



Linguistic theory on semantic change

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Hello!



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Overview

1. The discipline of historical semantics
2. What is semantic change?
 1. onomasiology vs. semasiology
 2. denotation vs. connotation
3. Mechanisms of semantic change
 1. generalization & specialization
 2. metaphorical & metonymical change
4. Theories and laws of semantic change
 1. Diachronic prototype semantics (lexical meaning change)
 2. Grammaticalization theory (grammatical meaning change)
 3. Law of Conformity/Innovation/Prototypicality/Differentiation/Parallel change
5. Semantic change in crosslinguistic perspective
6. Issues/caveats
 1. referential change vs. semantic change in corpora
 2. levels of analysis: tokens, types and the lexicon

1. The discipline of historical semantics

- first period: 1830 – 1930
 - linguistic research emerges as historical research
 - meaning is important for reconstructing past language states
 - wealth of empirical descriptions (e.g. historical dictionaries)
- second period: 1980 – 2000
 - cognitive-functional shift in linguistic theory (>< Chomsky)
 - rediscovery and reframing of the scholarship of the first period
- third period: > 2015
 - neural network revolution for the study of semantics
 - massive digitization efforts of historical archives
 - large-scale institutional frameworks: [Change is Key!](#) program, MSCA Doctoral Network [CASCADE](#)

2. What is semantic change?

- **semasiological change**

linguistic
form



concepts/
meanings

time period 1	time period 2
<i>mouse</i>	<i>mouse</i>
1. 'any of numerous small rodents'	1. 'any of numerous small rodents' 2. 'a hand-operated electronic device'

- takes as starting point the linguistic form (*mouse*) and looks at how the various meanings associated with it have changed over time
- addition of a new meaning (e.g.: *mouse*)
- loss of an old meaning (e.g.: *hospital*, lost the sense 'A house/hostel for the reception and entertainment of pilgrims, travellers, and strangers')
- semasiological change increases or decreases the **polysemy** of a word (= the synchronic presence of multiple meaning)

2. What is semantic change?

- **onomasiological change**

concept/
meaning



linguistic
forms

time period 1	time period 2
'a member of a fire department who tries to extinguish fires'	
<i>fireman</i>	<i>fireman</i> <i>firefighter</i>

- takes as starting point the concept or meaning to be expressed ('a member of a fire department') and looks at how the words associated with it have changed through time
- addition of a new word (e.g.: *firefighter*)
- loss of an old word (e.g.: 'something hard to endure' used to be lexicalized by the word *asperity* (next to *severity*, *severeness*, *hardship*) but is now hardly ever being used
- onomasiological change increases or decreases **synonymy** (= the synchronic presence of multiple words for the same meaning)

2. What is semantic change?

- **denotational change:** changes in the *descriptive* meaning of a word (i.e. changes in how a word is used to describe something about the world)
 - 4 mechanisms of semantic change (cfr. infra)
- **connotational change:** changes in the *emotional* associations of a word (i.e. changes in how a speaker expresses his subjective evaluation through that word)

- **amelioration:** a meaning shift accompanied by a more positive evaluation

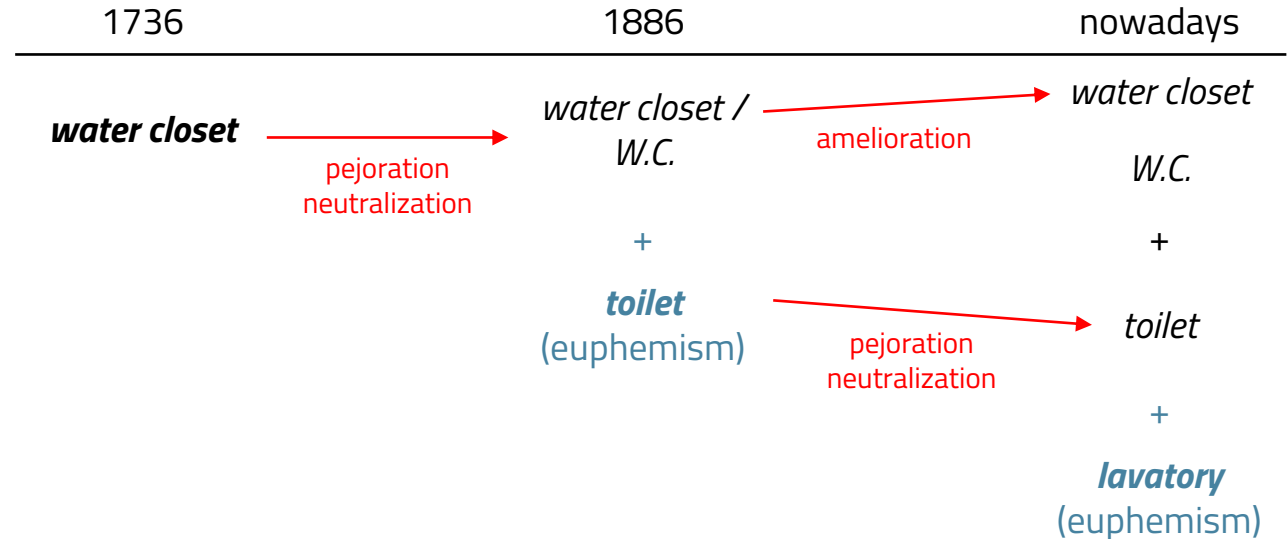
<i>nice</i>	<ol style="list-style-type: none">1. 'foolish, stupid' (1300-1617)2. 'agreeable, pleasant' (>1747)
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- **pejoration:** a meaning shift accompanied by a more negative evaluation

