Is it the size, or how you use it? Comparing the effects of subject length and predictability on contraction

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Overview

- Multiple factors condition auxiliary contraction (e.g., /ɪz/ ~ /z/), namely:
  - Subject length (size)
  - Predictability of the auxiliary (how you use it)
- What is their relative contribution?
- What causes these effects?

Analyzing auxiliary contraction

Auxiliary contraction

is

Yeah, **Salzburg's** nice. **Austria's** nice. **Europe is** nice! (sw_1151)

has

Oh, I'm sure **it's** been done. I'm sure **it has** been done. (sw_1060)

will

If I walk, **it'll** be ten degrees warmer, but **it will** last twenty minutes. (sw_1146)

The dependent variable

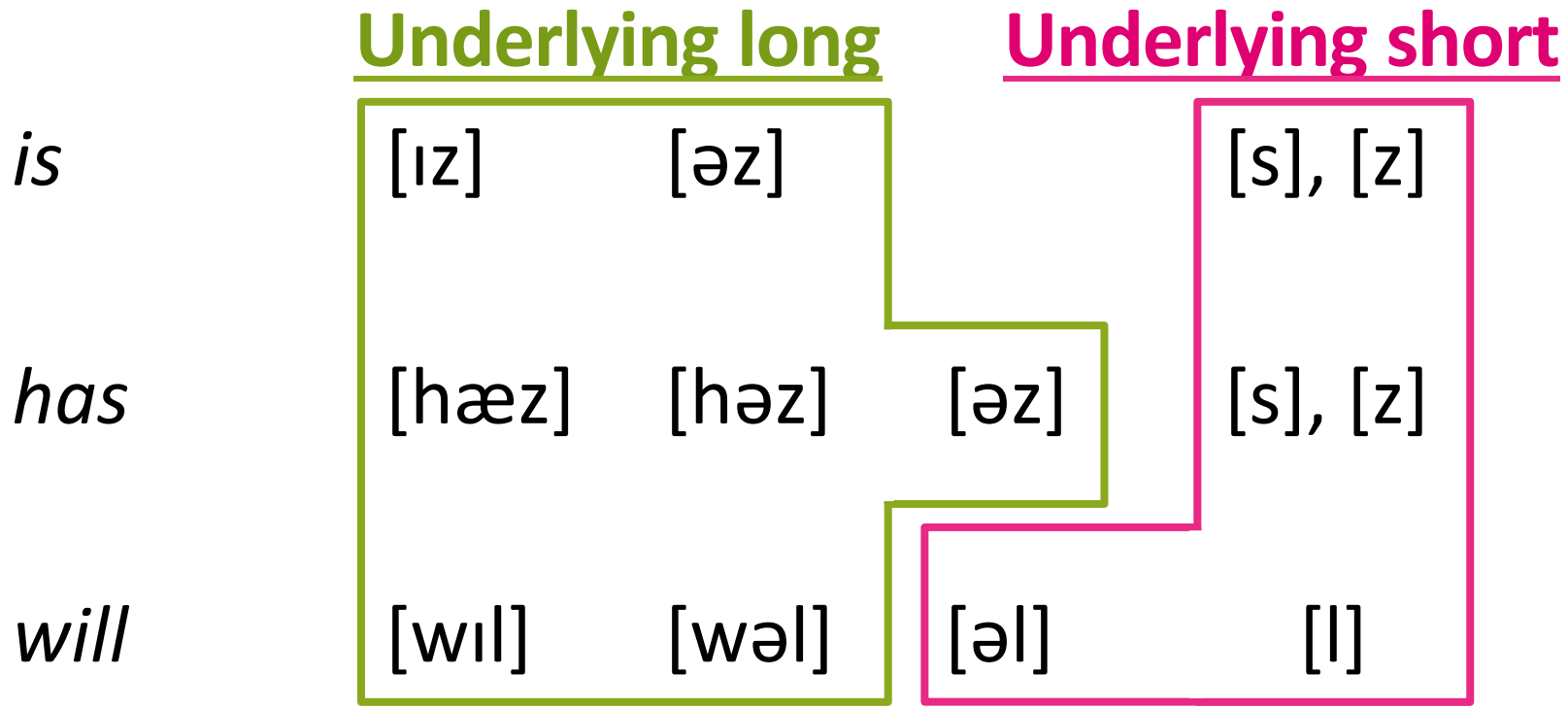
Underlyingly: a bipartite allomorphic alternation

“long”	/ɪz/	~	/z/	“short”
	/hæz/	~	/z/	
	/wɪl/	~	/l/	

(MacKenzie 2013)

The dependent variable

Surface forms can be reclassified:



(MacKenzie 2013)

Conditions on contraction

Subject length

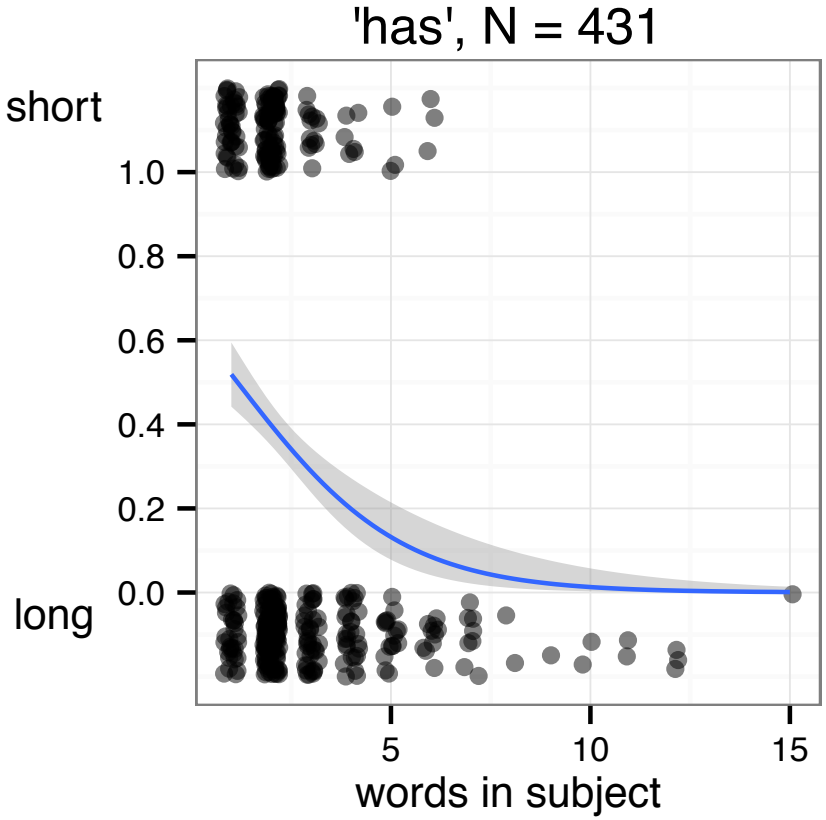
Orthographic word count:

