous words in the mental lexicon.



Homonyms are words that express two or more distinct and unrelated meanings.

AKCJA	SPRAWNA 'a smooth action'	GIEŁDOWA 'a stock market share'
GAZIK	WOJSKOWY 'a military car'	JAŁOWY 'a sterile gauze pad'
BAL	KARNAWAŁOWY 'a carnival ball'	SOSNOWY 'a pine wood log'
GRAFIK	ZAPEŁNIONY 'a full schedule'	ZDOLNY 'a talented graphic designer'
ADWOKAT	JAJECZNY 'egg advocaat'	DOŚWIADCZONY 'an experienced lawyer'

Polysemous words have multiple senses (i.e. different but semantically related interpretations).

Nad Zatoką Pucką przeszła niespodziewana **TRĄBA** powietrzna.

‘An unexpected **whirlwind** passed over the Bay of Puck.’



Głośno zagrał na blaszanej **TRĄBIE**.

‘He played the tin **trumpet** loudly.’



Ale z ciebie **TRĄBA**.

‘You’re a real **dumbo**.’

TRĄBA służy słoniowi do polewania się wodą.

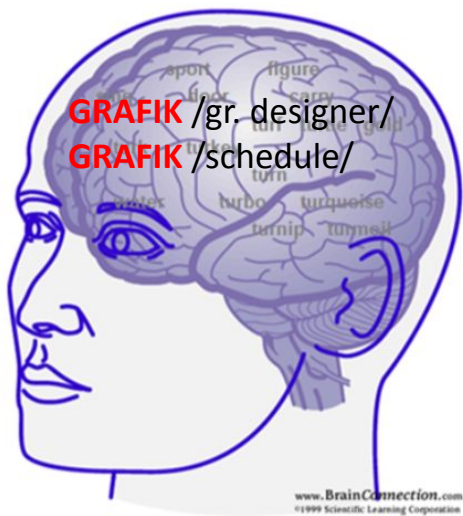
‘The **trunk** is used by the elephant to pour water on itself.’



HOMONYMY

→ Meaning Enumeration Lexicon

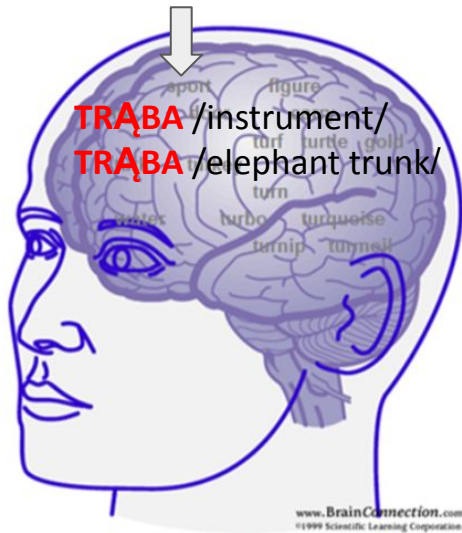
each meaning of a homonymous word is stored under a separate lexical entry. (e.g., Frazier and Rayner 1999)



HOMONYMY → CONSISTENT RESULTS

POLYSEMY

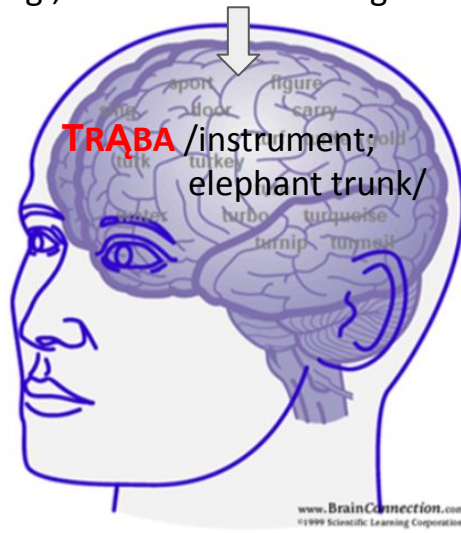
→ Sense Enumeration Lexicon each sense of a polysemous word is stored under a separate lexical entry. (e.g., Klein and Murphy 2001)



POLYSEMY → CONTRADICTIONARY RESULTS

→ Core Representation Theory

all senses of a polysemous word are stored under a single lexical entry. (e.g., Frisson and Pickering 1999)



THE ISSUE

Polysemy is **not a uniform phenomenon**.

While some broad generalisations about polysemy can be made, it is important to recognize that different kinds of polysemy may work differently from each other (and so give rise to different experimental results). They may have different representations in the mental lexicon and different processing profiles.

Falkum and Vincente (2015), Brocher et al. (2016), Carston (2020)

SENSE REMOTENESS

Psycholinguistic results point to processing differences between metonymic, metaphorical polysemy and homonymy. They account for it by resorting to SENSE RELATEDNESS/SENSE REMOTENESS/SIMILARITY OF SENSES.