<i>boor</i>	<ol style="list-style-type: none">1. 'peasant' (1548-1832)2. 'unmannered man' (> 1598)
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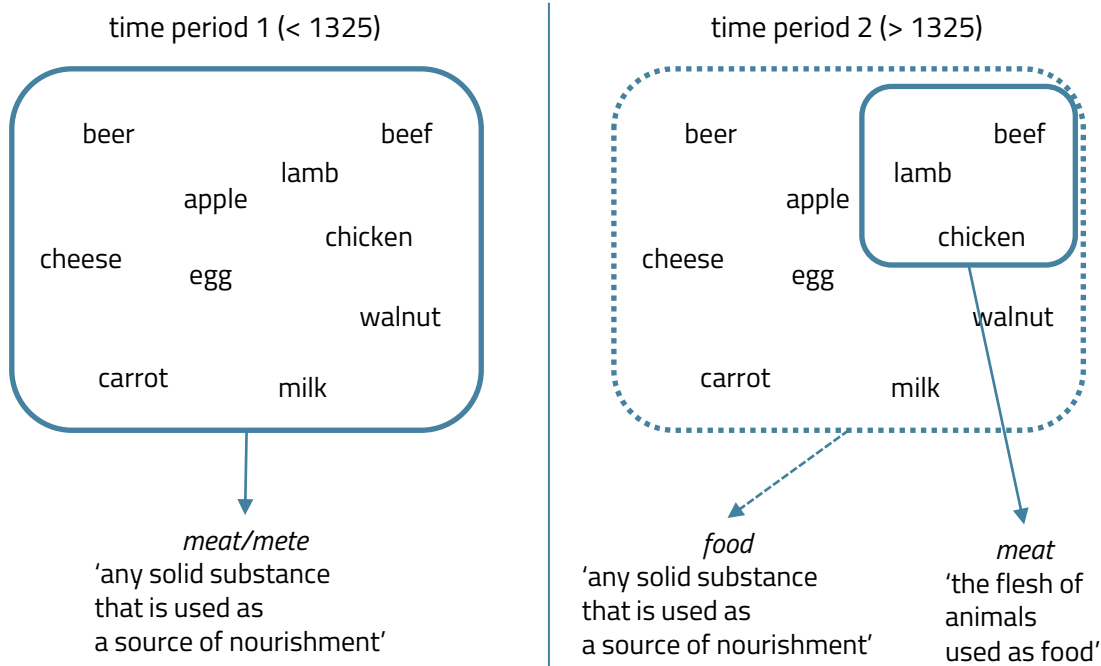
2. What is semantic change?

- the emotional value attached to the referent of words can lead to both **semasiological** and **onomasiological** innovations ('euphemistic treadmill', 'lexical replacement')
- in NLP parlance: 'sentiment analysis'



3. Mechanisms of semantic change

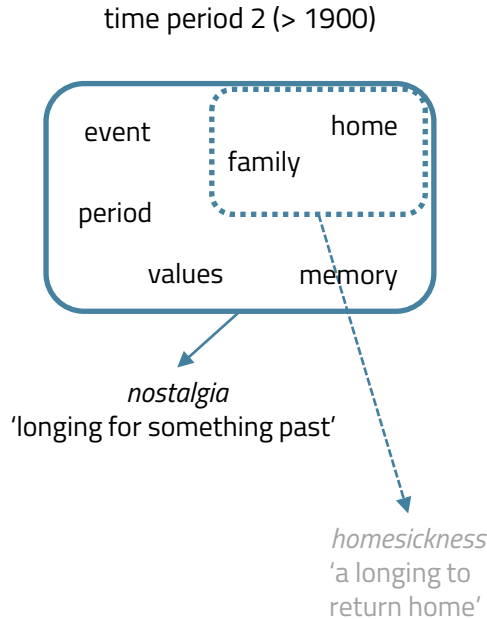
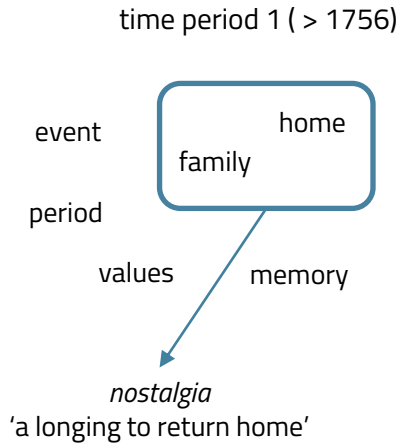
- **specialization**



