Hebrew Statistical Linguistics using a Morphologically Analyzed Blog Corpus

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Corpus linguistics
A very short introduction

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  1. Getting real examples for qualitative analyses
  2. Quantitative analyses (**"Statistical linguistics"**)

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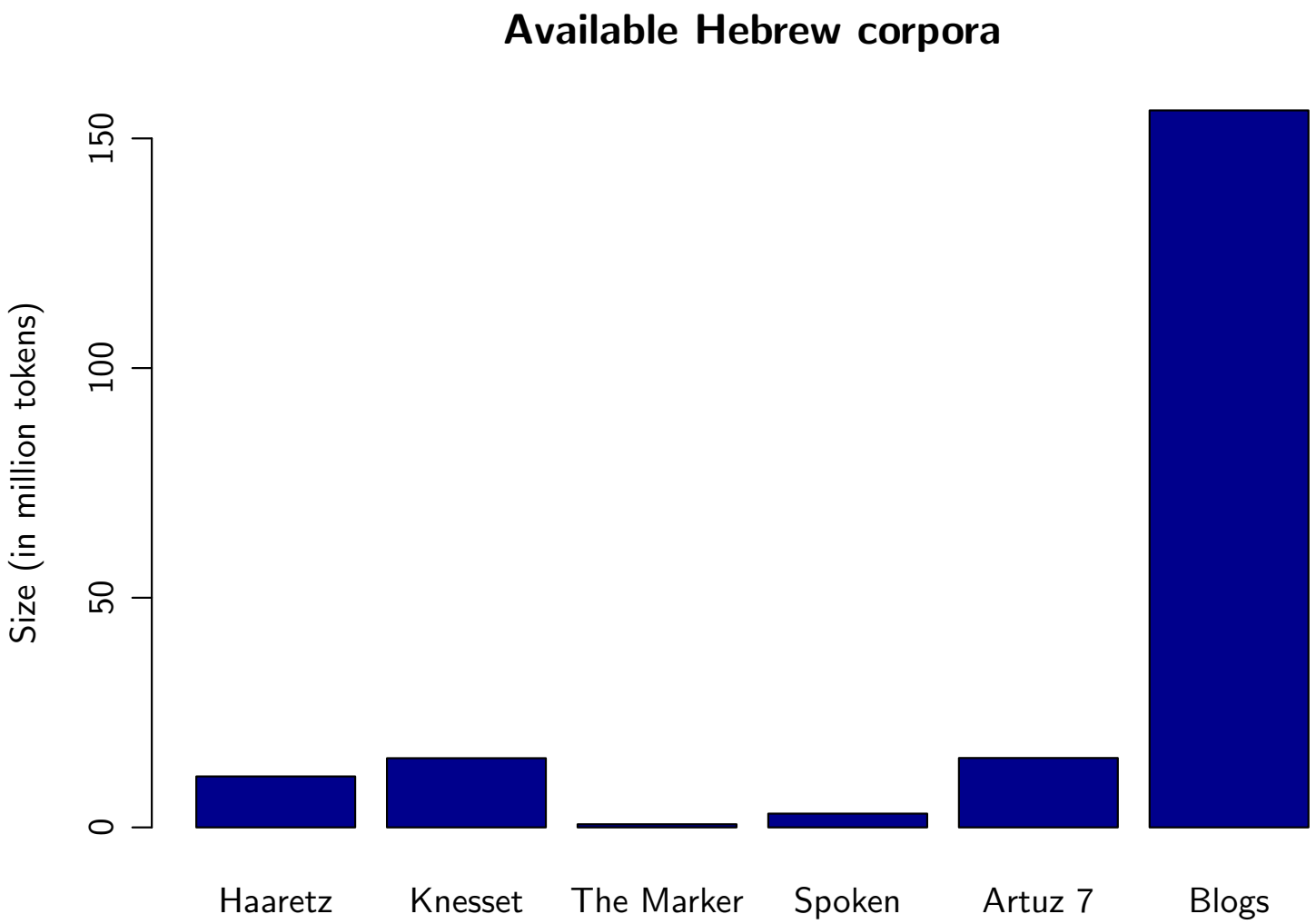
