Corpus Linguistics

Jean Mark Gawron

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San Diego State University

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Outline

1. Introduction

2. Limitations of armchair linguistics

3. Intrinsic problems

4. Corpus resources

5. Conclusion

What is a corpus?

Corpus

A corpus is a (usually computer readable) collection of spoken of written texts or conversations that is representative of a particular area of language use, by virtue of its size or composition.

Jespersen (1938)

I am above all an observer: I quite simply cannot help making linguistic observations. In conversations at home and abroad, in railway compartments, when passing people in streets and on roads, I am constantly noticing oddities of pronunciation, forms, and sentence constructions... For these notes I have found it practical to use small slips of paper...[a]

[a] This passage is cited and translated by Jan Svartvik in Svartvik (1992).

General corpus

Basic properties

Representative of language as a whole (and therefore LARGE). Examples: Brown Corpus (Francis and Kučera 1964), British National Corpus.

1. Seeks balance: statistics of samples should reflect statistics of language as a whole.
2. Seeks completeness: All the major phenomena of the language should appear. Therefore large [BNC → 100 million words]

Specialized corpus

Hunston (2002)

... a corpus of texts of a particular types, such as newspaper editorials, geography textbooks, academic articles in a particular subject, lectures, casual conversations, essays written by students, etc. It aims to be representative of a given type of text. It is used to investigate a particular type of language.

1. Representative of a specific text type, such as the Wikipedia corpus (Denoyer and Gallinari 2006), register, genre, or population (dialect corpora, CHILDES acquisition corpus).
2. May also be representative of a single speaker/author.
3. In extreme cases, can be a single document (Prince 1992)

Corpus studies: What can be studied

1. Occurrence and re-occurrence of particular linguistic features (how and where do they occur?): Frequencies of particular items (words) or of sequences of items (ngrams, lexical bundles); Collocations: sets of words that typically occur together
2. Language of a particular domain: spoken academic discourse (MICASE, Michigan academic corpus of spoken English)
3. Language of a particular genre: university tutorial discussion (a fixed communicative purpose)
4. Language of a particular population (Survey of English Dialects), CHILDES)
5. Translation (parallel corpora, Hansard, Europarl)
6. Grammar of language as a whole, or of a particular language type

Corpus studies: Who benefits

I. For the past 50 years, at least
   a. Applied linguistics: studies of specific text/speech types, pedagogically oriented studies
   b. Lexicography (at least since Johnson)
   c. Dialectology

II. Recent decades
   a. Descriptive linguistics
   b. Theoretical linguistics
   c. Language technology
   d. Social network studies [Enron email corpus]

Example corpus studies (general corpus)

a. Words that collocate with *girl* and *lady* (Sigley and Holmes 2002)

b. Compare the use of **hedges** (*kind of*, *sort of*) in English in general with their use in academic texts (Poos and Simpson 2002)

c. Building a grammar of English. Survey of English Usage (Quirk 1974). Penn Treebank (Marcus et al. 1993)

Two kinds of linguist

Caricatured

Fillmore (1992)

"... the armchair linguist ... sits in a deep soft comfortable armchair, with his eyes closed and his hands clasped behind his head. Once in a while, he opens his eyes, sits up abruptly shouting, 'Wow, what a neat fact!', grabs his pencil, and writes something down."

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"... the corpus linguist ... has all of the primary facts he needs, in the form of a corpus of one zillion running words, and he sees his job as that of deriving secondary facts from these primary facts. At the moment he is busy determining the frequencies of eleven parts of speech as the first word word of a sentence versus as the second word..."

Four sources of data

Placing what Labov calls “wooly-minded” introspection in context (Fillmore 1992)

Type	Method	Primary data
Armchair	“wooly-minded” introspection	native speaker intuitions
Corpus	text/speech collection	text tokens
Experimental	experiment	experiment measurements
Simulation	computer simulation	experiment measurements computational performance

Object of study

Collected

Type	Object of study	Idealization
Armchair	Native speaker knowledge	competence
Corpus	Language in context	Various
Created		
Experimental	Language and brain	computational models
Simulation	Language and brain	computational models
	Sociohistorical language patterns	speakers are “agents”