METONYMY

kryształowa szklanka 'a crystal glass'
czubata szklanka 'a heaping glass'

Sense1 ↔ Sense 2

METAPHOR

zamaszysty krok 'a long step'
mądry krok 'a wise step'

Sense1 ↔ Sense 2

HOMONYMY

smaczna kawka 'delicious coffee'
ćwierkająca kawka 'chirping jackdaw'

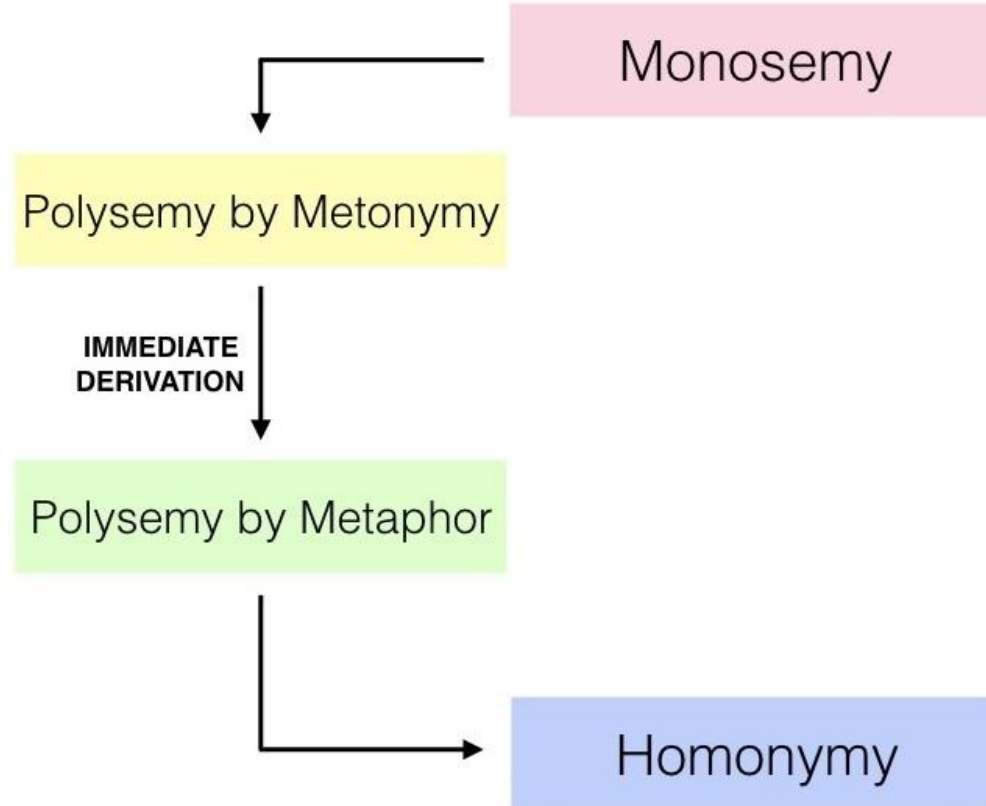
Sense1 ↔ Sense 2

(Klepousniotou and Baum 2007, Klepousniotou et al., 2012)

Rundblad & Annaz (2019): findings from language development research, language comprehension and language deficits suggest that metonymy is cognitively more basic than metaphor.

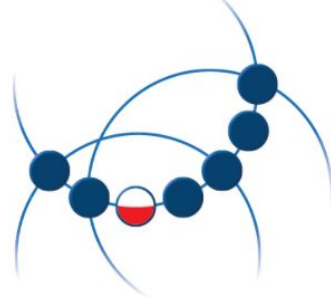
Metonymies are more literal than metaphors (Michl, 2019)

Spectrum of sense remoteness based on the existing literature



GOAL

Our goal is to extend this line of research by proposing a wider spectrum of sense remoteness of ambiguous words and test the impact of semantic similarity between different senses of polysemous words on their processing and, by inference also on their representation in semantic memory.



We rely on the services, tools and resources of the **CLARIN-PL Language Technology Center** (the Polish section of the European research infrastructure CLARIN ERIC) in collaboration with the members of the Computation Linguistics and Language Technology research group.

INITIAL MATERIAL

CLARIN equipped us with a list of **800** randomly selected polysemous pairs of senses, **180** polysemous feminatives, **1127** polysemous lemmas with at least one sense in the domain of 'food' **2609** polysemous lemmas with at least one sense in the domain of 'human'.

During a series of online meetings we have been working on preparing the material for the planned psycho- and neurolinguistic experiments on the processing of polysemy for the past pandemic year.

Oglądasz 1 z 3 dostępnych znaczeń tego słowa▼

[Następne znaczenie →](#)

Hiperonimy

[plastyk 2](#) 

domena: ludzie

← Kolokacyjność

grafik 1 artysta, którego domeną jest grafika grafik 2 informatyk zajmujący się grafiką komputerową grafik 3 harmonogram, rozkład, rozplanowanie przebieg... 

DOMENA

ludzie

PRZYKŁADY

Moreau był też utalentowanym grafikiem.