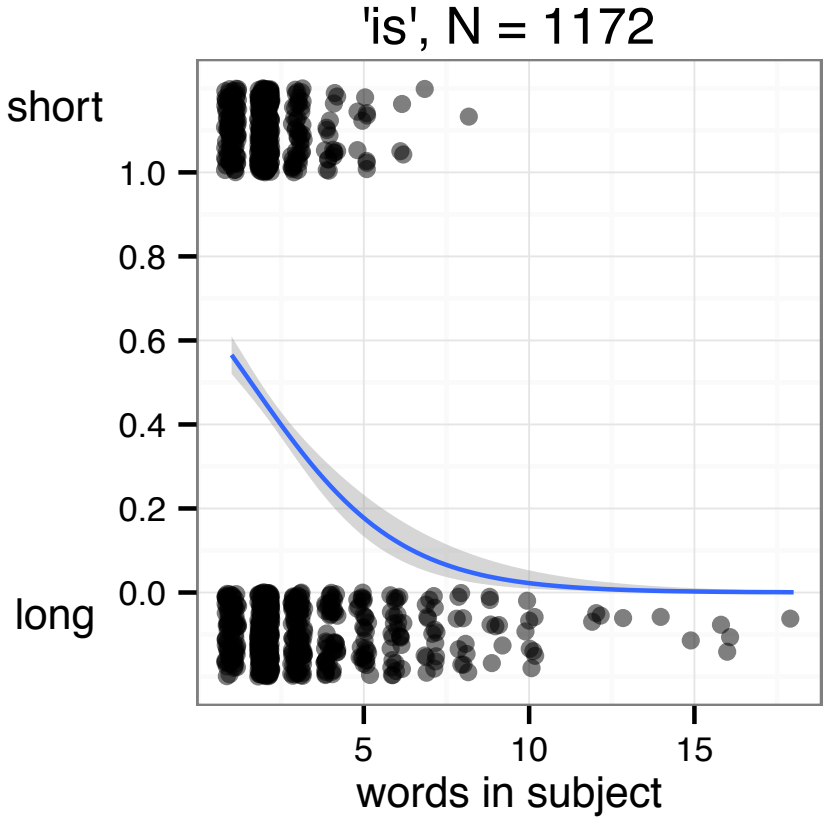
Salzburg's nice 1

The real estate out here's been pretty good 5

About the only thing I can do mechanically with a, a car is put gas in it 12

Subject length effect



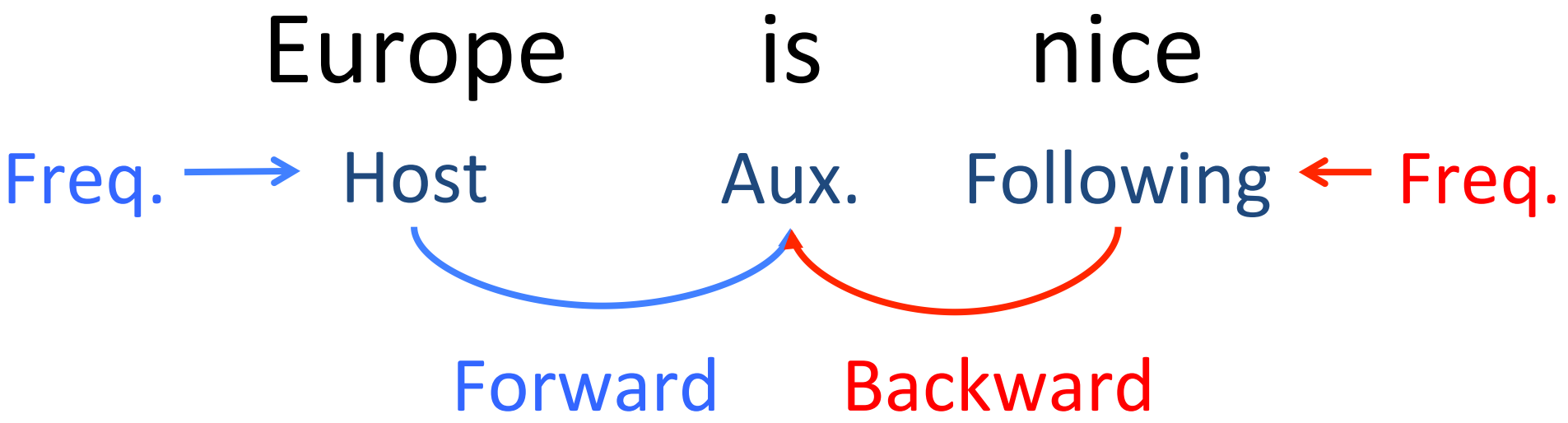


(MacKenzie, 2013)

Predictability

The more “predictable” a context is, the more likely contraction will occur there

(Frank & Jaeger, 2008)



Impact of predictability

"[Under our hypothesis] speakers should prefer a full form whenever the content conveyed by the form is unexpected in its context."

- They find:
  - Lower host freq. → less contraction
  - Lower forward prob. → less contraction

(Frank & Jaeger, 2008)

Why does predictability matter?

