Collocational networks and their application to an E-Advanced Learner's Dictionary of Verbs in Science (DicSci)

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Outline

- **Starting Points**

- **The DicSci – An E-Advanced Learner's Dictionary of Verbs in Science**

- **Building-up an Organic Dictionary**

- **Collocational Networks: an example**

- **Conclusions and Future Remarks**

Starting Points

- **the dictionary as an ongoing learning tool for scientists**

- **the place of science in learner's dictionaries**

- **the role of verbs in science**

- **the relationship between verbal and nominal forms**

- **the relationship between 'specialised' and 'general' words**

The DicSci – An E-Advanced Learner's Dictionary of Verbs in Science

- **Virtual Dictionary**

- **Corpus-driven**

- **Dictionary for Non-native speakers of English**

- **Dictionary of Verbs**

- **Dictionary of Patterns**

- **Dictionary of Science**

- **Organic Dictionary**

- A bottom-up dictionary of verb patterns with corpus-driven thematic and conceptual groupings

Sinclairian Perspective

- Idiom principle (Sinclair 1991)

- Pattern grammar (Hunston & Francis 1999)

- Semantic Prosody (Louw 1993, 2000|2008)

- Collocational phraseological patterning (Gledhill 2000)

- Collocational networks (Williams 1998)

- Collocational resonance (Williams, Hanks)

- Lexical primings (Hoey 2005)

- Norms and exploitaitions and Corpus Pattern Analysis (Hanks 2004)

Methods

■ **Collocational Networks (Williams 1998)**

Networks of statistically related collocates developed from a core lexical unit

■ **Intertextual Collocational Resonance (Williams 2008)**

Carrying over of aspects of meaning from one context to another, consciously and subconsciously