- *meat* used to mean 'any solid substance that is used as a source of nourishment'
- *meat* specialized to mean only 'the flesh of animals used as food'
- the new, specialized meaning has a more limited range of application than the older, original one
- specialization involves the semantic change from a higher-order level of meaning to a lower-order level of meaning

3. Mechanisms of semantic change

- **generalization**



- *nostalgia* used to mean chiefly 'a longing to return home'
- *nostalgia* generalized to mean only 'longing for something in the past (among which the home one had left)'
- the new, specialized meaning has a more extended range of application than the older, original one
- generalization involves the semantic change from a lower-order level of meaning to a higher-order level of meaning

3. Mechanisms of semantic change

- **metaphorical change:** when the new sense of a word is linked through a relation of *figurative similarity* to the old sense of that word

	old meaning	new meaning	type of similarity
<i>mouse</i>	[Old English] 'any of numerous small rodents'	[1965] 'a hand-operated electronic device'	formal similarity
<i>desktop</i>	[1929] 'the top of a physical desk'	[1983] 'the area of the computer screen against which icons and windows appear'	functional similarity
<i>branch</i>	[1300] 'a portion or limb of a tree growing out of the trunk'	[1817] 'a local office subordinate to the main or head office'	structural similarity

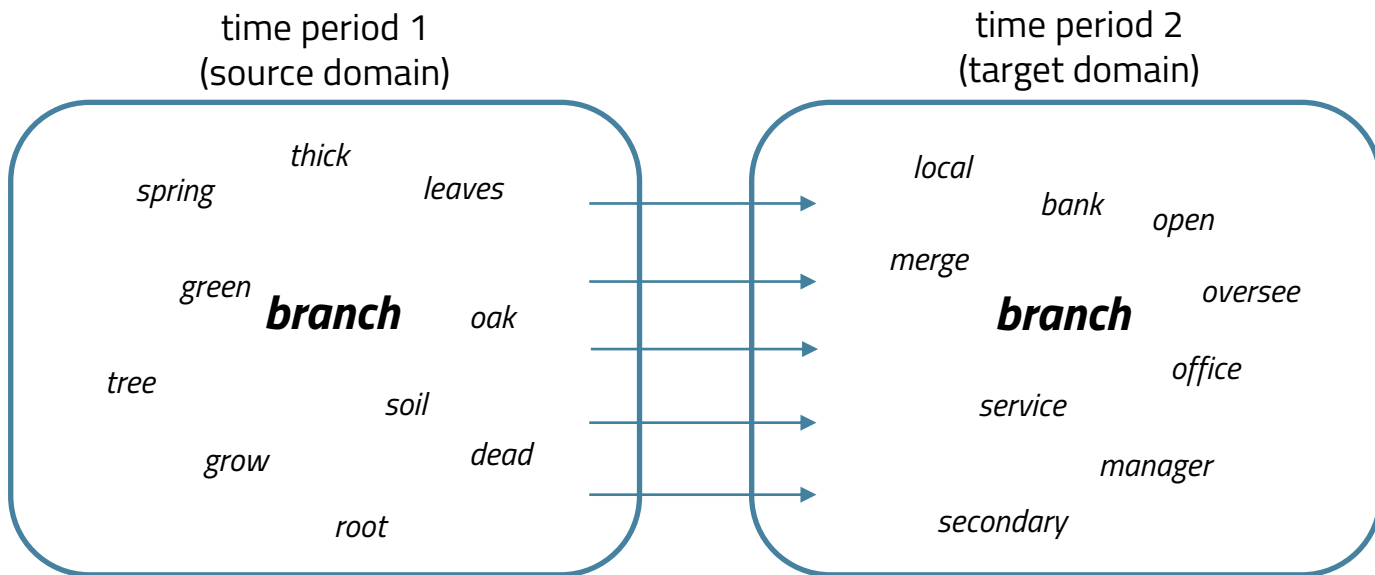
3. Mechanisms of semantic change

- **metaphorical change:** similarity mapping between a *source domain* and a *target domain* (e.g.: *branch*)

SOURCE DOMAIN: <i>TREE</i>	TARGET DOMAIN: <i>ORGANIZATION</i>
• trunk	• main office
• branches	• local offices
• roots	• history/community
• (fresh) water	• (fresh) capital
• flourishing	• doing well financially

3. Mechanisms of semantic change

- identification of metaphorical change in diachronic corpora
 - associated context words of source domain in time period 1
 - associated context words of target domain in time period 2