We don't know, but maybe:

- We are highly rational in our communications, contracting in more predictable contexts to aid the hearer
- The architecture of our speech planning system is affected by predictability

Methodological challenges

Contractions can't be coded using Switchboard transcripts alone:

> Contractions are allowed, but be conservative. […] It is always permitted to spell out forms in full, even if the pronunciation suggests the contracted form.
>
> (Instruction manual for Switchboard transcribers)

Methodological challenges

- No explicit analysis of contraction, modeled mix of:
  - Phonological variation (/h/-deletion)
  - Morphological variation (short/long allomorphy)

- Poor estimates of predictability
  - Relatively small data set used for estimates

Open questions

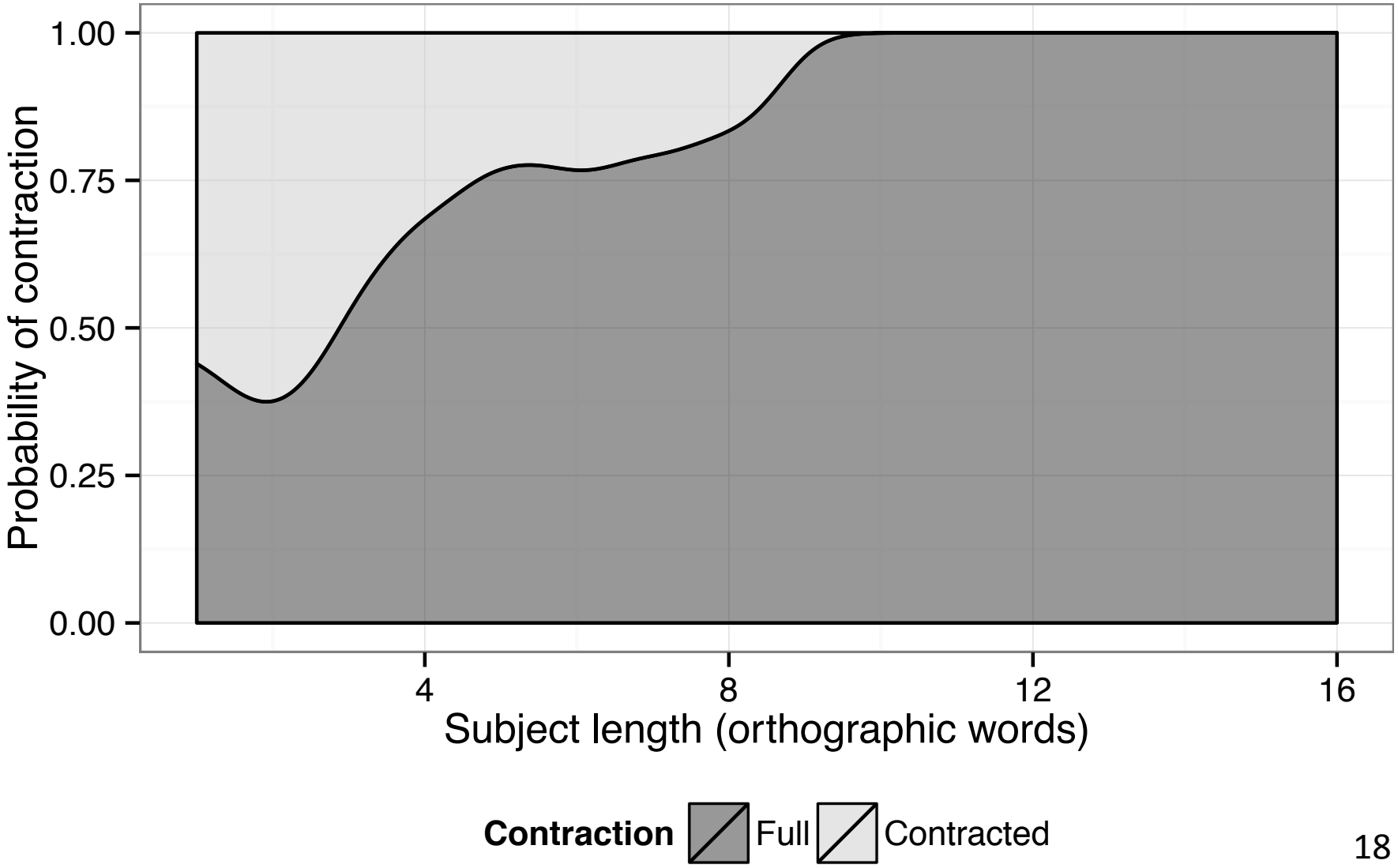
- What is the relationship between subject length and predictability?
  - Are they possibly measures of the same thing?
  - Are they equally important?
- What measure(s) best express subject length?
  - e.g., syllables, ortho. words, phon. words…

Size, or how you use it?