Other legitimate objects of study I

1. Linguistic properties of particular registers

Example

Halliday and Matthiessen (1999)	*Recipes and weather reports*
Dale (1990)	*Computer recipe generator*
Teng et al. (2012)	*Building ingredient networks from recipe*

2. Endangered languages or dead languages or older forms of living languages

Other legitimate objects of study II

3. Underlying human computational system (intuitions unavailable).

Example

Speech errors: key evidence for computational system

Other legitimate objects of study III

4. Discourse function/syntax interface: Much less accessible to native speaker intuition

Example

Prince (1978)	*Corpus-based study of* It- *and Wh-clefts*
Prince (1992)	*Study of subject & definiteness based on a single letter*
Bresnan et al. (2007)	*Corpus-based study of dative alternation*

Other legitimate objects of study IV

5. Soft constraints/variation: Significant reproducible results for statistically dominant patterns

Example

Labov (1972)	*Variation with social class*
Bresnan et al. (2001)	*Voice and person in English and Lummi*
Jelinek and Demers (1983)	

Other legitimate objects of study V

6. Detailed analysis of lexical patterns (e.g., lexicography)

Example

Johnson (1825)	*Samuel Johnson's dictionary plan*
James A. H. Murray	*Oxford English Dictionary 1928 (4 million cita*
George & Charles Merriam	*Webster's New International (1934, 2nd Ed.)*
Sinclair (1987)	*Collins COBILD English Language dictionary*

Experimental digression

Kaiser and Trueswell (2004)

1. Various online studies of flexible word order languages: Hyönä and Hujanen (1997) showing noncanonical word orders are harder to process
2. Kaiser and Trueswell (2004) did an experiment which controlled for discourse context which showed that much of the difficulty in prcocessing noncanonical word orders goes away *in the appropriate discourse contexts*.
3. Experimental method can play a role in many of the kinds of inquiry discussed above.

The role of experimentation

1. Can experiments play a role in historical linguistics?

2. Can experiments play a role in studying native speaker intuitions?

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    1. de Boer (2000) presents a computational simulation using agents of the evolution of vowel systems

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The role of experimentation

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   1. de Boer (2000) presents a computational simulation using agents of the evolution of vowel systems
   2. Briscoe (2000) presents a computational model of acquisition for **populations** of agents from which some selectional pressures on language evolution emerge.
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The role of experimentation

1. Can experiments play a role in historical linguistics?
    1. de Boer (2000) presents a computational simulation using agents of the evolution of vowel systems
    2. Briscoe (2000) presents a computational model of acquisition for **populations** of agents from which some selectional pressures on language evolution emerge.
2. Can experiments play a role in studying native speaker intuitions? Magnitude estimation is a technique originally used in psychophysics (for assigning measures to things like perceived loudness or perceived brightness). In the linguistic variant, subjects are asked to assign numbers reflecting their estimate of the degree of acceptability of various sentences (Bard et al. 1996).

Problems afflicting the study of competence

1. We focus on the problem of characterizing **lexical competence**, in particular, on characterizing what we know when we know the meaning of a word, and what we know when we know how to use a word correctly.
2. Two problems arise: **Completeness** and **Correctness**.
3. We start with completeness, using the example of a complete account of the meaning of the word *risk*.
4. We illustrate correctness with the problem of knowing the syntax of the verb *give*.

Frame semantics

Word Meaning and event types

The meanings of most words can best be understood on the basis of a **semantic frame**: a description of a type of event, relation, or entity and the participants in it. For example, the concept of cooking typically involves the following:

cook	*person doing the cooking*
food	*the food that is to be cooked*
heating_instrument	*source of heat*
container	*what holds the food during cooking*

Words that evoke this frame:

fry, bake, boil, poach, *and* broil.

Completeness

Fillmore's 1992 *risk* examples, illustrating elements of the **risk frame**.

Risk frame

You would risk death doing what she did

He decided to risk the venture

Now he was prepared to risk his good name

Completeness

Fillmore's 1992 *risk* examples, illustrating elements of the **risk frame**.

Risk frame

You would risk death doing what she did

Harm

He decided to risk the venture

Now he was prepared to risk his good name

Completeness

Fillmore’s 1992 *risk* examples, illustrating elements of the **risk frame**.