■ **Corpus Pattern Analysis (Hanks 2004)**

Work-in-progress corpus-driven methodology for mapping meaning onto use in texts

Building-up an Organic Dictionary

Collocational Network

Collocational resonance

Dictionary entry

CPA

Conceptual classification
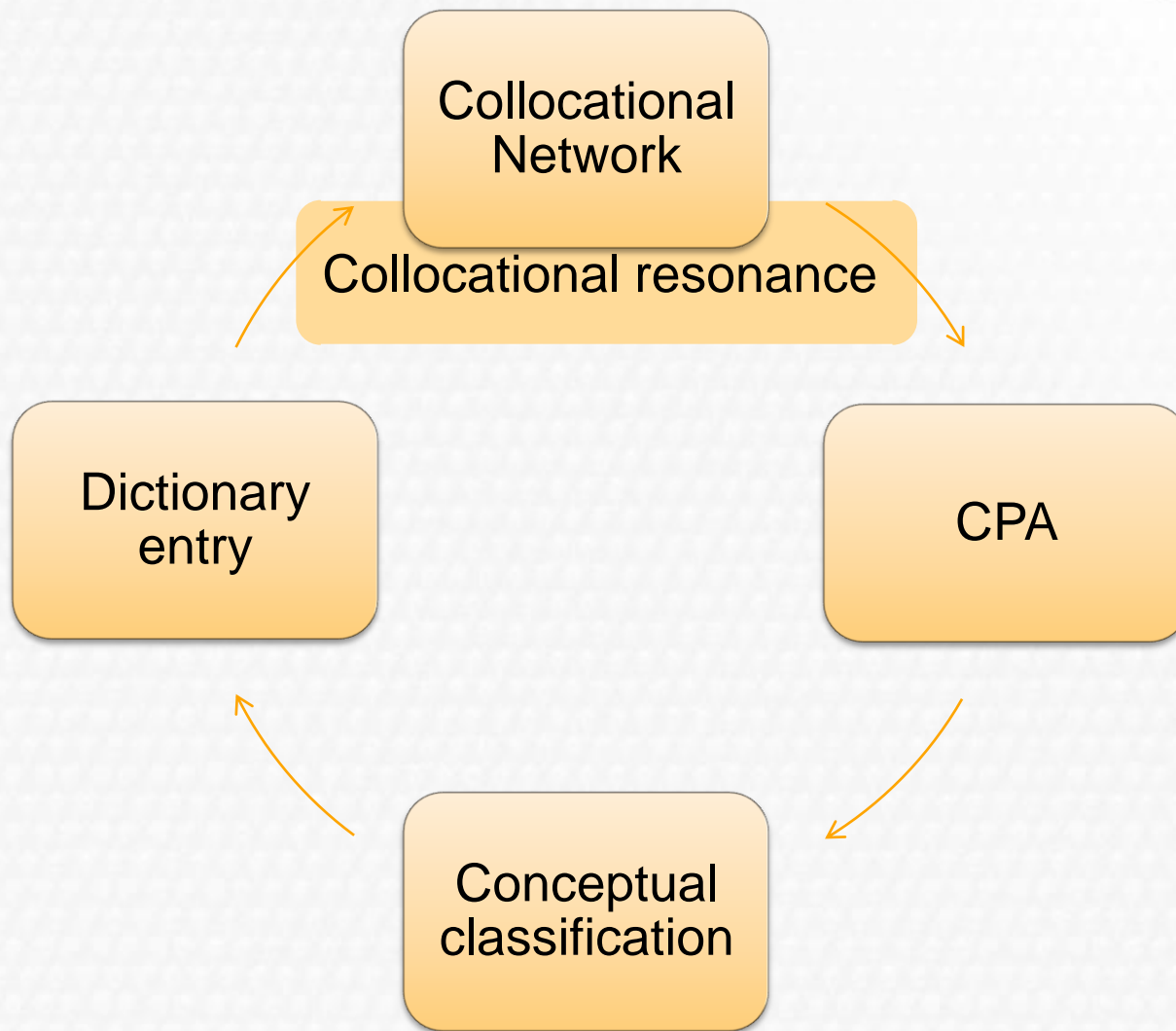
BMC Corpus

SCIENTEXT INITIATIVE

- Open Source

- Size 33 million words

- Fully POS tagged and lemmatised

- Subcategorised for topic and genre

http://scientext.msh-alpes.fr/scientext-site/?article30

http://www.biomedcentral.com

Collocational Networks: an example

to treat

Collocational Networks: an example

PDEV – Patrick Hanks

No.	%	Pattern / Implicature	
1	69%	[[Human 1 | Institution 1 | Animal 1]] treat [[Human 2 | Animal 2 | Entity | Event]] [Adv[Manner]]	conc.
		[[Human 1 | Institution 1 | Animal 1]] behaves toward [[Human 2 | Animal 2 | Entity | Event]] in the [[Manner]] specified	exploit.
2	17%	[[{Human 1 = Health Professional} | {Process = Medical} | Drug]] treat [[{Human 2 = Patient} | {Animal = Patient} | Disease | Injury]] [NO ADVL]	conc.
		[[Human 1 = Health Professional]] applies a [[Drug]] or [[Process = Medical]] to [[Human 2 =Patient]] for the purpose of curing the patient`s [[Disease | Injury]]	exploit.
3	5%	[[Human]] treat [[Inanimate]] (with [[Stuff]] | by [[Process]])	conc.
		The chemical or other properties of [[Inanimate]] are improved or otherwise changed by [[Process]] or the application of [[Stuff]]	exploit.
4	5%	[[Human 1]] treat [[Human 2 | Self]] {(to [[Eventuality = Good]])}	conc.
		[[Human 1]] gives or pays for [[Eventuality = Good]] as a benefit for [[Human 2 | Self]]	exploit.

Collocational Networks: an example

Concordances *to treat*

- A more consistent weight increase was achieved from week 8 to week 10.5 in mice **treated** with S. gordonii GP1294, with statistically significant differences compared to animals inoculated with the control strain

- We observed a 16 % increase in heart mass in both sexes after 3-days of isoproterenol treatment compared to mice **treated** with equivolume of saline .

- N-acetylcysteine prevents exacerbations of COPD because it is an anti-inflammatory agent and/or antioxidant, it may be difficult to see additional benefit in established exacerbations of COPD when the patients are also **treated** with prednisone, which has anti-inflammatory actions and the potential to reduce formation of reactive oxygen species from inflammatory cells.

- Control cells were **treated** with ethanol vehicle.

DicSci

[[Human 1 | Human Group]] **treat** [[Human 2 = Patient | Laboratory Animal = *Rat, Mouse* | Organism = *Cell*]] (with [[Drug= *Vehicle*]])

Implicature

For the purpose of being cured

For getting a cure to a disease

Collocational Networks: an example

Concordances *vehicle*

- Measurements were performed using a moving **vehicle** in some of the main streets of the city of Athens (Greece).

- The **vehicle** was moving with a speed of approximately 60 km/ h. The tests were performed in such a way and using the relevant equipment in order to simulate the data calls from an Ambulance vehicle .