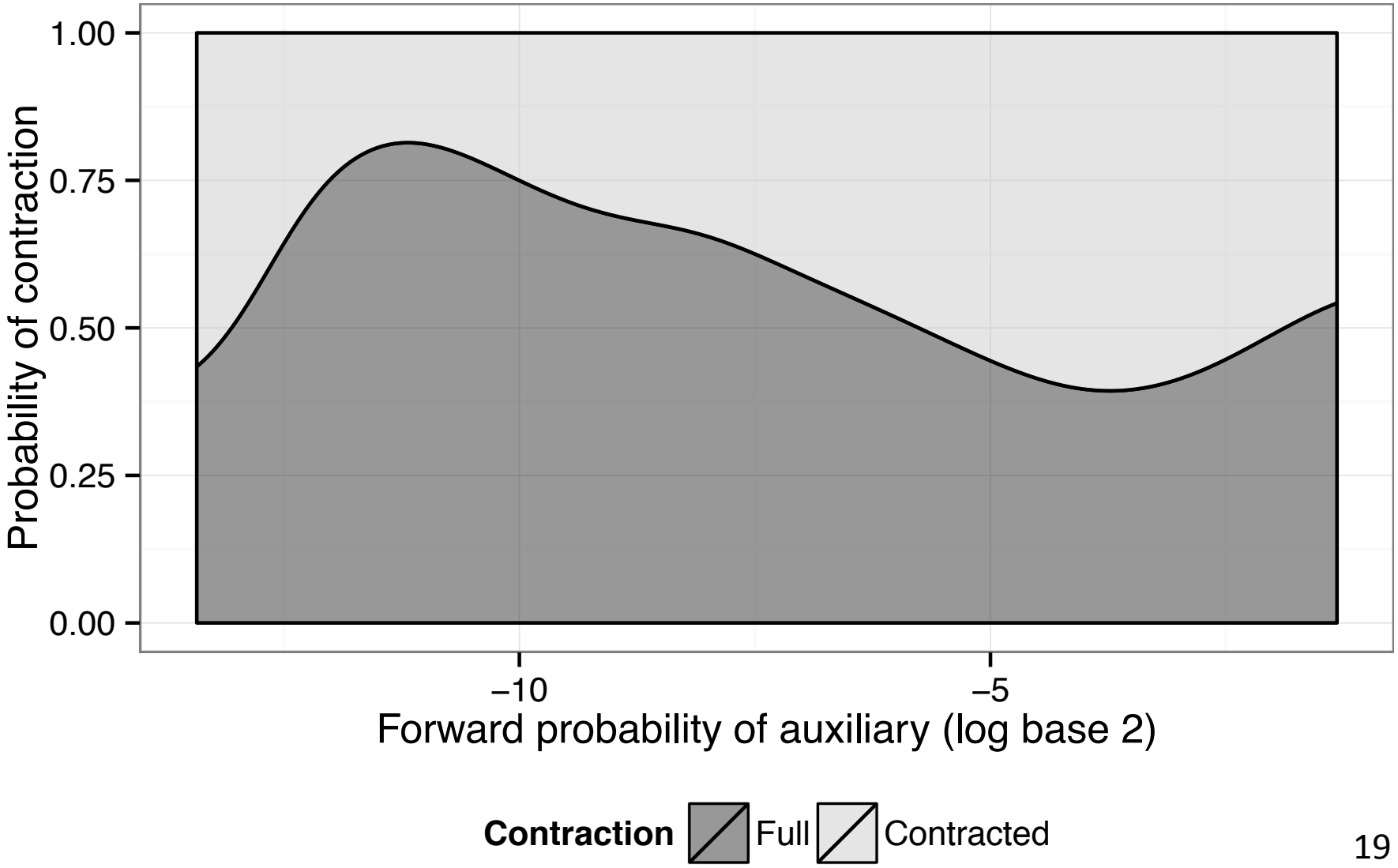
Data sources

- The Switchboard corpus (Godfrey et al., 1992)
- The Fisher corpus (Cieri et al., 2004)
  - 5-minute telephone conversations between strangers on a given topic
- The Philadelphia Neighborhood Corpus (Labov & Rosenfelder, 2011)
  - Sociolinguistic interviews carried out by Penn Linguistics students
- 1,092 tokens in contractible contexts with valid predictability information