3. Mechanisms of semantic change

- **metonymical change:** when the new sense of a word is linked through a relation of *contiguity* ('nearness') to the old sense of that word

	old meaning	new meaning	type of contiguity
<i>paper</i>	[1341] 'material in the form of thin, flexible sheets'	[1652] 'an essay, dissertation, or article (on a particular topic).'	material & object
<i>board</i>	[1576] 'a table at which a council is held'	[1623] 'the company of persons who meet at a council-table'	location & located
<i>to sweat</i>	[Old English] 'to emit or excrete sweat'	[1589] 'to work out; to work hard at;'	part & whole

3. Mechanisms of semantic change

- identification of metonymical change in diachronic corpora
 - changes happen within one domain (≠ source vs. target domain)
 - generally much harder to model
 - potential additional cues: change of semantic role and syntactic dependency

time period 1 (< 1918)
Moscow as 'city' [LOCATION]

(spatial) prepositional object

- live **in** *Moscow*
- travel **to** *Moscow*
- retreat **from** *Moscow*
- return **from** *Moscow*

time period 2 (> 1918)
Moscow as 'government' [LOCATED]

subject of 'animate' verb

- *Moscow* **said** foreign trade expanded
- *Moscow* **wants** a SALT agreement
- but *Moscow* **knows** it can't count on loyalty
- when *Moscow* **sent** representatives to talks

5. Theories and laws of semantic change

- **Diachronic prototype theory** (Geeraerts 1997)
- origins: categorization research in cognitive psychology (work of Eleanor Rosch)
- previous theories: we can distinguish the meaning of words by means of necessary and sufficient features (e.g.: the meaning of *bird* corresponds to the sum of those features)
- now: the structure of the meaning of words has a prototypical center and a periphery
 - center: the more typical exemplars of the category (greatest overlap of the features)
 - periphery: the less typical exemplars of the category (smallest overlap of the features)

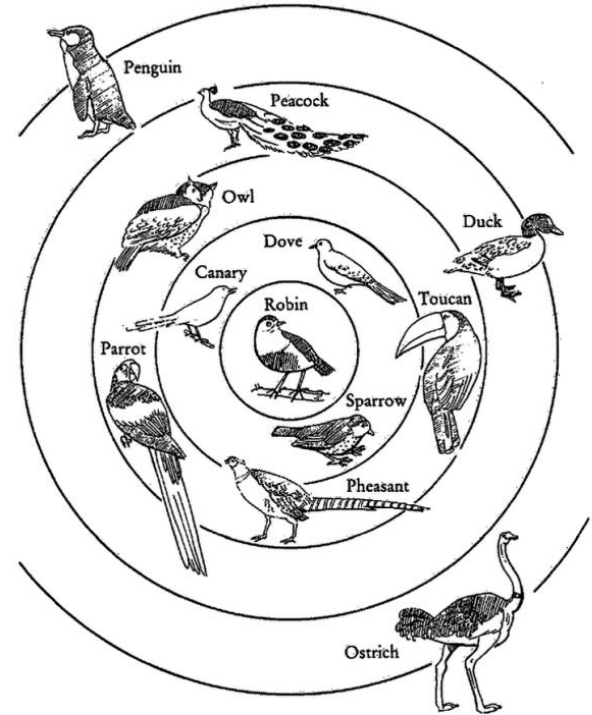
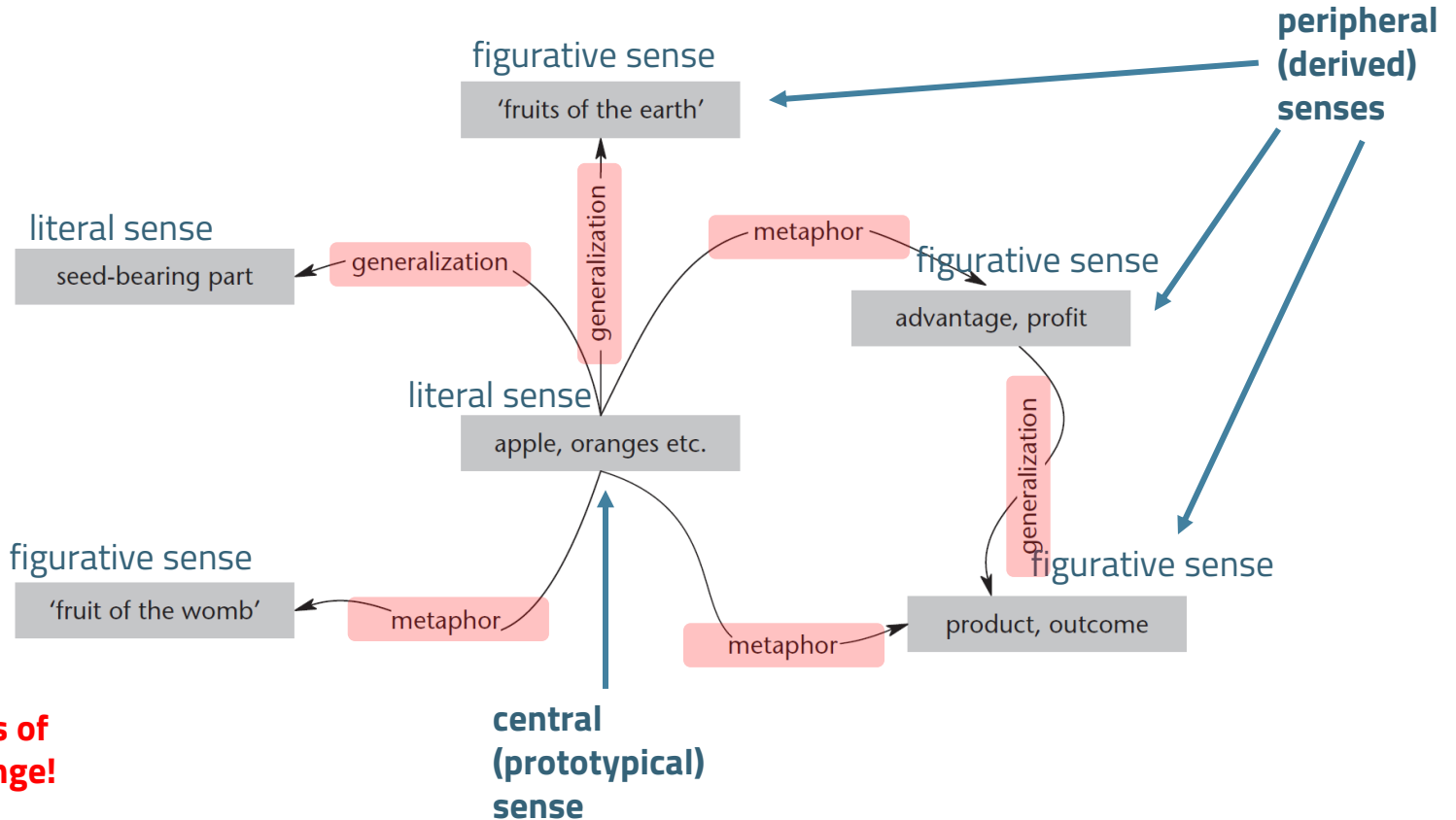