Risk frame

You would risk death doing what she did

Harm

He decided to risk the venture

Deed

Now he was prepared to risk his good name

Completeness

Fillmore's 1992 *risk* examples, illustrating elements of the **risk frame**.

Risk frame

You would risk death doing what she did	Harm
He decided to risk the venture	Deed
Now he was prepared to risk his good name	Valued Possession

Completeness

Fillmore's 1992 *risk* examples, illustrating elements of the **risk frame**.

Risk frame

You would risk death doing what she did	Harm
He decided to risk the venture	Deed
Now he was prepared to risk his good name	Valued Possession

Roosevelt risked fifty thousand dollars *in* Dakota ranch lands.	invest
You risked a month's earnings *on* that stupid horse!	gamble
The captain risked his ship *to* torpedo attack.	expose

Correctness

To characterize the syntax of the word *give*, many linguists have assumed TWO meanings. Bresnan et al. (2007)

Meaning to Structure Hypothesis

causing a change of state (possession) ⇒ V NP NP

Susan [$_{\text{V}}$gave] [$_{\text{NP}}$the children] [$_{\text{NP}}$toys].

causing a change of place (movement to goal) ⇒ V NP [to NP]

Susan [$_{\text{V}}$gave] [$_{\text{NP}}$toys] [$_{\text{PP}}$to the children].

Evidence

Examples 1

i. That movie gave me the creeps.

ii. * That movie gave the creeps to me.

iii. The lighting here gives me a headache.

iv. * The lighting here gives a headache to me.

Evidence

Examples 1

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ii. * That movie gave the creeps to me.

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iv. * The lighting here gives a headache to me.

Examples 2

v. I carried/pulled/pushed the box to John.

vi. * I carried/pulled/pushed John the box.

Counterexample 1

Corpus: The web (Bresnan et al. 2007)

i. . . .Orson Welles, who as the radio character, The Shadow, used to give the creeps to countless child listeners. . .

ii. This story is designed to give the creeps to people who hate spiders, but is not true.

iii. She found it hard to look at the Sages form for long. The spells that protected her identity also gave a headache to anyone trying to determine even her size...

iv. Design? Well, unless you take pride in giving a headache to your visitors with a flashing background? no.

Counterexample 2

a. Karen spoke with Gretchen about the procedure for registering a complaint, and hand-carried her a form, but Gretchen never completed it.

b. As player A pushed him the chips, all hell broke loose at the table.

c. Nothing like heart burn food. I have the tums. Nick joked. He pulled himself a steaming piece of the pie. Thanks for being here.

d. “Well. . . it started like this. . . “. Shinbo explained while Sumomo dragged him a can of beer and opened it for him, “We were having dinner together and. . . “

What is going on?

a. * That movie gave the creeps to me.
b. Stories like these must give the creeps to people whose idea of heaven is a world without religion.
c. ?? Stories like these must give people whose idea of heaven is a world without religion the creeps.
d. That movie gave me the creeps.

“the longer phrase is placed at the end by the principle of end weight (Wasow 2002)” *give X the creeps* has a strong bias toward V NP NP, but

the principle of end weight can override that bias.

Multidimensionality/Context-dependence

The valid forms of a language are the results of compromises between *many* weighted constraints evaluated *in context*.

Summary thus far

- There are legitimate objects of study outside the scope of armchair linguistics (the object of study isn't linguistic competence)
- *Even if* the object of study is linguistic knowledge (competence), different kinds of linguistic knowledge vary considerably in their accessibility to introspection: register, socially sensitive variables, discourse constraints on syntactic constructions
- Completeness: Generalizations we would never have found by consulting our intuitions
- Correctness: False generalizations we make because of our inability to manipulate all the many variables of linguistic acceptability in our heads.
- So even if you want to study competence, limiting yourself to armchair linguistics is a mistake.

Discussion

False dichotomy

Some subjects require a combination of corpus and armchair linguistics: Consider Bresnan et al. (2001) & Jelinek and Demers (1983).

Corpus resources: Getting started

a. Amercian Association for Corpus Linguistics Conference 2013

b. Compling Lab

c. Comp Ling Lab corpora

d. Online Corpora

BNC I

British National Corpus

The British National Corpus (BNC) is a 100 million word collection of samples of written and spoken language from a wide range of sources, designed to represent a wide cross-section of current British English, both spoken and written.