Hiponimy

[litternik 1](#) 

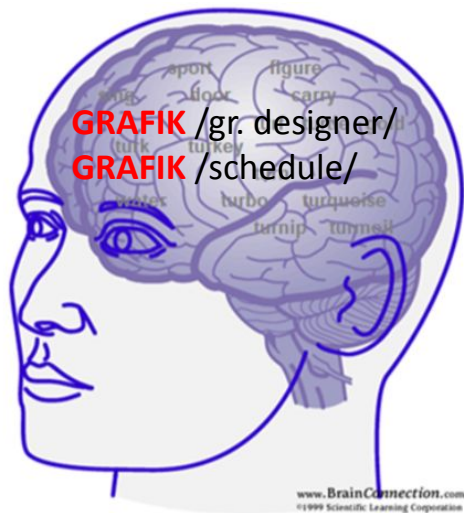
domena: ludzie

[ilustrator 1](#) 

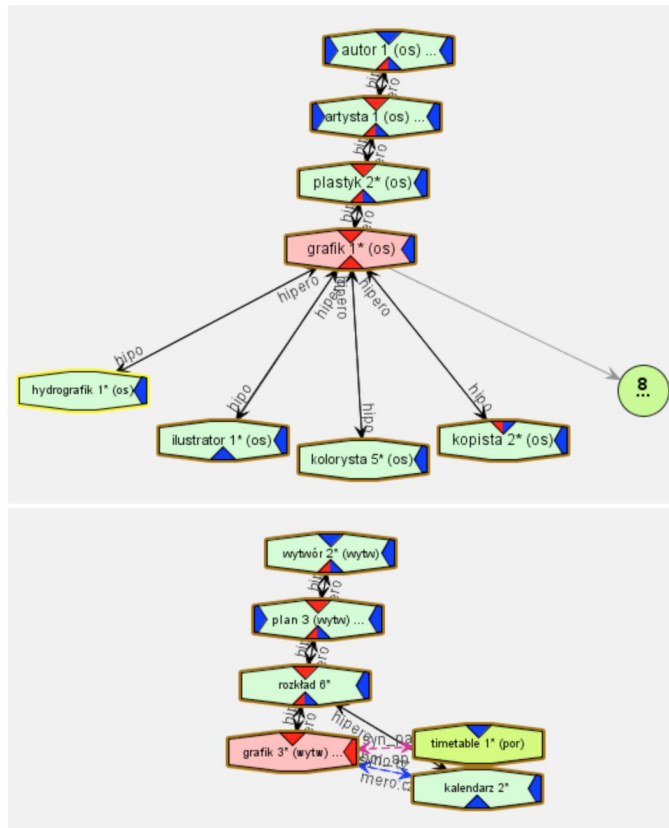
domena: ludzie

[rysownik 1](#) 

PSYCHOLINGUISTICS: MENTAL LEXICON (HUMAN WORDNET)



COMPUTATIONAL LINGUISTICS: DIGITAL WORDNET



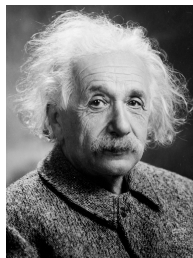
OUR APPROACH

Homonymy-polysemy distinction is for us a matter of speakers' mental representations and their perception of sense relatedness. It may happen that the speaker's perception of polysemous and homonymous words may be distinct from what lexicographers propose in dictionaries where on the basis of etymology facts they set up a single dictionary entry for a case of polysemy and two or more for a case of homonymy.

Extending the spectrum: NESTED POLYSEMY

FIZYK (sławny vs. wymagający)

‘(famous) physicist’



‘(demanding) physics teacher’

excerpt of a derivational nest:

fizyk
(physics teacher)

subject with unexpressed predicate

fizyka
(physics class)

fizyk
(scholar specializing
in physics)

subject with unexpressed predicate

fizyka
(physics - natural science)

↑
metonymy

Extending the spectrum: NESTED POLYSEMY

PARTYZANTKA (blondwłosa vs. nielegalna)

‘(blonde) woman
partisan’



‘(illegal) guerilla’

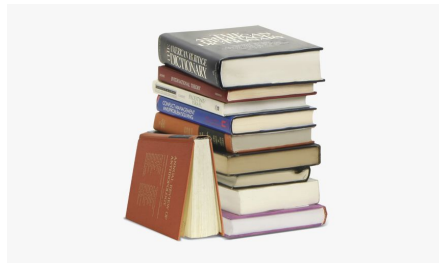
excerpt of a derivational nest:



Extending the spectrum: NESTED POLYSEMY

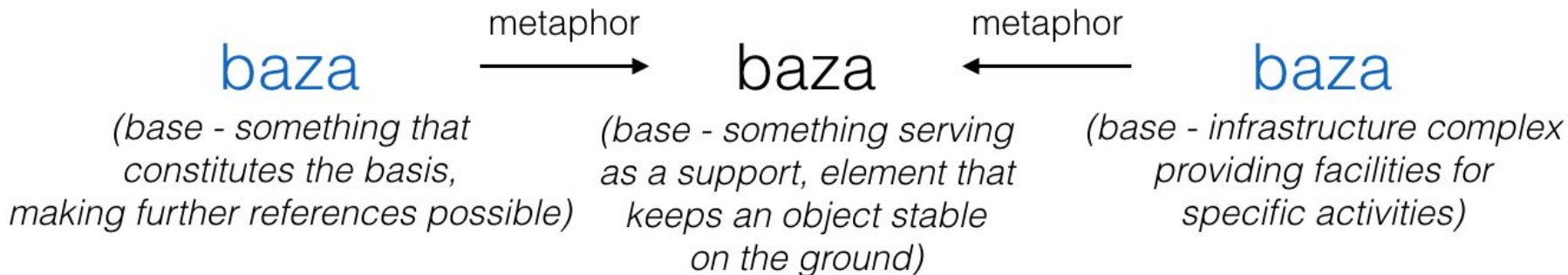
BAZA (wojskowa vs. merytoryczna)