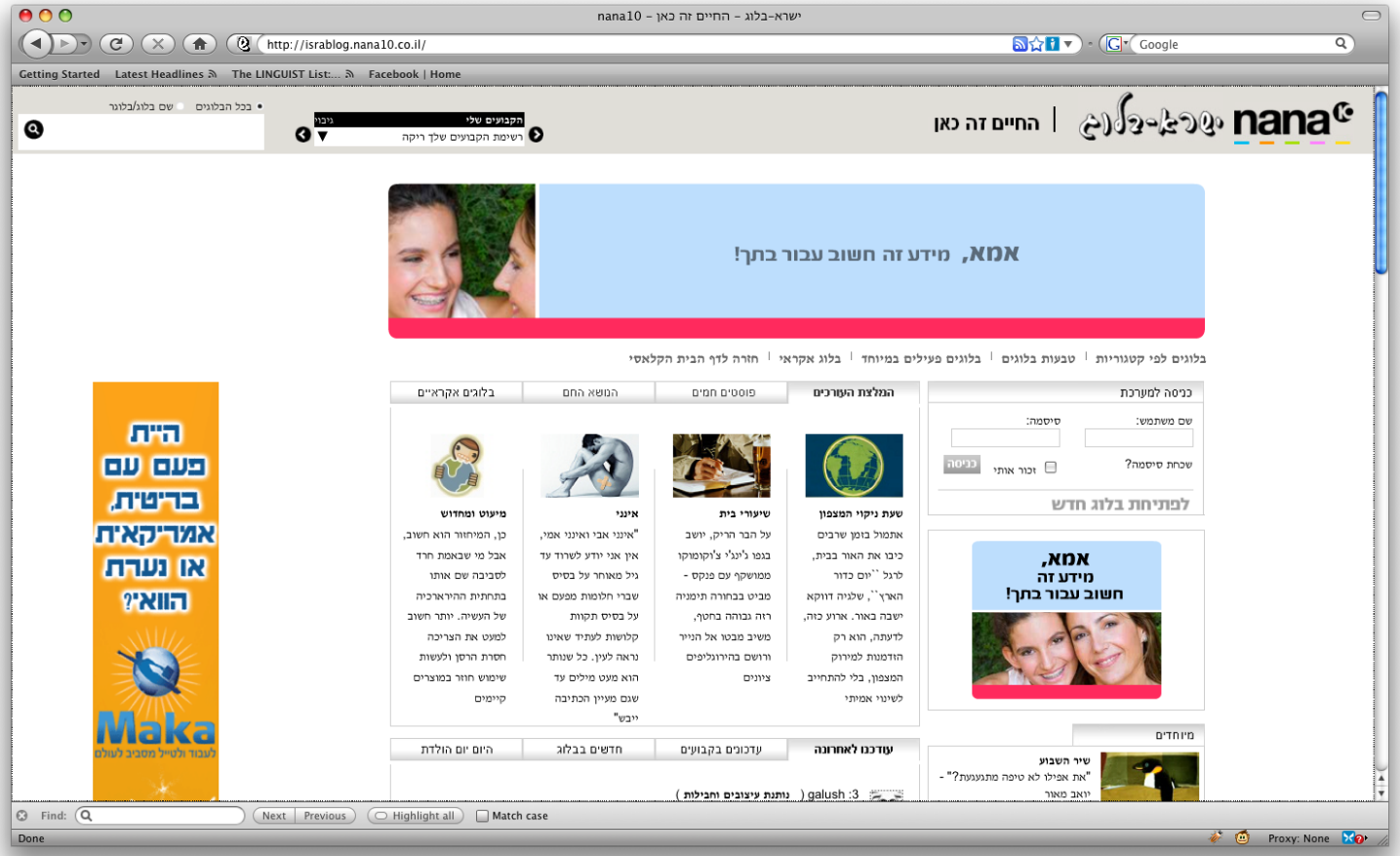
- **Yes**: Google provides very limited search facilities, especially for languages with complex morphology (such as Hebrew)
- Results are not reproducible and counts are unreliable – unsuitable for Type 2 corpus linguistics
- Still, good source of ideas and examples for Type 1 corpus linguistics of (which is always a part of Type 2 work)

Why another corpus?