Figure . 1 Birdiness rankings

5. Theories and laws of semantic change

- psychology meets linguistics: the same mechanisms that apply at the level of natural categories, are found in the semantic structure of words! (Geeraerts, 2010)
- polysemy of *fruit*
 - literal meanings:
 1. 'soft and sweet edible part of a plant' [*apples, strawberries, etc.*]
 2. 'seed-bearing part of a plant or tree' [*acorns, walnuts etc.*]
 3. 'everything that grows that can be eaten' [*the fruits of nature, the fruits of the grounds, such as grains and vegetables*]
 - figurative meanings:
 1. 'the results or outcome of an action' [*the fruits of my labor*]
 2. 'offspring' [(Biblical) *the fruits of the womb*]
 3. 'gain or profit' [*the fruits of someone's advice*]

5. Theories and laws of semantic change



4 mechanisms of semantic change!

5. Theories and laws of semantic change

- **Grammaticalization theory** (Heine et al. 1991; Hopper & Traugott 2003)
= approach to study morphosyntactic change (>< lexical change)
- grammatical meaning arises from lexical meaning
 - prepositions derive from body parts (English: *back, behind*)
 - the verb for FINISH comes to be used as a marker of completion (Chinese: *-le < liao*)
- “bleaching”: the loss of contentful meaning from a lexical item
 - *It's a **pretty** gift* “It's a fine gift” [lexical meaning]
 - *It's a **pretty** ugly gift* “It's a very ugly gift” [grammatical meaning: intensification of next adjective]

5. Theories and laws of semantic change

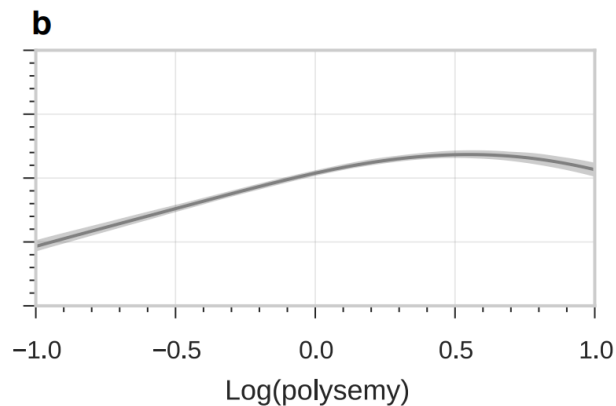
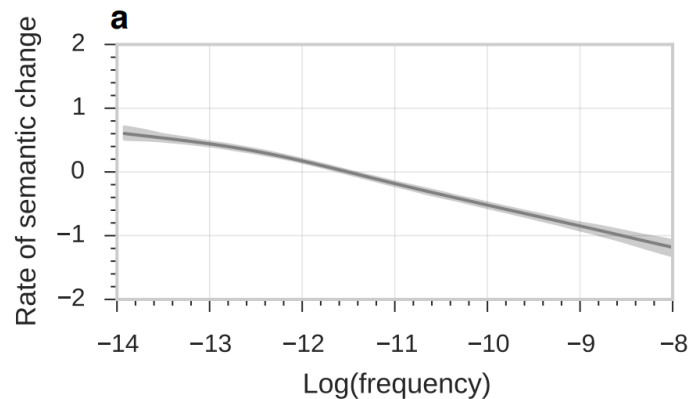
Regularities involving the interaction between synonymy and change rate (Xu & Kemp 2015; Liétard et al. 2023)