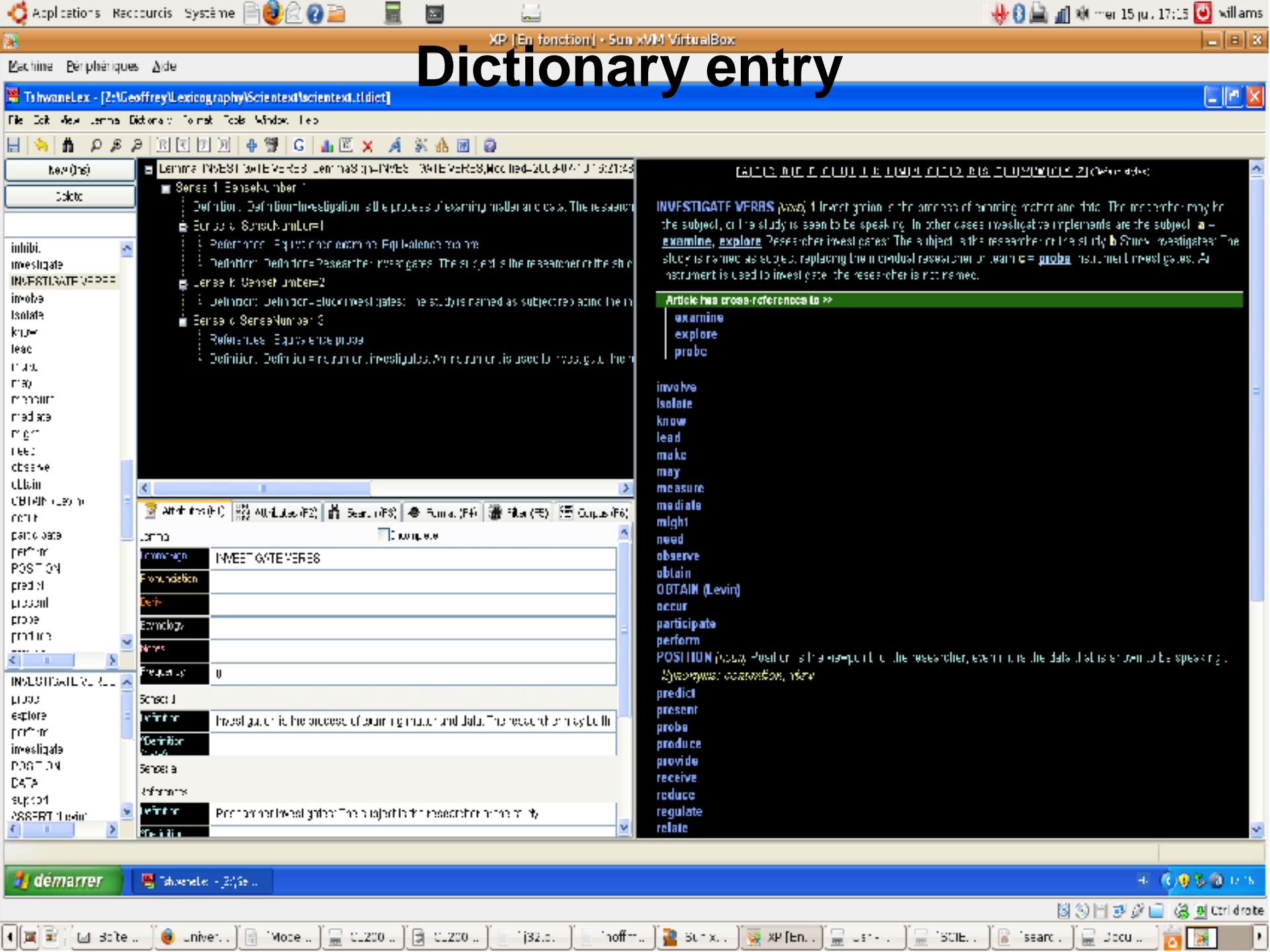- Adsflt, AdLacZ, or **vehicle** was injected directly into the tumours.

Conceptual classification

- ‘Giving Drugs’: *dissolve, deliver, administer, receive, inject*
- Laboratory Animal: *rat, mouse, rabbit*
- Drug*: Adsflt, AdLacZ*
- Word sense discrimination algorithm (Millon 2011)

Verb classes

Noun classes

Dictionary entry

Conclusions and Future Remarks

- **natural selection of the main cognitive nodes of scientific texts**

- **links between lexical units**

- **thematic patterns in texts**

- **differences between general and specialised uses**

- **sense disambiguation of polysemic words**

- **semasiologically and onomasiologically organisation**

- **organic dictionary**

- **conceptual classification**

- **microstructure**

- **collocational resonance**

Thank you for your attention!!!

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