Israblog


nana10 – החיים זה כאן – ישרא-בלוג
http://israblog.nana10.co.il/
החיים זה כאן
אמא, מידע זה חשוב עבור בתך!
בלוגים לפי קטגוריות
טבעות בלוגים
בלוגים פעילים במיוחד
בלוג אקראי
חזרה לדף הבית הקלאסי
כניסה למערכת
שם משתמש:
סיסמה:
זכור אותי
כניסה
שכחת סיסמה?
לפתיחת בלוג חדש
המלצת העורכים
פוסטים חמים
הנושא החם
בלוגים אקראיים
שעת ניקוי המצפון
שיעורי בית
אינני
מיעוט ומחדוש
עודכנו לאחרונה
עדכונים בקבועים
חדשים בבלוג
היום יום הולדת
מיוחדים
שיר השבוע
היית פעם עם בריטית, אמריקאית או נערת הוואי?
Maka
Find:
Next
Previous
Highlight all
Match case
Done
Proxy: None

Technicalities

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- Morphologically analyzed using Adler and Elhadad's BGUTagger
- No parser, so not parsed (hint!)

Properties of the corpus

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- Variety of ages and styles, not copy-edited
- On the other hand, not balanced

Use case 1: Possessive Datives

- **Possessive Dative:**

(1) šavarti le-šaul et ha-kos.
I.broke to-Shaul ACC the-glass
'I broke Shaul's glass.' *(contested gloss)*

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- **Ordinary possession:**

(2) šavarti et ha-kos šel šaul.
I.broke ACC the-glass of Shaul
'I broke Shaul's glass.'

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  - **Synchronic:** the Possessive Dative should be more popular when the possessed object is a body part
  - **Diachronic:** this preference should diminish with time