- **Law of differentiation** [Bréal 1897]: synonyms tend to diverge over time (a word can take on a different meaning, or disappear)
- **Law of parallel change** [Stern 1921]: synonyms tend to develop similar senses, and so as a whole remain synonymous over time
- Studies point to different results, although there are issues in comparability between the data and methods (+ other issues)

5. Theories and laws of semantic change

Regularities involving the interaction between frequency, polysemy and change rate (Hamilton, Leskovec & Jurafsky, 2016)

- **Law of conformity:** frequent words change more slowly (with a negative power)
- **Law of innovation:** after controlling for frequency, polysemous words change faster

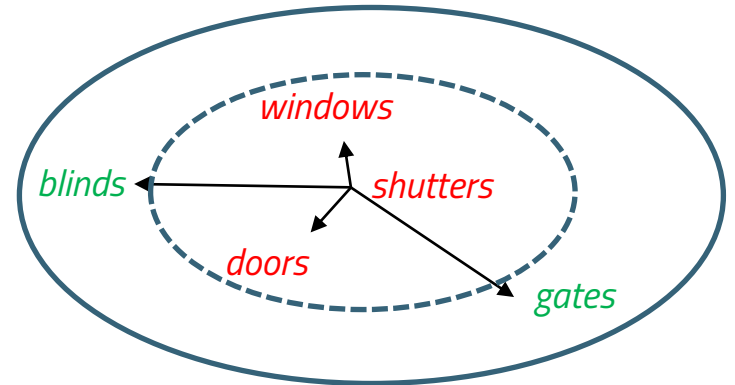


5. Theories and laws of semantic change

Regularities involving the interaction between prototypicality and change rate (Dubossarsky et al. 2015)

- **Law of prototypicality:** more peripheral words change faster than more prototypical words (within a lexical field of near-synonyms [i.e. words that have very similar meanings])
- prototypicality defined as cosine distance between cluster centroid and cluster item

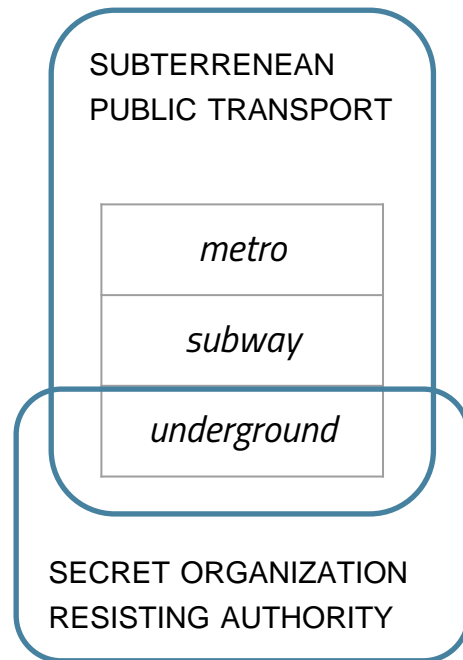
COVER OF AN ENTRANCE



- **red:** items within a cluster that have **low** rates of semantic change
- **green:** items within a cluster that have **high** rates of semantic change

5. Theories and laws of semantic change

- Most of these laws have been questioned or even debunked (Dubossarsky, Grossmann & Weishall, 2017)
- **First problem:** what type of frequency effect is relevant?
 - *topic frequency*: the propensity to talk/write about certain real-world phenomena and not others
 - *sense/concept frequency*: the frequency of a specific sense in a corpus
 - *word frequency*: the frequency of specific words in a corpus.