1. Tokenized, lemmatized

The dogs barked.

⇒

The/the dogs/dog barked/bark ./.

BNC II

2. Part of speech tagged, supporting queries that use parts of speech.

   The dogs barked.
   ⇒
   The_DT/the dogs_NN2/dog barked_VBD/bark ._./.

3. Sample texts, paragraphs, sentences, separated by XML boundaries
4. Text headers for extraction of subcorpora conforming to certain text types

XML: Typical document header

```
<bncDoc xml:id="A00">
<teiHeader>
<fileDesc>
 <titleStmt>
   <title> [ACET factsheets &amp; newsletters].
          Sample containing about 6688 words of miscellanea
          (domain: social science)
   </title>
   <respStmt>
     <resp> Data capture and transcription </resp>
     <name> Oxford University Press </name>
   </respStmt>
 </titleStmt>
<editionStmt>
  <edition>
    NC XML Edition,
    December 2006
   </edition>
</editionStmt>
<extent>
 6688 tokens; 6708 w-units; 423 s-units
</extent>
```

XML: Typical sentence

```
<s n="52">
  <w c5="PNP" hw="you" pos="PRON">You </w>
  <w c5="VVB" hw="need" pos="VERB">need </w>
  <w c5="TO0" hw="to" pos="PREP">to </w>
  <w c5="VVI" hw="involve" pos="VERB">involve </w>
  <w c5="DPS" hw="you" pos="PRON">your </w>
  <w c5="NN2" hw="friend" pos="SUBST">friends </w>
  <w c5="VVG" hw="collect" pos="VERB">collecting </w>
  <w c5="NN1" hw="jumble" pos="SUBST">jumble</w>
  <c c5="PUN">.</c>
</s>
```

More BNC info

David Lee's genre classification scheme
BNC home page

BNCweb

BNCweb is a pretty intuitive web-based interface to BNC you can use with your web browser.

BNCweb in CompLing Lab

`http://bulba.sdsu.edu/bncweb`

Requirements

Password and account name

Simple queries

Queries

introvertedness [no matches]

introverted

Results

```
Your query "introverted" returned 84 hits in 69 different texts.

1  A06 1335  But besides this more obvious point, there are subtler connections between
                        voice and body: Cicely Berry observes that an  introverted and thoughtful
                        person often finds more difficulty in speaking and does not carry the
                        thought through into the physical process of making speech.
2  A18 429  Razumikhin himself may or may not have come from the country, but he is
                        certainly a member of the floating, unbelonging population of students
                        and ex-students, and he records in simple puzzlement that Raskolnikov
                        has been growing increasingly moody and suspicious and  introverted;
                        he has no time for anything, people are always in his way, and yet he
                        lies about and does nothing  a confirming echo of Raskolnikov on his
                        bed telling Nastasya the maid that he is working, by which he means thinking.
```

Lemmas, intervening stuff I

Lemmas

{kick/V} curly braces signal lemma, {kick/N} and {kick/V} are different lemmas

{kick} All instances of all lemmas with the form *kick*

Intervening stuff

day ⟩⟩ 2 ⟩⟩ night *day* followed by *night* within a 2 word window (excludes *by day and by night*)

night ⟨⟨ 2 ⟨⟨ day *day* followed by *night* within a 2 word window, but *night* will be the highlighted word

day ⟨⟨ 2 ⟩⟩ night *day* and *night* within 2 words in either order

Lemmas, intervening stuff II

Plus and Star

this (_{A})* {day}	*this* followed by any form of *day* with any number of adjectives intervening
this (_{A})+ {day}	*this* followed by any form of *day* with at least one adjective intervening
this + day	*this* followed by any form of *day* with exactly one word intervening
this ++ day	*this* followed by any form of *day* with exactly two words intervening

Lemma/partof speech/sentences boundary

Query

```
kick/V <<s>> bucket_NN1
```

“All tokens of the LEMMA *kick* and the singular noun *bucket* occurring within a single sentence (in either order)”