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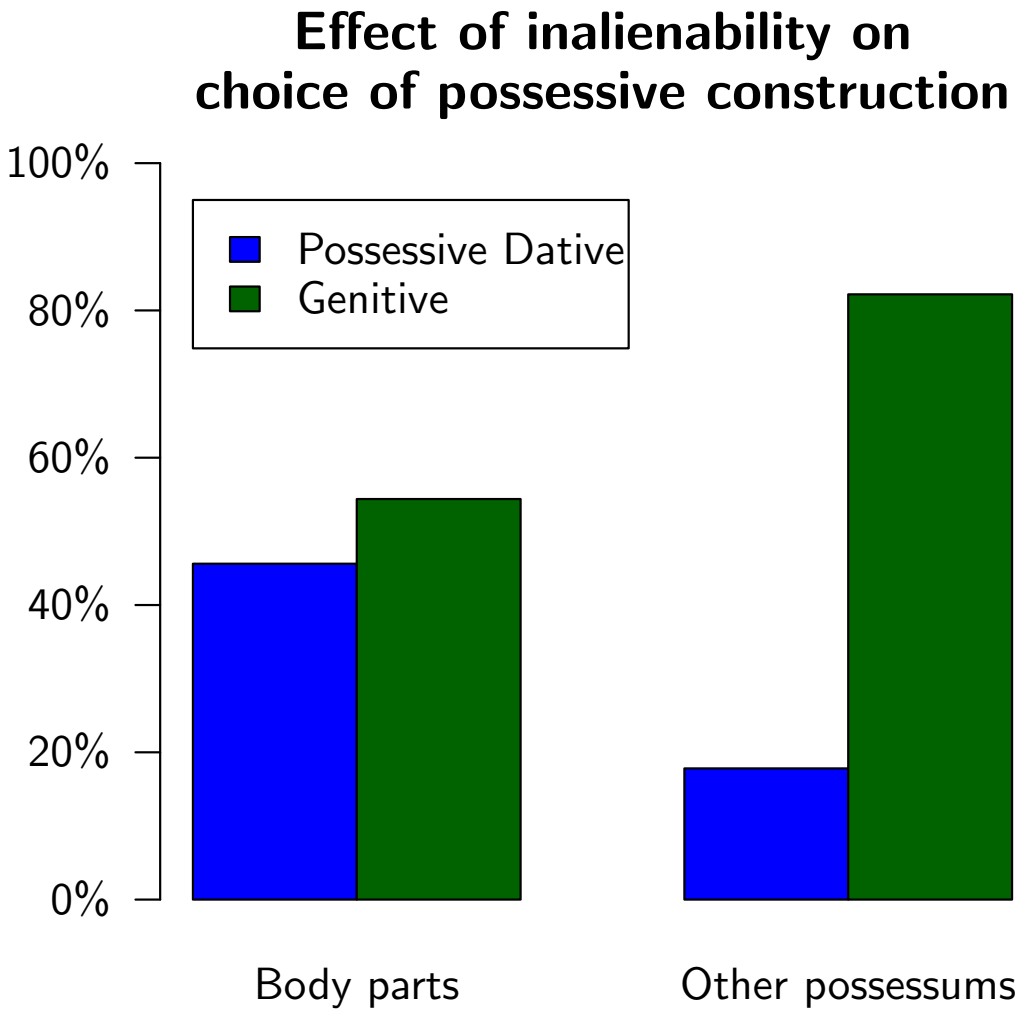
- The dative preposition *le* 'to' is fused with the word in Hebrew orthography, so in general it's hard to search for dative sentences
- Luckily, corpus is morphologically analyzed
- Dative constructions with common transfer verbs (*give* etc.) were automatically removed
- The remaining sentences were filtered manually, to remove irrelevant uses of the preposition *le*

Possessive Datives: The synchronic hypothesis

Linzen (2009)