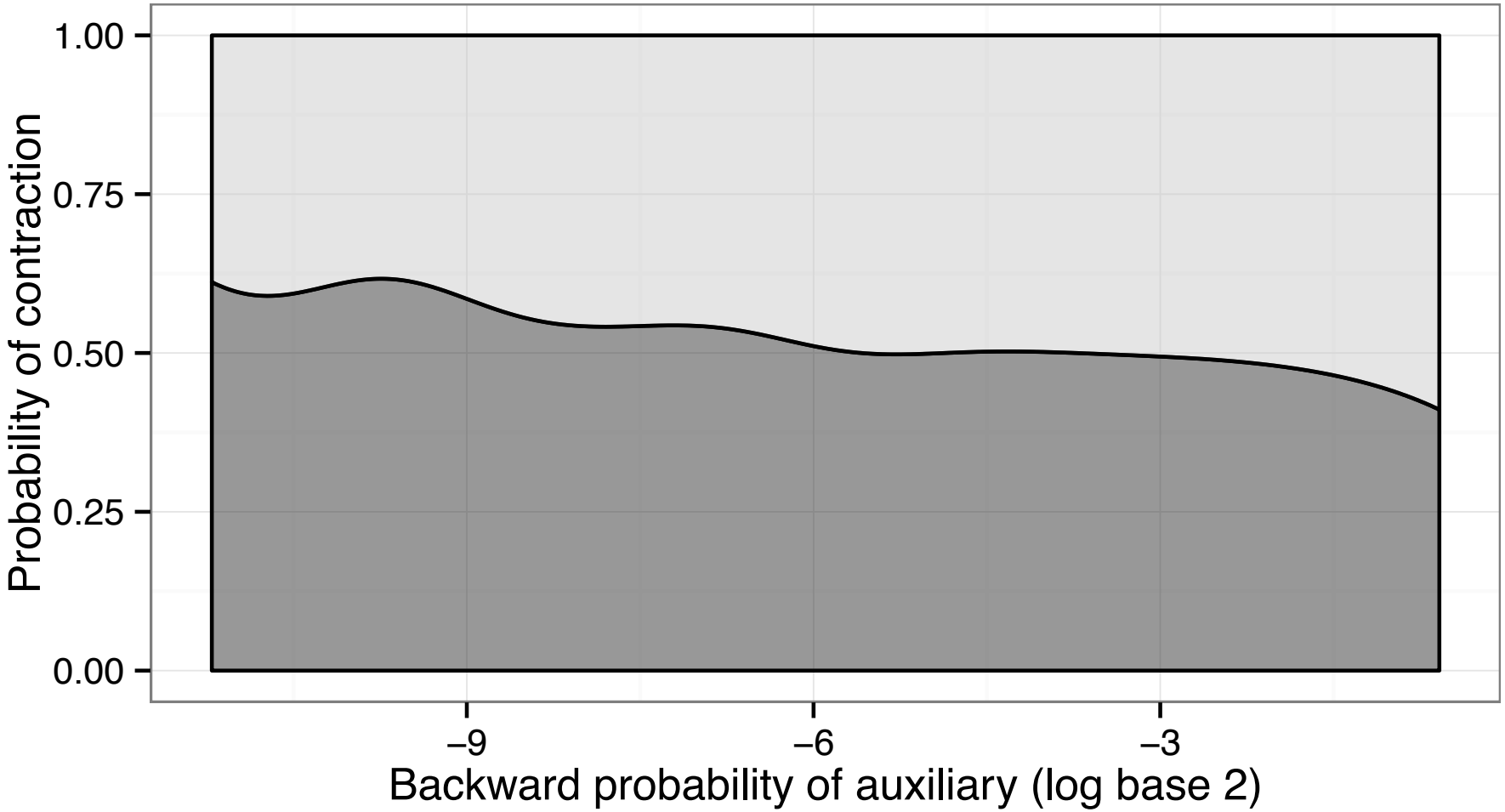
Number of words



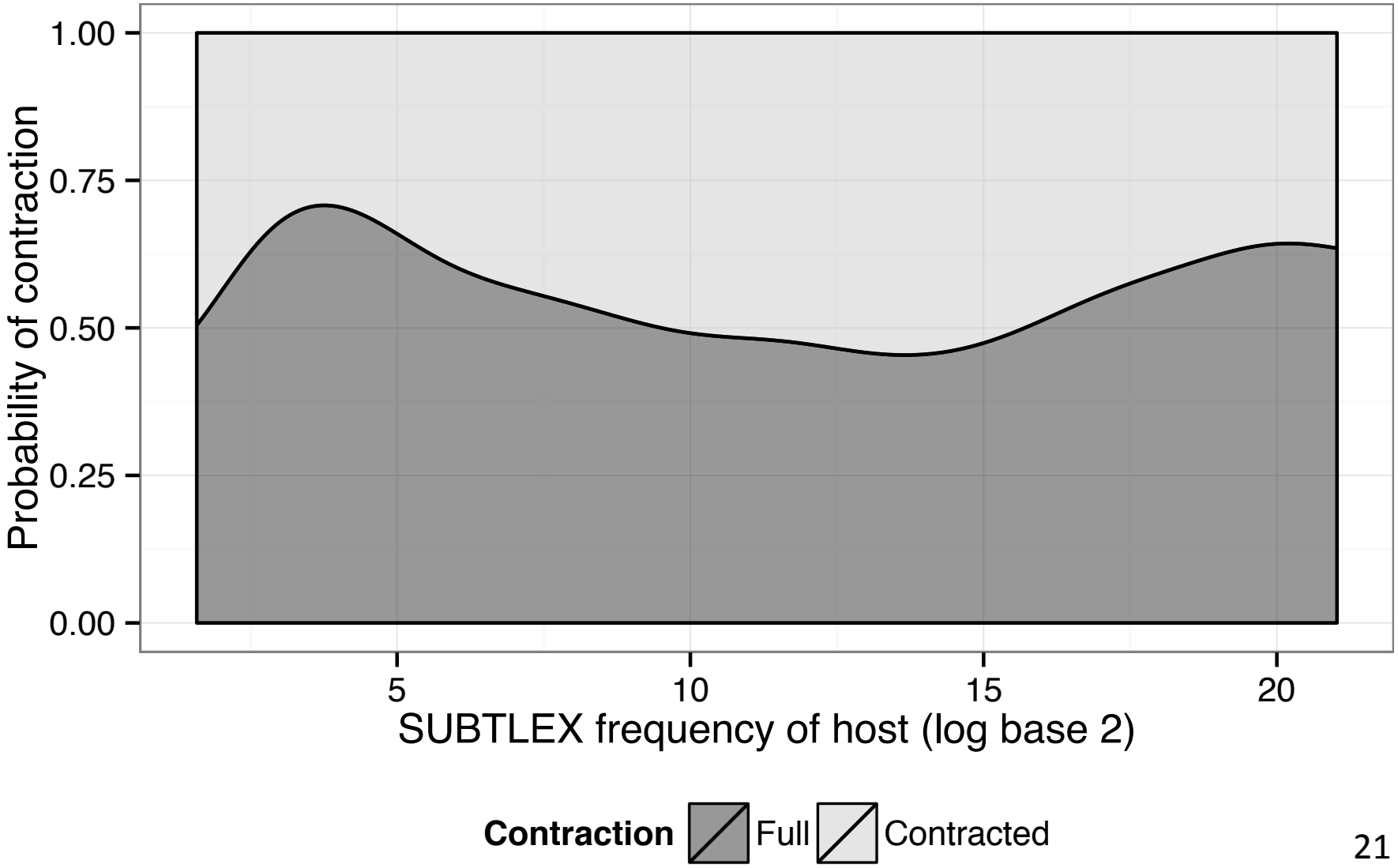
Forward probability



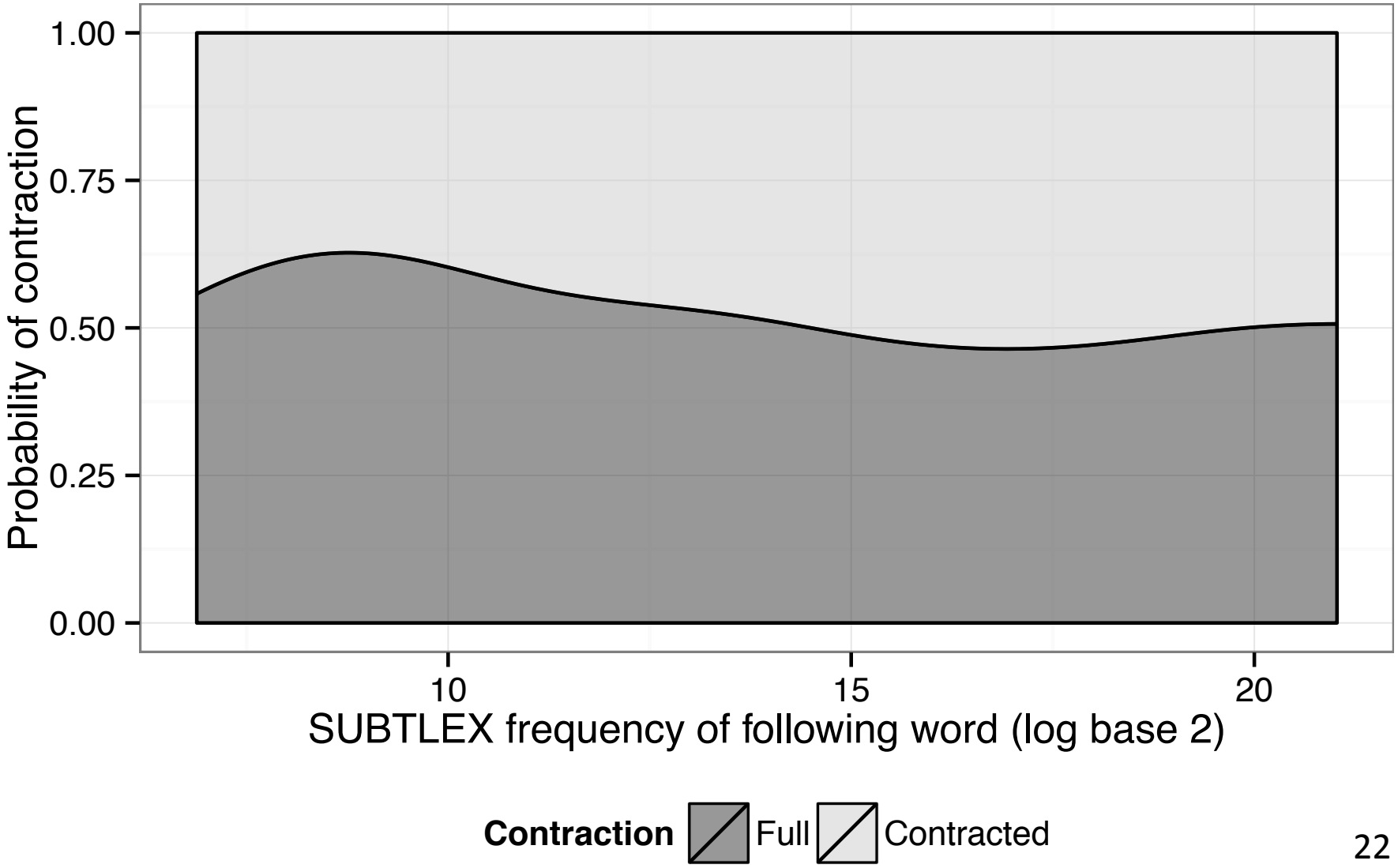
Backward probability



Host frequency



Following word frequency



Modeling methodology

- Mixed effects logistic regression using lme4.0
- Control fixed effects:
  - Subject-based: age***, gender*, education level***
  - Token-based: corpus, speaking rate, aux. identity, preceding segment (C or V) and stress
- Fixed effects of interest:
  - Subject size, frequency of host and following word (log), forward and backward probability of aux. (log)
- Random intercepts: preceding and following word, speaker dialect region, speaker identity

It's the size *and* how you use it…