‘(military)
base’



‘(knowledge)
base/basis’

excerpt of a derivational nest:



Extending the spectrum: NESTED POLYSEMY

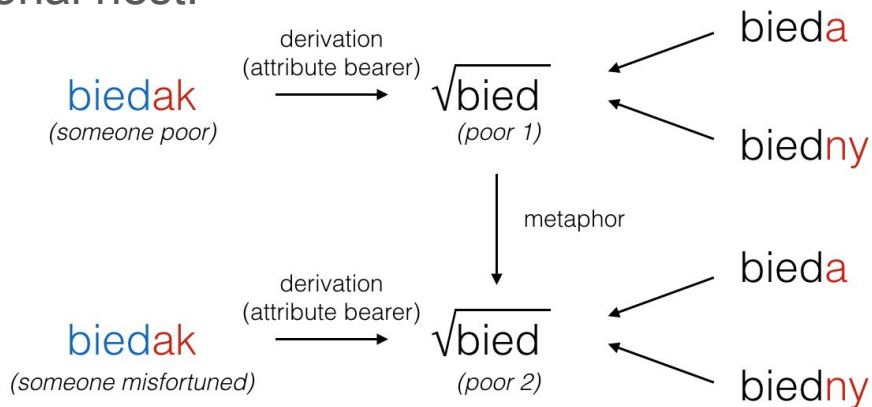
BIEDAK (bezdomny vs. nieporadny)

‘(homeless)
poor man’



‘(clumsy)
poor thing’

excerpt of a derivational nest:



Extending the spectrum: NESTED POLYSEMY

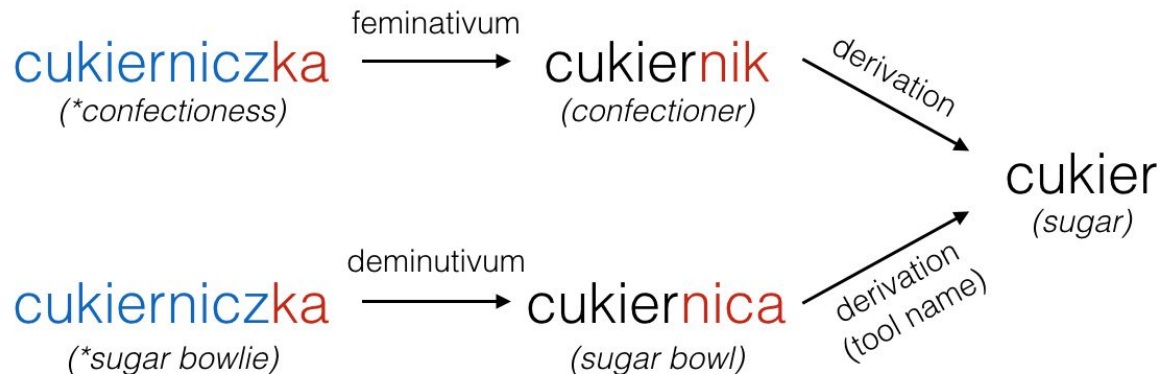
CUKIERNICZKA (srebrna vs. doświadczona)

‘(silver) sugar
bowl’

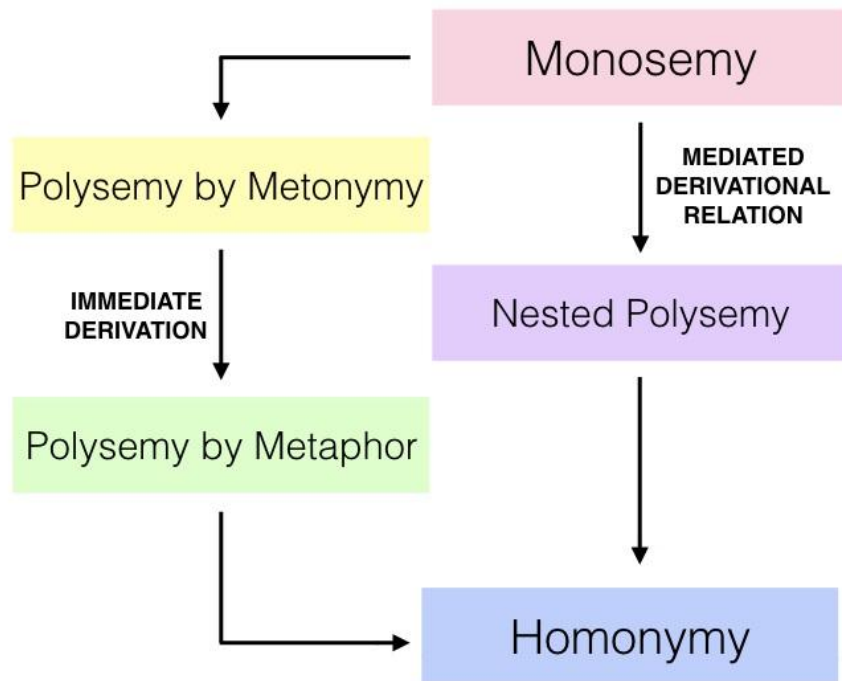


‘(experienced) cake
lady/female
confectioner’

excerpt of a derivational nest:



Spectrum of sense remoteness extended to nested polysemy

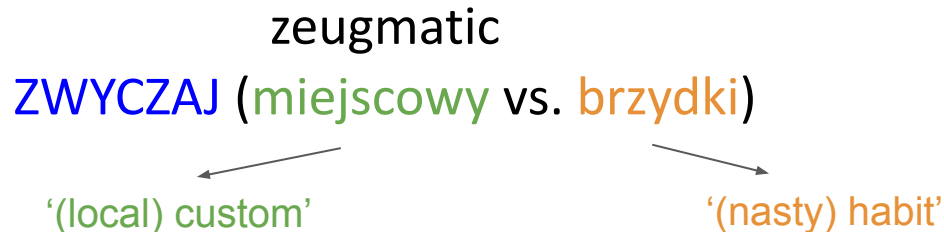


Extending the spectrum: NEIGHBOURING POLYSEMY

Inherent (neighbouring) polysemy involves senses where there are no substantial reasons for assuming that one or another of them is prior. Rather, they are so intimately interconnected with each other that they must be viewed as being **part of a complex meaning**.

Dölling (2018)

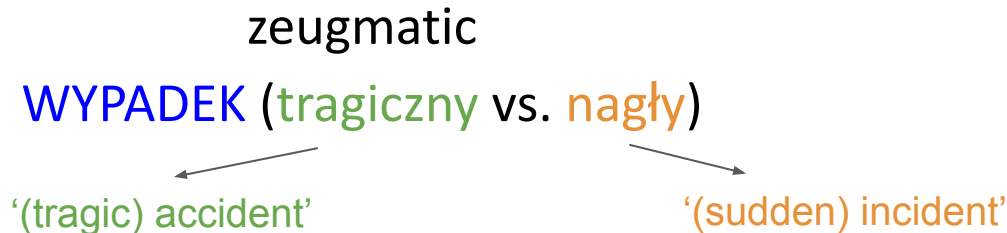
Extending the spectrum: NEIGHBOURING POLYSEMY



Nie może się oduczyć jednego paskudnego **miejscowego** choć **brzydkiego** **zwyczaju**, i zawsze charcze prosto na ziemię, uważając, że smarkanie w chusteczkę jest niehygieniczne.

‘?He can't seem to get rid of one **local** but **nasty** **custom/habit**, and is always snarling straight at the ground, believing that snotting into a handkerchief is unhygienic.’

Extending the spectrum: NEIGHBOURING POLYSEMY



Musiałem przerwać rozmowę, bo zdarzył się niespodziewany wypadek, ale nie martw się, nie było to nic groźnego, po prostu ptaszek wleciał mi przez otwarte okno do pracowni.

‘?I had to interrupt the conversation because an unexpected accident/incident happened, but don't worry, it was nothing dangerous, just a bird flew through my open window into the studio.’

Extending the spectrum: NEIGHBOURING POLYSEMY

non-zeugmatic

WIERSZ (środkowy vs. patriotyczny)

←
'(middle) line'

→
'(patriotic) poem'

*Napisał **środkowy wiersz** patriotyczny.

*He wrote the **middle patriotic line/poem**.

Extending the spectrum: NEIGHBOURING POLYSEMY

non-zeugmatic

KOSTIUM (taliowany vs. karnawałowy)