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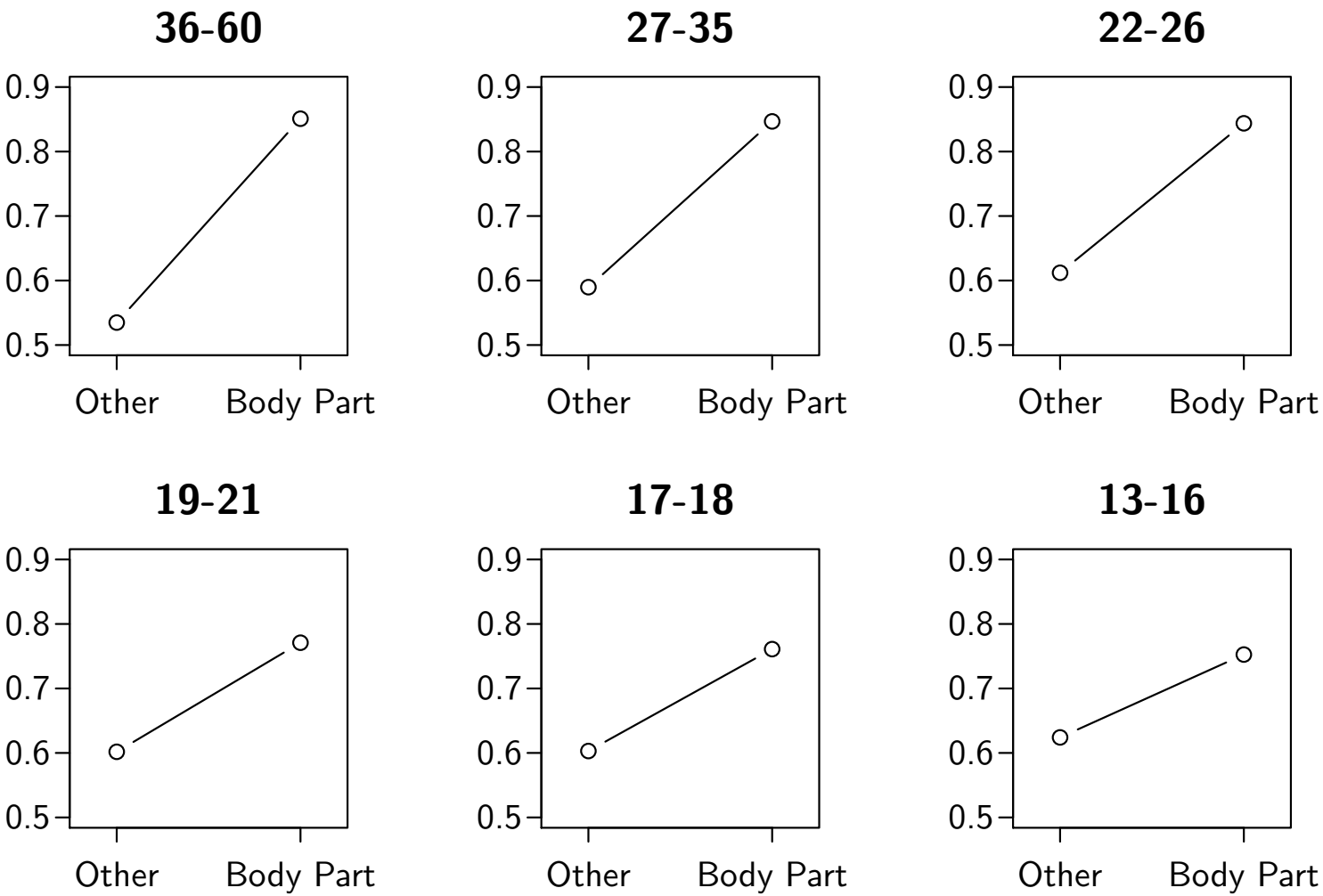
- Solution: use **ages** reported by bloggers
- Analyzed using a mixed-effects logistic regression model

Regression coefficients

Factor	Estimate	Std. Error	z value	Pr	Sig
(Intercept)	0.507	0.101	5.035	0.000	***
17-18	−0.089	0.055	−1.609	0.108	
19-21	−0.094	0.057	−1.661	0.097	.
22-26	−0.051	0.091	−0.560	0.575	
27-35	−0.144	0.104	−1.394	0.163	
36-60	−0.368	0.124	−2.976	0.003	**
bodypart	0.605	0.116	5.204	0.000	***
male	−0.294	0.152	−1.928	0.054	.
17-18:bodypart	0.135	0.098	1.375	0.169	
19-21:bodypart	0.195	0.100	1.953	0.051	.
22-26:bodypart	0.625	0.172	3.642	0.000	***
27-35:bodypart	0.741	0.192	3.856	0.000	***
36-60:bodypart	0.997	0.237	4.205	0.000	***

Age × inalienability interaction

Effect of possessum inalienability on the probability of choosing the Possessive Dative increases with age



Use case 2: Verb frame bias

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(3) I want an icecream.

(4) I want to eat.

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- fMRI experiment on the effect of frequency on language processing in the brain
- Verbs can appear in more than one *frame* (syntactic context):

  (3) I want an icecream.

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- Compare three types of verbs:
  1. Single frame
  2. Multiple frames, frequency bias to one frame
  3. Multiple frames, no one frame takes a large portion of the frequency cake

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- NLP development in Ben Gurion University

Conclusion and sermon

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- Statistical linguistics requires large analyzed corpora
- The state of Hebrew NLP leaves much to be desired: morphological disambigutor can be improved, no parser

Thank you!