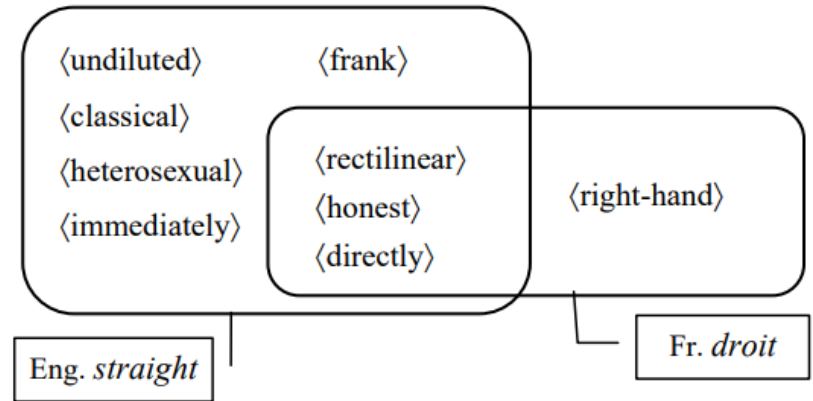
5. Theories and laws of semantic change

- Most of these laws have been questioned or even debunked (Dubossarsky, Grossmann & Weishall, 2017)
- **Second problem:** we model semantics by means of frequency
 - transformers and other architectures start with picking up local and global collocational patterns between word strings in texts
 - even though semantic representations might *on average* be better with more data, it is likely that high-frequency items will have better representations relative to low-frequency items

6. Semantic change in crosslinguistic perspective

- *semantic map*: ~union of the meanings (or conceptual 'atoms') between crosslinguistic translations
- cfr. onomasiological representation of slide 6
- related to the typological notion of 'colexification' [very similar to 'polysemy', which is considered to be a language-specific notion]

François (2008)



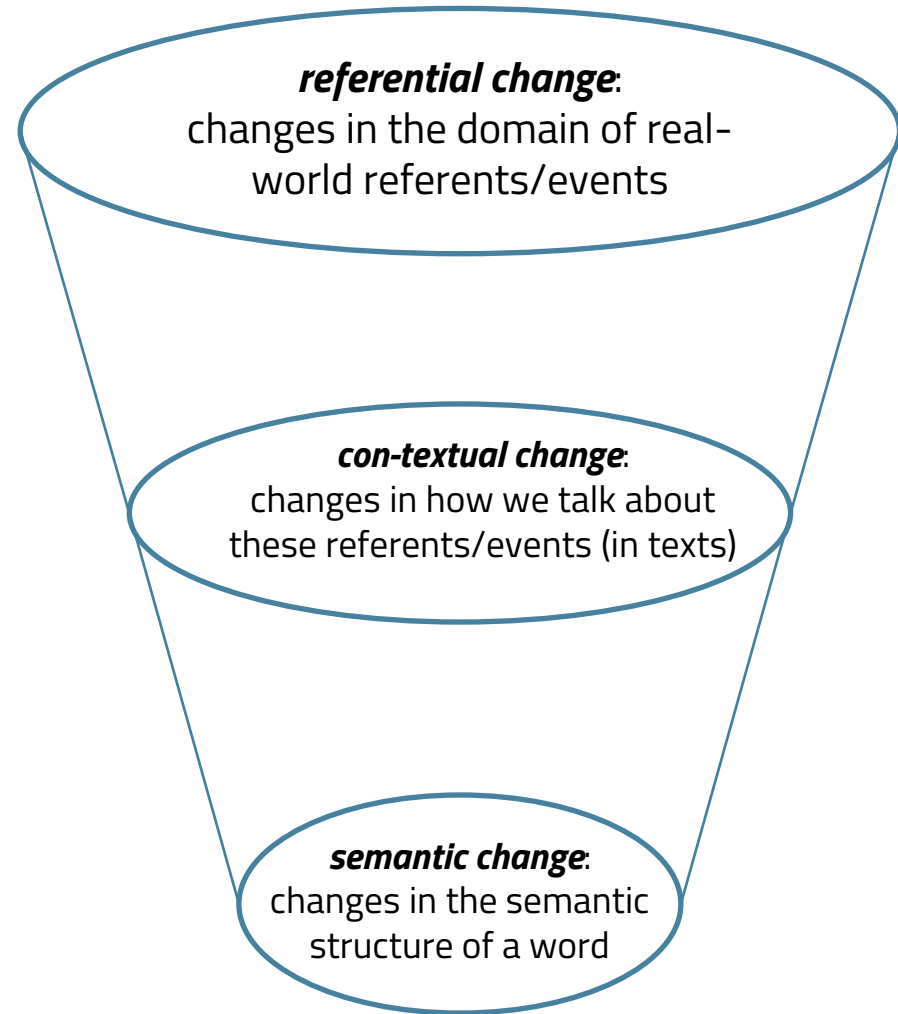
! possible enrichment with diachronic information: provide first attestation dates to semantic/conceptual 'atoms'