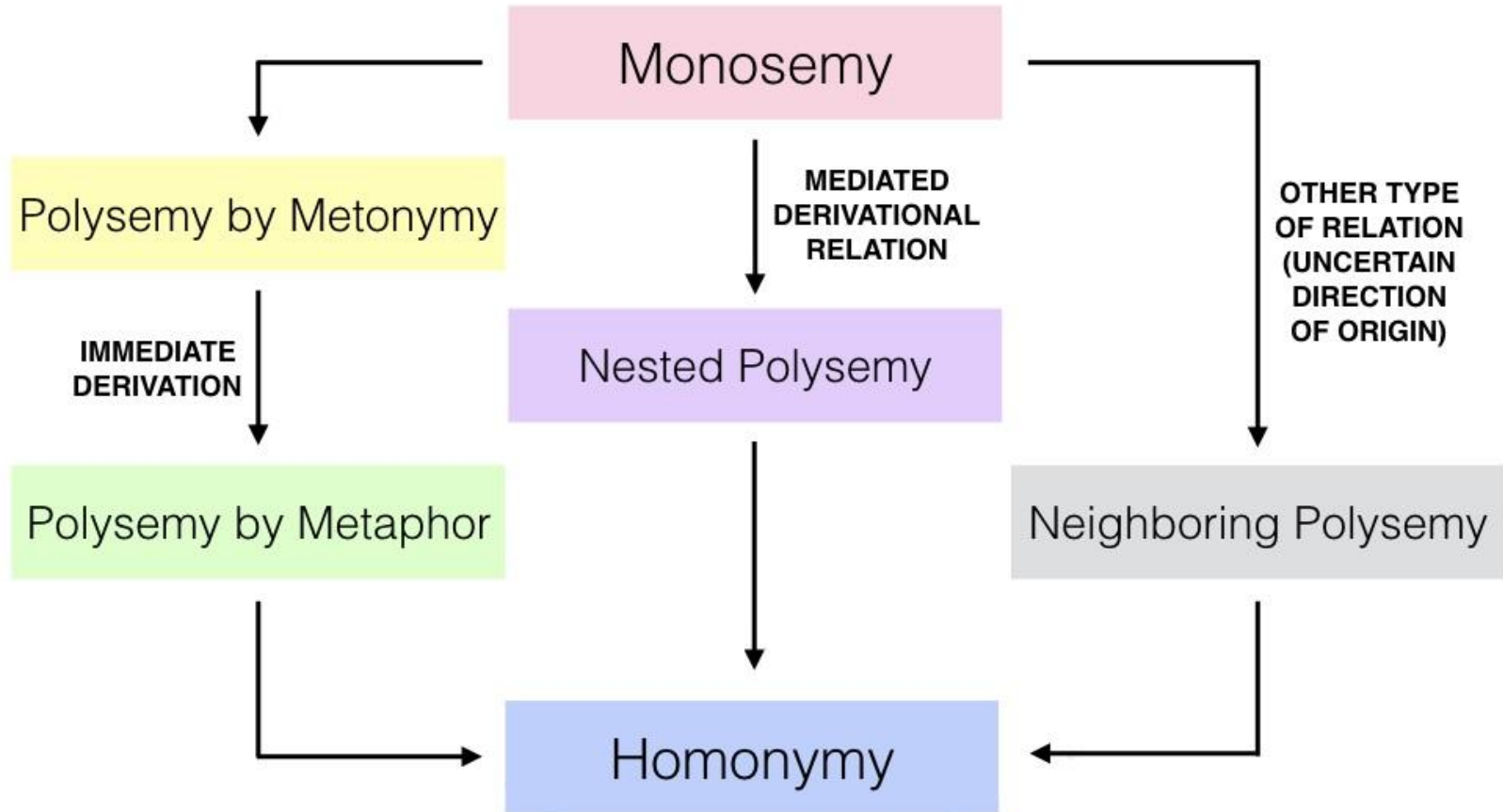
←
'(tight-waisted) outfit'

→
'(fancy-dress) costume'

*Na bal charytatywny założyła nowy taliowany kostium karnawałowy.

*He wore a new fancy-dress tight-waisted outfit/costume to the charity ball.

Spectrum of sense remoteness extended to neighboring polysemy



Extending the spectrum: 50-50

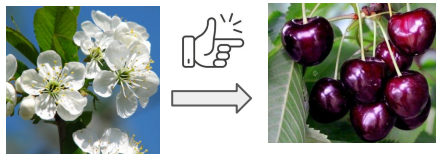
HOMONYMY MAY SOMETIMES BE PERCEIVED AS POLYSEMY AND POLYSEMY MAY
SOMETIMES BE PERCEIVED AS HOMONYMY

Carston (2020)

Extending the spectrum: 50-50

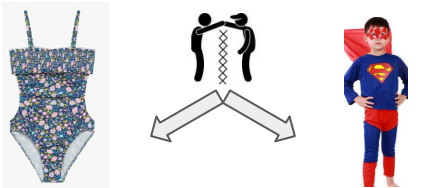
POLYSEMY BY METONYMY

czereśnia
'cherry (tree)'



NEIGHBOURING POLYSEMY

kostium
'suit/costume'



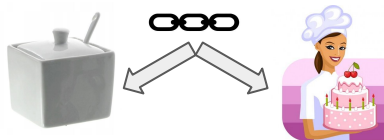
POLYSEMY BY METAPHOR

nos
'nose'

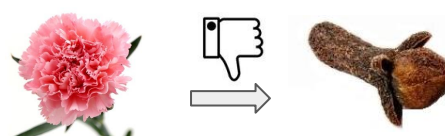


NESTED POLYSEMY

cukierniczka
'sugar bowl/
female
confectioner'

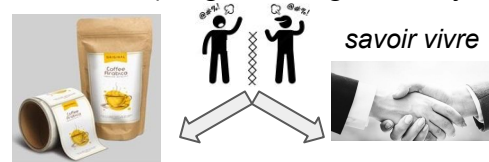


50/50 (metonymy/homonymy)



goździk
'carnation/
clove'

50/50 (neighbouring/homonymy)



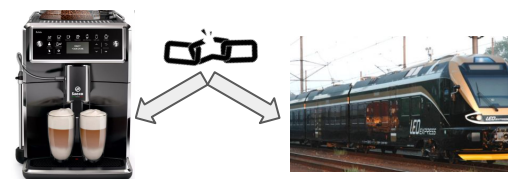
etykieta
'label/etiquette'

50/50 (metaphor/homonymy)