Predictor	Estimate	Std. Error	P(>|z|)	
Intercept	-0.812	0.766	0.289	
Number of words	-0.440	0.074	3.34E-09	***
Host freq.	0.063	0.036	0.078	.
Following word freq.	0.070	0.033	0.036	*
Forward prob.	0.242	0.060	5.71E-05	***
Backward prob.	0.098	0.059	0.095	.

(Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1)

…but size matters much more.

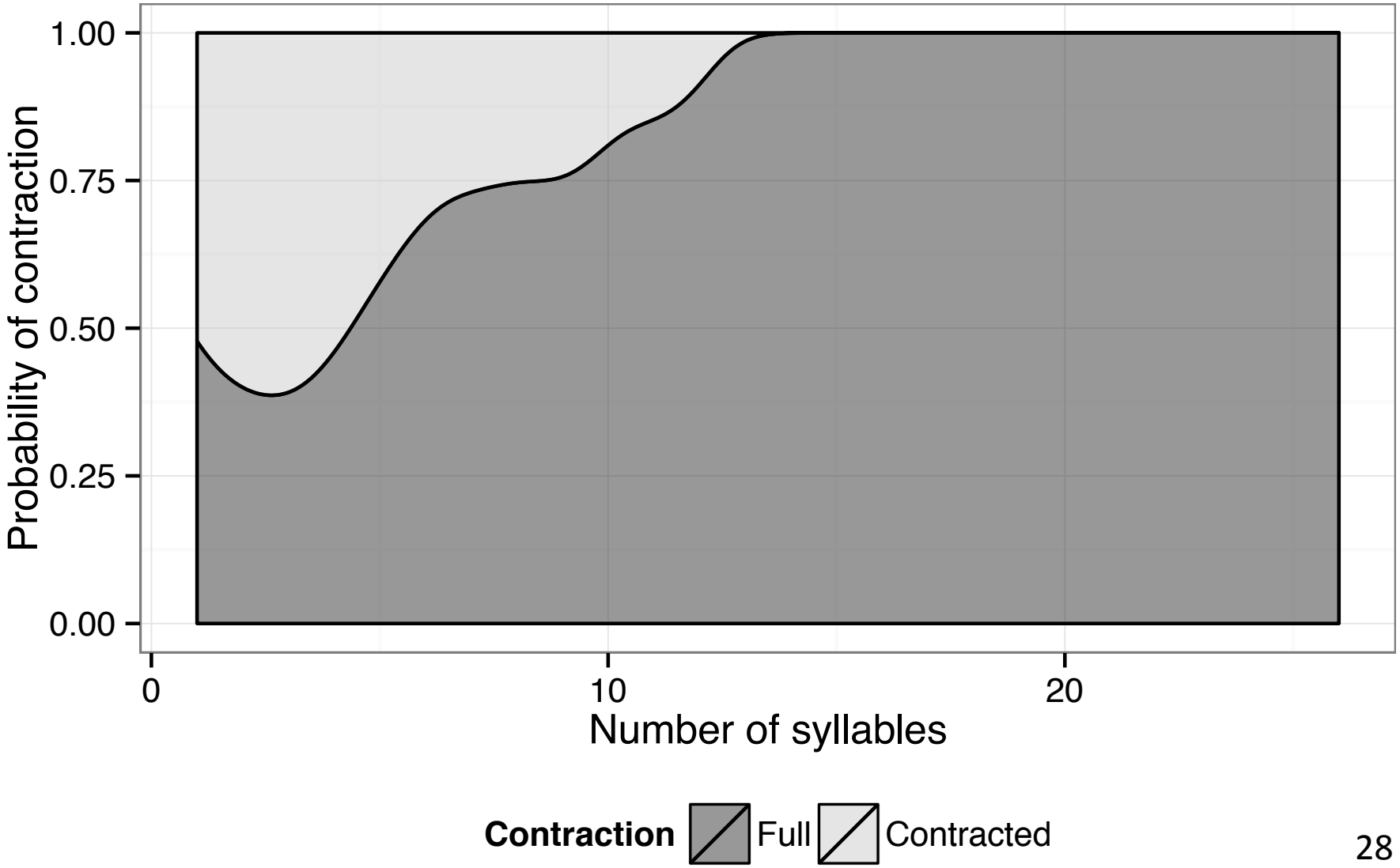
- *Impact*: effect of predictor across meaningful range
- Number of words
  - *Mary* (1) vs. *the county that I live in now* (7)
  - Increase of 6 words → **14.1x** less likely to contract
- Forward probability
  - *Communism is* (.364) vs. *work is* (.00787)
  - 46x (2^5.5) decrease → **3.8x** less likely to contract

What is size, really?