6. Semantic change in crosslinguistic perspective

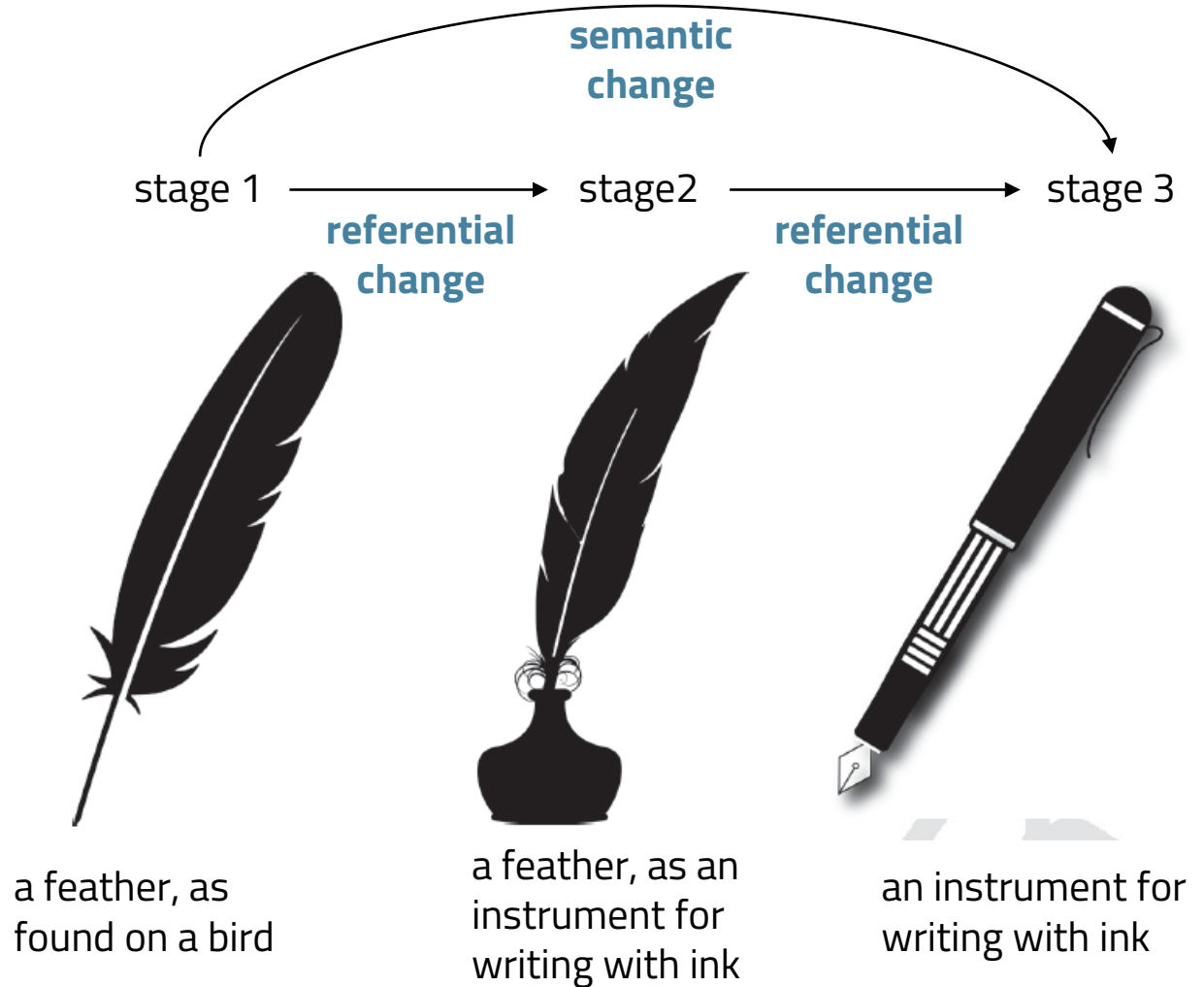
- what are the drivers of semantic change crosslinguistically? (Xu et al. 2017; Fugikawa et al. 2023); can we find regularities in the directionality of changes?
- **concreteness:** from concrete senses to abstract senses
(e.g.: «foot» → «lower location»)
- **valence:** from neutral senses to high-valence senses (~emotional polarity)
(e.g.: «hot» → «angry»)
- **frequency:** from high-frequent senses to low-frequent senses
(e.g.: «hard/solid» → «obstinate»)
- also role of animacy, embodiment, intersubjectivity

7. Further issues and caveats

1. **referential change vs. con-textual change vs. semantic change**
 - “the fact that things change (i.e. *referential change*) does not imply that the meaning of words changes (i.e. *semantic change*)” (Geeraerts 2020)
 - historical texts reflect the spirit of the time (*Zeitgeist*) [trends, problems, interests etc.]



- distinguishing between *referential* change and *semantic* change is hard!
- example: the semantic change of *pen*



7. Further issues and caveats

2. levels of analysis: types and tokens

- semantic change “in the wild” occurs as an accumulation of individual and contextualized communicative (and receptive) acts between speaker and listener
- the most relevant (and most difficult!) place to look for cues of semantic change is therefore at the level of the *individual occurrence of a word (= token)* (e.g.: immediate sentence context, characteristics of the speaker, the hearer, the communicative situation etc.)
- the word **type**, as an average, conflated representation of all these occurrences is a feasible starting-point, but also an impoverished artifact:
 - it hides the diversity at the token level
 - it hides the diversity at the sense level (i.e. polysemy)

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