Results

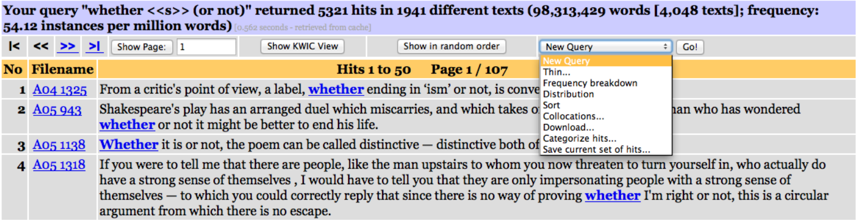
```
Your query "{kick/V} <<s>> bucket_NN1" returned 24 hits in 17 different texts

No   Filename
1    A6W1120    At any speed, in any gear on the mile straight there is enough power to bury you
                hard into the thin bucket seats; every quick-fire gearchange though the massively
                solid Borg-Warner box  kicks at the back end.
3    AC4 2431  Jinny was so startled that she nearly  kicked the bucket over.
6    ATE 787  ‘‘Did you think I’d  kicked the bucket, Ma?’’
```

More BNCweb info

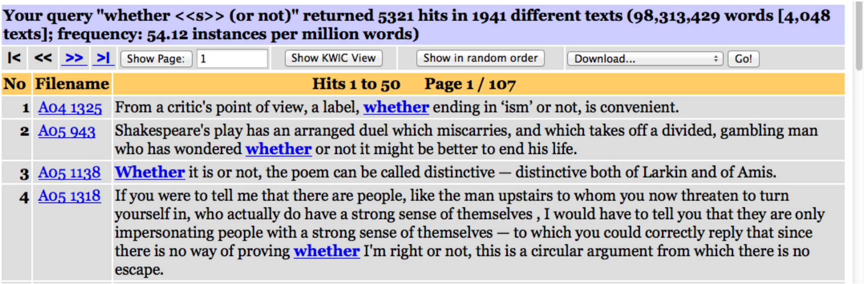
Hoffmann et al. (2008)	Book flyer
Reading	Book extract
Getting started	Quick tutorial
ISBN	978-3-631-56315-1

Downloading results



Your query "whether <<s>> (or not)" returned 5321 hits in 1941 different texts (98,313,429 words [4,048 texts]; frequency: 54.12 instances per million words) [0.562 seconds - retrieved from cache]

No	Filename	Hits 1 to 50 Page 1 / 107
1	A04 1325	From a critic's point of view, a label, **whether** ending in 'ism' or not, is conve
2	A05 943	Shakespeare's play has an arranged duel which miscarries, and which takes o an who has wondered **whether** or not it might be better to end his life.
3	A05 1138	**Whether** it is or not, the poem can be called distinctive — distinctive both of
4	A05 1318	If you were to tell me that there are people, like the man upstairs to whom you now threaten to turn yourself in, who actually do have a strong sense of themselves , I would have to tell you that they are only impersonating people with a strong sense of themselves — to which you could correctly reply that since there is no way of proving **whether** I'm right or not, this is a circular argument from which there is no escape.



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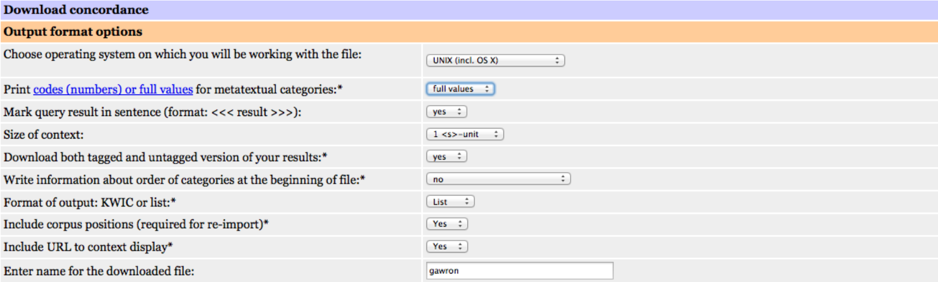
No	Filename	Hits 1 to 50 Page 1 / 107
1	A04 1325	From a critic's point of view, a label, **whether** ending in 'ism' or not, is convenient.
2	A05 943	Shakespeare's play has an arranged duel which miscarries, and which takes off a divided, gambling man who has wondered **whether** or not it might be better to end his life.
3	A05 1138	**Whether** it is or not, the poem can be called distinctive — distinctive both of Larkin and of Amis.
4	A05 1318	If you were to tell me that there are people, like the man upstairs to whom you now threaten to turn yourself in, who actually do have a strong sense of themselves , I would have to tell you that they are only impersonating people with a strong sense of themselves — to which you could correctly reply that since there is no way of proving **whether** I'm right or not, this is a circular argument from which there is no escape.