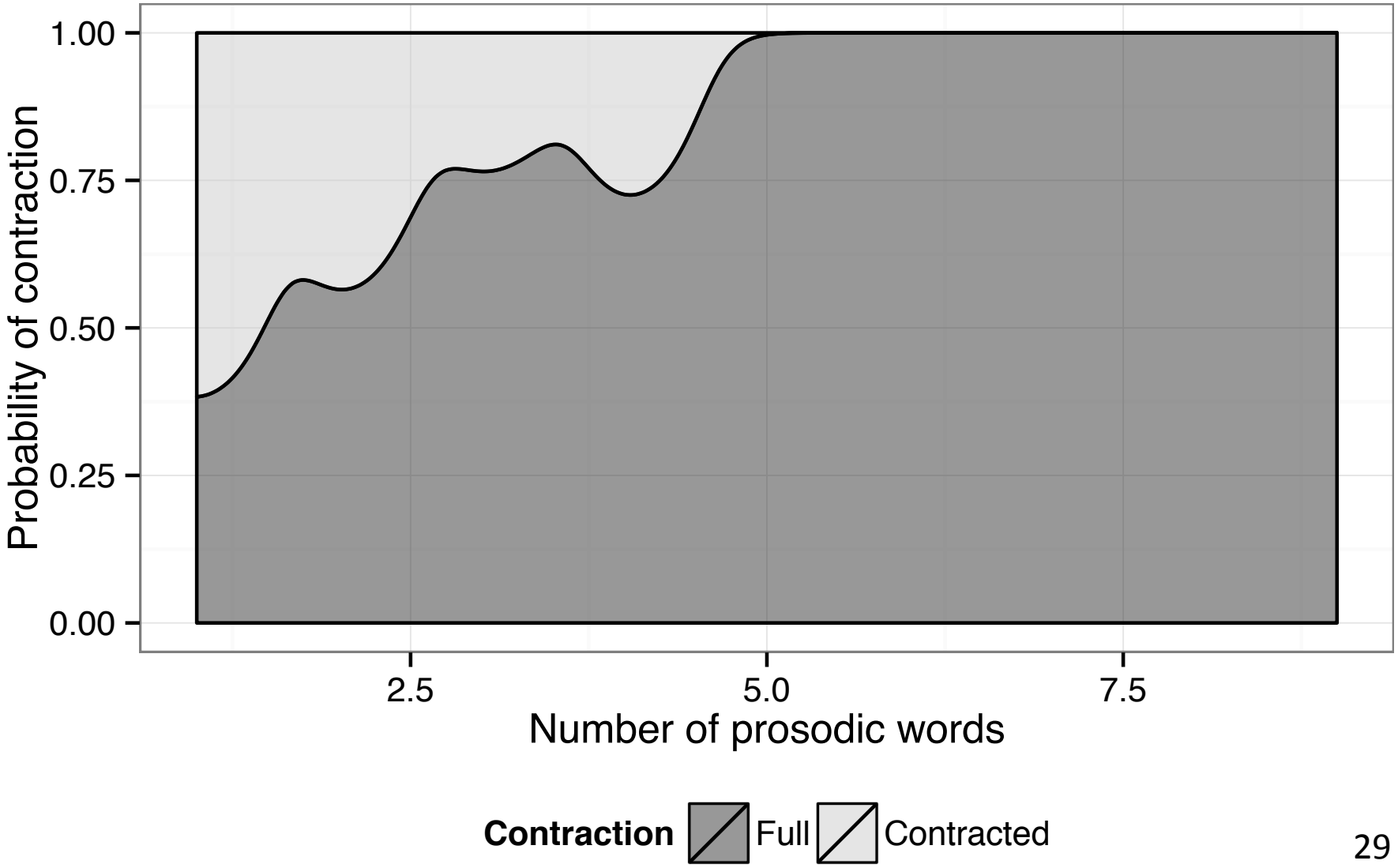
Operationalizing length

- Baseline: orthographic words
- Phonological
  - Number of syllables
  - Number of prosodic words, function words
    (following Selkirk, 1984, 1995)
  - Some combination of these?
- Syntactic
  - Height (maximal embedding) of subject parse
    (syntactic parses from Penn Treebank (Marcus et al., 1993))