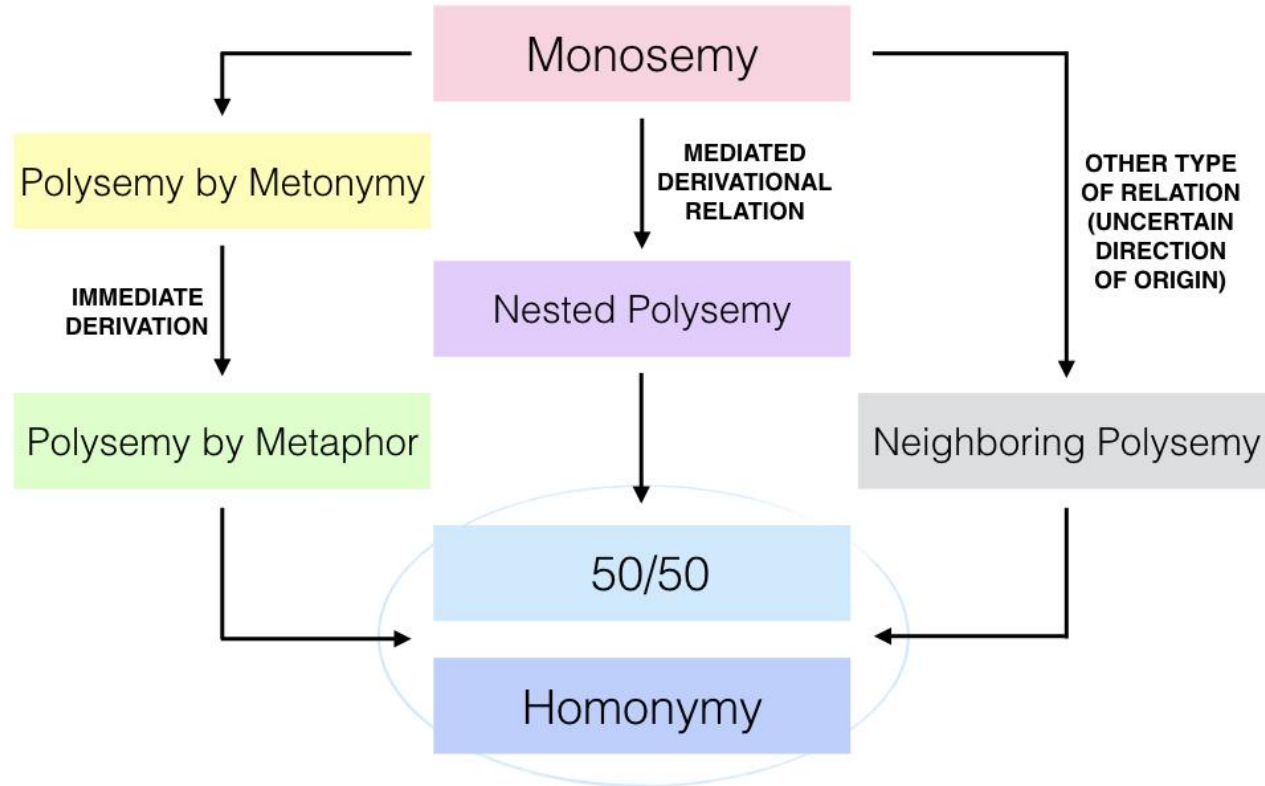
gołąbek
'pidgeon/
cabbage roll'

50/50 (nested polysemy/homonymy)



ekspres
'coffee machine
/express'

Spectrum of sense remoteness extended to 50/50 cases



What we know about the spectrum:

Monosemy

- unambiguous word
- a rare phenomenon
- over time words cease to be monosemous

Polysemy by Metonymy

- new sense within the same conceptual domain
- often zeugmatic
- the derived unit (sense) must be defined with a reference to the primary one
- very regular

Polysemy by Metaphor

- new sense within different conceptual domain
- direct semantic derivation (similarity or symbol)
- regular metaphors more akin to metonymy

What we know about the spectrum:

Nested Polysemy

- common derivation base
- not necessarily directly related to the central unit (possible intermediate links)
- coincidentally formed by the same suffix

Neighboring Polysemy

- impossible to indicate the primary sense
- is there family resemblance between concepts?

50/50

Homonymy

- vague border between homonyms or polysemes
- mainly: polysemes whose etymology is unclear in the minds of the language users (e.g. culturemes)
- also: homonyms for whom language users establish common origin (folk etymology)
- words proved in lexicology to be homonyms with easily identifiable common root in other languages
- ambiguous words with unrelated meanings
- two distinct words which happen to have the same phonological representation or a word

SOME INSIGHTS AND CHALLENGES FROM OUR WORK ON METONYMY
FURTHER EXTENDING THE SPECTRUM

CHALLENGE

Petra Schumacher (2019):

Future research should further aim at a better understanding of metonymy as a continuum in terms of a finer-grained classification of types of metonymy.

WELL-BEHAVING METONYMY

Zeugmatic regular polysemy-formation **patterns**:

- object-activity

OBIAD (smaczny vs. rodzinny)
Zjadł *smaczny rodzinny obiad*.
'He had a *tasty family dinner*.'

- tree-wood

SOSNA (rozłożysta vs. sękata)
Cały jego dom jest *obłożony lokalnie rosnącą sosną*.
'His entire house is *laid in locally growing pine*.'

- container-unit of measure

ŁYŻECZKA (srebrna vs. czubata)
Wsypał *czubatą łyżeczkę* cukru pudru i ją *oblizał*.
'He poured in a *heaping teaspoon* of ice sugar and *licked it off*.'

- animal-meat

INDYK (gulgoczący vs. pieczony)
Na święta *upiekłam indyka z wolnego wybiegu* i smakował lepiej niż te z chowu klatkowego.
'I *roasted a free-range turkey* for Christmas and it tasted better than the caged ones.'