Now click go!

Download form



Download concordance

Output format options

Choose operating system on which you will be working with the file:	UNIX (incl. OS X)
Print codes (numbers) or full values for metatextual categories:*	full values
Mark query result in sentence (format: <<< result >>>):	yes
Size of context:	1 <s>-unit
Download both tagged and untagged version of your results:*	yes
Write information about order of categories at the beginning of file:*	no
Format of output: KWIC or list:*	List
Include corpus positions (required for re-import)*	Yes
Include URL to context display*	Yes
Enter name for the downloaded file:	gawron

Default results (1 example)

```
1 A04 1325 From a critic 's point of view , a label , <<< whether >>> ending in
           &lsquo; ism &rsquo; or not , is convenient .

           From_PRP a_AT0 critic_NN1 's_POS point_NN1 of_PRF view_NN1 ,_PUN a_AT0
           label_NN1 ,_PUN <<< whether_CJS >>> ending_VVG in_PRP &lsquo;_PUQ
           ism_UNC &rsquo;_PUQ or_CJC not_XX0 ,_PUN is_VBZ convenient_AJ0 ._PUN

           Written Written books and periodicals  W:ac:humanities_arts

           1985-1993 Academic prose Beginning sample Book
           Informative: Arts
            High unknown UK and Ireland Male Sole
             Adult Mixed Medium n/a n/a n/a n/a n/a n/a
           n/a n/a n/a n/a n/a n/a
             http://bulba.sdsu.edu/bncweb-cgi/context.pl?text=A04&qname=nosol&
                refnum=0&theData=0&len=0&showTheTag=0&color=0&begin=1325&spids=1&
                interval=11&first=yes&urlTest=yes
           77845 77845
```

Abbreviated results

```
1 A04 1325 From a critic ’s point of view , a label , whether ending in &lsquo;
           ism &rsquo; or not , is convenient .
2 A05 943  Shakespeare ’s play has an arranged duel which miscarries , and which
           takes off a divided , gambling man who has wondered whether or not
           it might be better to end his life .
3 A05 1138 Whether it is or not , the poem can be called distinctive &mdash;
           distinctive both of Larkin and of Amis .
4 A05 1318 If you were to tell me that there are people , like the man upstairs
           to whom you now threaten to turn yourself in , who actually do have a
           strong sense of themselves , I would have to tell you that they are
           only impersonating people with a strong sense of themselves &mdash;
           to which you could correctly reply that since there is no way of
           proving whether I ’m right or not , this is a circular argument from
           which there is no escape .
```

FrameNet I

Intro

The FrameNet project is building a lexical database of English that is both human- and machine-readable, based on annotating examples of how words are used in actual texts. From the student's point of view, it is a dictionary of more than 10,000 word senses, most of them with annotated examples that show the meaning and usage. For the researcher in Natural Language Processing, the more than 170,000 manually annotated sentences provide a unique training dataset for semantic role labeling, used in applications such as information extraction, machine translation, event recognition, and sentiment analysis.

FrameNet link

FrameNet II

Apply_Heat

In the FrameNet project, cooking event types are represented as a frame called **Apply_heat**, and the Cook, Food, Heating_instrument and Container are called **frame elements** (FEs).

cook	*person doing the cooking*
food	*the food that is to be cooked*
heating_instrument	*source of heat*
container	*what holds the food during cooking*

Words that evoke this frame:

fry, bake, boil, poach, *and* broil.

Such words are called **lexical units** (LUs) of the Apply_heat frame.

Revenge frame I

An Avenger performs a Punishment on a Offender as a consequence of an earlier action by the Offender, the Injury. The Avenger inflicting the Punishment need not be the same as the Injured_Party who suffered the Injury. The Injured_Party can be an abstract concept such as honor.