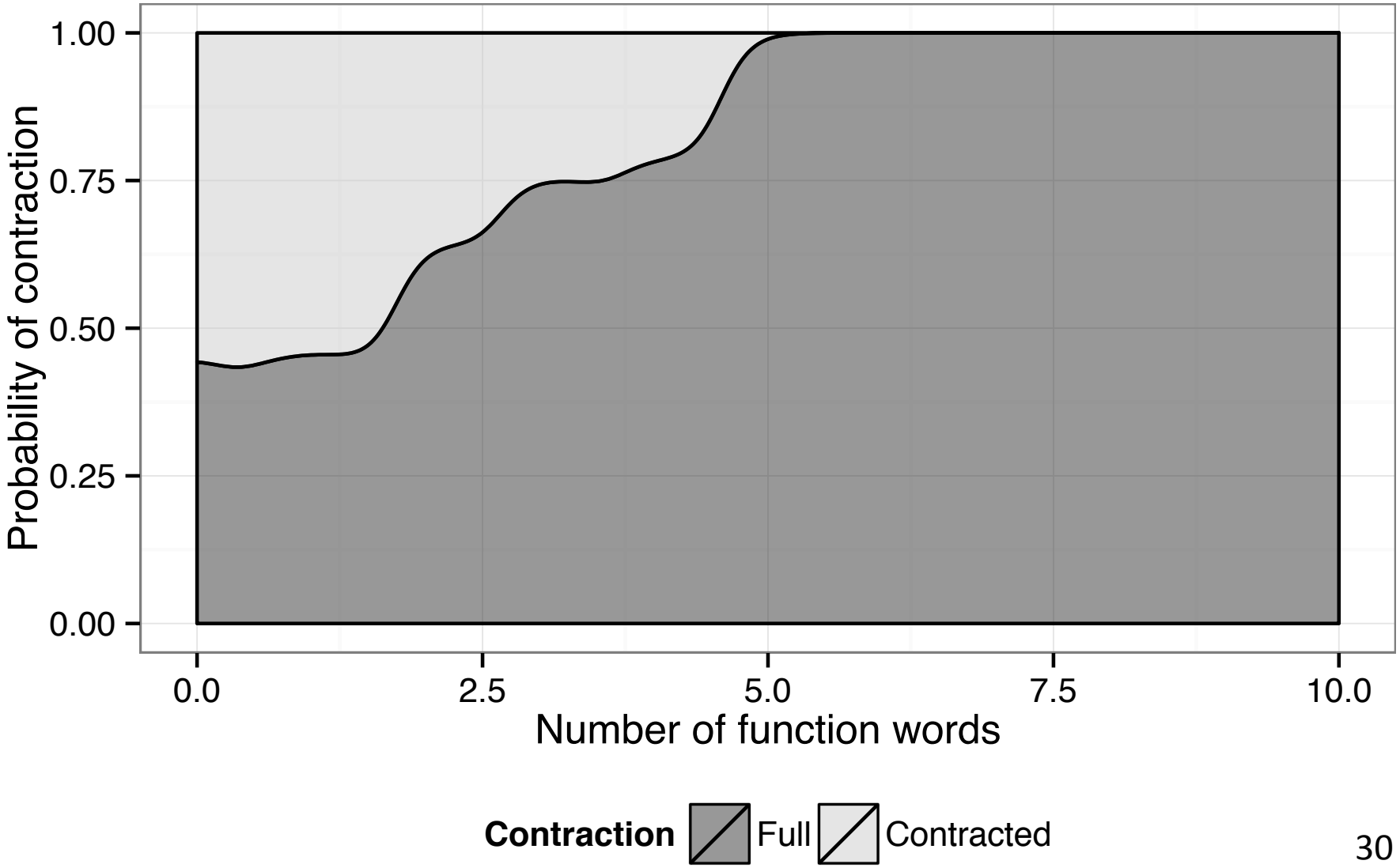
Number of syllables



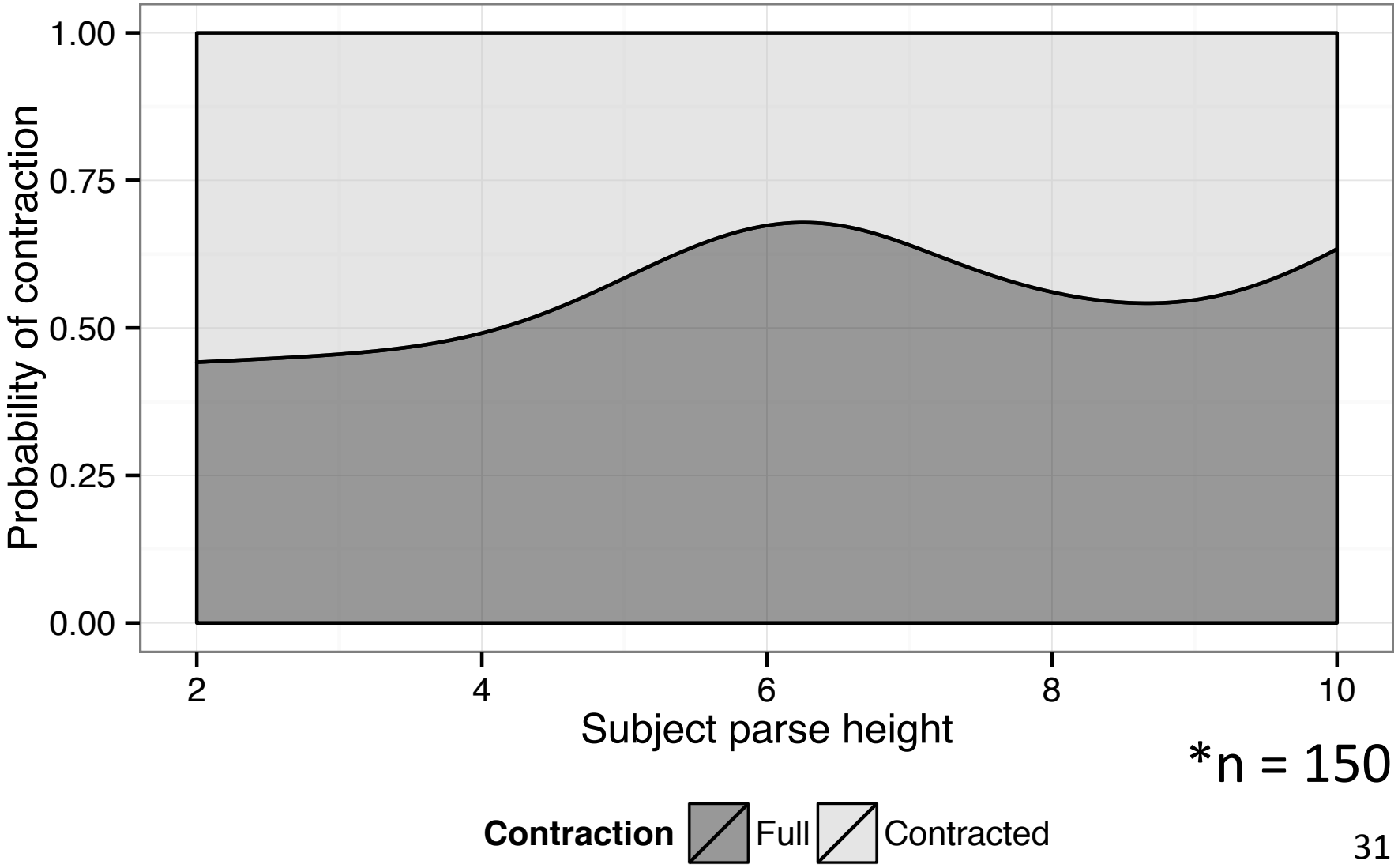
Number of prosodic words



Number of function words



Subject parse height*



*n = 150

Comparing measures of length

- High level of correlation across length measures makes dissociation difficult
- Replacing number of orthographic words with other predictors results in worse fits (AIC/BIC)
- Splits of words into separate predictors does not produce better fits (Chisq. LL ratio test)
  - e.g., n. function words + other words, n. single syllable function words + other words

Conclusions

- It's the size **and** how you use it…
- …but it's mostly the size
- Size and predictability are independent
- Number of words is the best predictor of subject size and is not reducible to other predictors

Extensions

- Possible confounds of forward predictability
  - Real relationship may be between auxiliary and subject head, not last word of subject
- Explanation from speech planning and/or prosodic phrasing
- Connection to other length-conditioned variable phenomena (e.g., heavy NP shift, dative alternation)