MISBEHAVING METONYMY

Non-zeugmatic regular polysemy:

- object-activity

gwizdek (chromowany vs. końcowy)
(chrome vs. final)

*Chromowany gwizdek zakończył mecz.

*'Chrome whistle ended the match.'

- place-people in this place

klasa (klimatyzowana vs. zdolna)
(air-conditioned vs. clever)

**Trzecia klasa miała dzisiaj lekcję w-fu, ale ponieważ była klimatyzowana, to się nie spociła.*

*The third classroom/class had a gym lesson today, but because it was air-conditioned, they didn't sweat.

MISBEHAVING METONYMY

Challenges concerning polysemy by metonymy: BORDERLINE CASES

- between metonymy and neighboring polysemy:

RADIO (*zepsute* ‘broken’ vs. *katolickie* ‘catholic’)

- between metonymy and metaphor:

KARK (*złamany* ‘broken’ vs. *łysy* ‘bald’)

FLAKI (*pyszne* ‘yumy’ vs. *wyprute* ‘ripped out’)

PAS (*szczupły* ‘slim’ vs. *skórzany* ‘leather’)

GIPS (*ziarnisty* ‘grainy’ vs. *zdejty* ‘removed’)

- between metonymy and nested polysemy:

FIZYK (*kwantowy* ‘quantum’ vs. *szkolny* ‘school’)

SOME INSIGHTS AND CHALLENGES FROM OUR WORK ON METAPHOR
FURTHER EXTENDING THE SPECTRUM

WELL-BEHAVING METAPHOR

We focus only on conventional (lexicalized metaphor).

MUCHA (natrętna ‘an intrusive fly’ vs. elegancka ‘an elegant bowtie’)

NARYBEK (odłowiony ‘caught fry’ vs. piłkarski ‘football fry’)

MARGINES (lewy ‘a left margin’ vs. przestępczy ‘a criminal margin’)

REKIN (rafowy ‘a reef shark’ vs. giełdowy ‘a stock market shark’)

GŁOWA (łysa ‘a bald head’ vs. mądra ‘a wise head’)

OCZKO (bystre ‘a smart eye’ vs. wodne ‘a water pond’)

MISBEHAVING METAPHOR

Challenges concerning polysemy by metaphor: BORDERLINE CASES

- between metaphor and nested polysemy:

DOJARKA (*ładna* ‘pretty milkmaid’ vs. *elektryczna* ‘electronic milking machine’)

WIATRAK (*biurkowy* ‘desk fan’ vs. *holenderski* ‘Dutch windmill’)

- between metaphor and neighboring polysemy:

SASZETKA (*herbaciana* ‘tea bag’ vs. *skórzana* ‘leather purse’)

Some metaphors may be regular:

- object-to-shape pattern: e.g., *pierścień* ‘ring’, *gwiazdka* ‘star’, *wąż* ‘snake’, *sznur* ‘rope’, *grzyb* ‘mushroom’...
- shape-to-object pattern: e.g., *koło* ‘circle’, *trójkąt* ‘triangle’, *walec* ‘cylinder’, *kula* ‘sphere’...

Will they be closer to metonymy (smaller sense remoteness)?

METAPHOR: EXTENDING THE SPECTRUM

Glucksberg & Keysar: one category exhibits some of the characteristic of another.
It is not an entirely unified phenomenon.

1. HIGH PHYSICAL RESEMBLANCE

NOS (*kobięcy* 'female nose' vs. *samolotowy* 'a plane nose'), **NOGA** (*umięśniona* 'muscular leg' vs. *drewniana* 'wooden leg [of a table]'), **KAPELUSZ** (*bawełniany* 'a cotton hat' vs. *gąbczasty* 'a warty hat [of a mushroom]')

2. LOW PHYSICAL RESEMBLANCE (tylko pod względem jakiejś właściwości lub funkcji)

ŚLIZGAWKA (*ślizista* 'a muddy slide' vs. *spadzista* 'a slanted slide'), **BIEŻNIA** (*tartanowa* 'tartan treadmill' vs. *elektryczna* 'electronic treadmill'), **LÓD** (*arktyczny* 'arctic ice' vs. *waniliowy* 'vanilla ice')

3. LITERAL PHYSICAL SENSE IS PROJECTED ONTO METAPHORIC ABSTRACT SENSE

PRZECIEK (*kanalizacyjny* 'sewer leak' vs. *medialny* 'press leak'), **KOSMOS** (*bezkresny* 'endless space' vs. *istny* 'real cosmos'), **CIOŚ** (*śmiertelny* 'mortal blow' vs. *życiowy* 'life blow')

4. METAPHOR BY SYMBOL

LIS (*zraniony* 'a wounded fox' vs. *wredny* 'a cunning fox'), **SERCE** (*operowane* 'an operated heart' vs. *szlachetne* 'a noble heart')

Once our spectrum and our material are ready, we plan psycholinguistic research:

STEP 1: Testing the psychological reality of our spectrum by asking native speakers of Polish for subjective evaluation of sense remoteness.

STEP 2: Memory experiment as in Klein and Murphy (2001) but for a broader spectrum of polysemy.

STEP 3: Planning eye-tracking or ERP experiments based on the results of our earlier studies.

Thank you!

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