Revenge

Avenger	*person performing the punishment for the Injury*
Offender	*person performing the Injury*
Injury	*the wrong perpetrated by the offender*
Injured_Party	*person or abstract concept injured by the Injury*
Punishment	*action performed by the Avenger*

Revenge frame II

LUs: *avenge.v, avenger.n, get_back_(at).v, get_even.v, payback.n, retaliate.v, retaliation.n, retribution.n, retributive.a, retributory.a, revenge.n, revenge.v, revengeful.a, revenger.n, sanction.n, vengeance.n, vengeful.a, vindictive.a*

i.		They	took revenge	for the deaths of two men.
		Avenger		Injury
ii.		Lachlan	sought to avenge	them.
		Avenger		Injured_Party
iii.	Later	the Romans	took revenge	on their enemies.
		Avenger		Offender

Summary

- Two excellent reasons to use corpora
  1. To do linguistic research that is not competence/grammar oriented
  2. To do competence/grammar-based research in a more complete and correct way.
- FrameNet and BNC (BNCweb) are existing corpus resources that provide tools for a variety of different kinds of corpus studies.
- FrameNet and BNC annotate different and complementary kinds of information.

Conclusion

1. There are variety of reasons to stop being a linguist who does only armchair linguistics.
2. At the same time, linguistics that studies competence (the grammar in people's heads) is alive and well, and corpus-based linguistics and armchair linguistics are not incompatible.
3. Important questions remain as to the content and design of corpora:
    - What kind of annotation should the corpus I use for my research contain?
    - What kind of data should the corpus I use for my research contain?

Course outline

I. Syntax and morphology
   a. Corpus linguistics motivations and methods
   b. Word structure
   c. Constituent structure
   d. Semantic roles and grammatical relations
   e. Lexical entries and well foprmed clauses

II. Phonetics/phonology
   a. Acoustic phonetics
   b. Cross linguistic phonetic variation
   c. Speech perception
   d. Phonological patterns

III. Information structure
   a. Topic/focus
   b. Given/new

Assignment, slide I

the prefix *out-*

Consider the prefix *out-*, which attaches to verbs and produces a verb. Restrict your attention to cases in which the resulting verb is transitive, and in which the meaning of the prefixed verb involves comparing the subject and object on some scale relevant to the verb. Here are some examples:

i. *This bell outweighs that one.*
ii. *The Jets outscored the Patriots.*
iii. *The Texans outlasted Santa Anna.*

We call the prefix morpheme in these examples *comparative out-*.

Find more examples of this morpheme by doing a BNC web search to find all instances of verbs forms beginning with *out-*. Answer the questions on

Assignment, slide II

the following slides. Whenever making a claim about the data, give the entire example and the **Filename** of the example.

1. What was your query?
2. How many examples did your search return?
3. In some of examples returned, the highlighted *out*- word is not in fact a verb. Find one such part of speech error. (Note: There are are errors within the first 500 examples returned).
4. In all the sentences returned, was *out*- a morpheme? If not give examples.
5. In the cases in which *out*- is a morpheme, is it always comparative *out*-? That is, is it the same morpheme as in examples (i)-(iii) above? If not, give examples. If multiple examples exist, give at least three.

Assignment, slide III

6. Evaluate the following claim: Comparative *out-* attaches to verbs which inherently involve something being measured and its measurement on some scale. We'll call the thing being measured the OBJECT and we'll call the result of the measurement the MEASUREMENT. [inspired by some Framenet examples]. Here are some examples of inherent measurement verbs:

Some bells	*weigh*	*more than a ton*
OBJECT		MEASUREMENT
The Jets	*scored*	*30 points*
OBJECT		MEASUREMENT
The trip	*lasted*	*4 hours*
OBJECT		MEASUREMENT

The comparison described by the prefixed verb is always on this scale

Assignment, slide IV

(*outweigh*, *outscore*, *outlast*). If you think this hypothesis is wrong, give 3 counterexamples from the data.

7. If the previous hypothesis is wrong, try to make some generalizations about where the scale used by *out-* is coming from. Give examples.
8. Evaluate the original hypothesis, Hypothesis A. Is is right? Is it complete and correct? Is it specific?

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