

Opacity over time:
Charting the paths of fricative
voicing in English plurals

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The phenomenon

An opaque alternation in English plurals

singular	'wolf' /wɒlf/	'path' /pæθ/	'house' /haʊs/	'cough' /kɒf/	'kiss' /kɪs/
plural	[wɒlv-z]	[pæð-z]	[haʊz-əz]	[kɒf-s]	[kɪs-əz]

The question

Can its diachronic development and synchronic patterning be understood in terms of processes of native language acquisition?

Outline

- Diachronic development
 - child language learners' ability to learn rules with exceptions
- Synchronic patterning
 - child language learners' ability to learn irregular lexical items

Diachronic development

The phenomenon

	'cat (pl.)' /kæt-z/	'kiss (pl.)' /kɪs-z/	'wolf (pl.)' /wɒlf-z/	'path (pl.)' /pæθ-z/	'house (pl.)' /haʊs-z/
reg. voicing	—	—	[wɒlv-z]	[pæð̥-z]	[haʊz-z]
epenthesis	—	[kɪs-əz]	—	—	[haʊz-əz]
prog. voicing	[kæt-s]	—	—	—	—
plural	[kæt-s]	[kɪs-əz]	[wɒlv-z]	[pæð̥-z]	[haʊz-əz]

The history

Old/early Middle English plural formation:

	'cat (pl.)' /kat-əs/	'wolf (pl.)' /wʊlf-əs/	'path (pl.)' /paθ-əs/	'house (pl.)' /hu:s-əs/
anterior fricative voicing	—	[wʊlv-əs]	[pað-əs]	[hu:z-əs]

(Lass 2000:142,
Ringe & Eska 2013:142)

The Tolerance Principle

Learners form productive generalisations (rules)
over evidence

R = IF X THEN Y

(Yang 2005b)

The Tolerance Principle

Learners form productive generalisations (rules)
over evidence

Exceptions are memorised

```
IF word = [e1] THEN [handle exception]
ELSE IF word = [e2] THEN [handle exception]
ELSE IF word = [e3] THEN [handle exception]
      ELSE apply R
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(Yang 2005b)

The Tolerance Principle

Learners form productive generalisations (rules) over evidence

Exceptions are memorised

IF word in $\{e_1, e_2, e_3\}$ THEN [handle exception]
ELSE IF word = $[e_4]$ THEN [handle exception]
ELSE apply R

(Yang 2005b)

The Tolerance Principle

Learners form productive generalisations (rules) over evidence

Exceptions are memorised

A learner can only tolerate a certain number of exceptions — beyond this number, it is no longer time-effective to “wait” to reach the rule

(Yang 2005b)

The Tolerance Principle

IF word in $\{e_1, e_2, e_3\}$ THEN [handle exception]
ELSE IF word = $[e_4]$ THEN [handle exception]
ELSE IF word = $[e_5]$ THEN [handle exception]
ELSE IF word = $[e_6]$ THEN [handle exception]
ELSE IF word = $[e_7]$ THEN [handle exception]
...
ELSE IF word = $[e_n]$ THEN [handle exception]
ELSE apply R

(Yang 2005b)

The Tolerance Principle

Learners form productive generalisations (rules) over evidence

IF [+vd] [-vd +ant +cont] [+vd]
THEN [-vd] → [+vd]

The Tolerance Principle

Middle English denominal verb formation:

	‘permit (v.)’ /lɛ:f-ən/	‘bath (v.)’ /baθ-ən/	‘house (v.)’ /hu:s-ən/
anterior fricative voicing	[le:v-ən]	[bað-ən]	[hu:z-ən]

(Ringe & Eska 2013:142)

The Tolerance Principle

Exceptions are memorised

IF [+vd] [-vd +ant +cont] [+vd]
THEN [-vd] → [+vd]

(Ringe & Eska 2013:142)

The Tolerance Principle

Exceptions are memorised

IF [+vd] [-vd +ant +cont] [+vd]

IF word = /grasə/ 'grace' THEN do not apply

IF word = /pe:sə/ 'piece' THEN do not apply

12th c. French borrowings

ELSE [-vd] → [+vd]

(Ringe & Eska 2013:142)

The Tolerance Principle

Exceptions are memorised

IF [+vd] [-vd +ant +cont] [+vd]

IF word = /grasə/ 'grace' THEN do not apply

IF word = /pe:sə/ 'piece' THEN do not apply

IF word = /ko:fəs/ 'coughs' THEN do not apply

| 4th c. /x/ > /f/

ELSE [-vd] → [+vd]

(Lass 1992:63)

The Tolerance Principle

Exceptions are memorised

IF [+vd] [-vd +ant +cont] [+vd]

IF word = /grasə/ 'grace' THEN do not apply

IF word = /pe:sə/ 'piece' THEN do not apply

IF word = /ko:fəs/ 'coughs' THEN do not apply

IF word = /cʊfəs/ 'cuffs' THEN do not apply

IF word = /mʌθəs/ 'moths' THEN do not apply

IF word = /masəs/ 'masses' THEN do not apply

15th c. simplification of geminates

The Tolerance Principle

Too many exceptions?

IF word in
{/wʊlfəs/ ‘wolves’,
/paθəs/ ‘paths’,
/hʊ:səs/ ‘houses’, ...}
THEN [-vd +ant +cont] → [+vd]

Number of tolerable exceptions: $N / \ln(N)$

The Tolerance Principle

Too many exceptions?

IF word in
{/wʊlfz/ ‘wolves’,
/paθz/ ‘paths’,
/hʊ:səz/ ‘houses’, ...}
THEN [-vd +ant +cont] → [+vd]

The Tolerance Principle

Too many exceptions?

IF word in
{/wɔlfz/ ‘wolves’,
/pæθz/ ‘paths’,
/haʊ:səz/ ‘houses’, ...}
THEN [-vd +ant +cont] → [+vd]
ELSE [+vd] → [α vd] / [α vd] _

Synchronic patterning

Methodology

Three audio corpora of American English

– Switchboard (Godfrey et al., 1992) (1991–2)

– Fisher (Cieri et al., 2004) (2002–3)

– Philadelphia Neighborhood Corpus

(Labov & Rosenfelder 2011)

(1973–2012)

(1990–2003)

N = 2158

Methodology

Two coders

- Binary decision: voiced vs. voiceless
- Coded separately, then met to agree

Corpus	Agreement	Kappa
Switchboard	84%	0.68
Fisher	88%	0.76
PNC	88%	0.76

Methodology

30+ words

-f: *bee{f/ve}s, cal{f/ve}s, dwar{f/ve}s, el{f/ve}s, hal{f/ve}s, hoo{f/ve}s, kni{f/v}es, li{f/v}es, loa{f/ve}s, roo{f/ve}s, scar{f/ve}s, sel{f/ve}s, shel{f/ve}s, thie{f/ve}s, wi{f/v}es, wol{f/ve}s*

oursel{f/ve}s, bookshel{f/ve}s, werewol{f/ve}s, midwi{f/v}es

-θ: *baths, booths, cloths, faiths, moths, mouths, oaths, paths, truths, wreaths, youths*

tablecloths, homeopaths, psychopaths

-s: *houses, blouses, spouses*

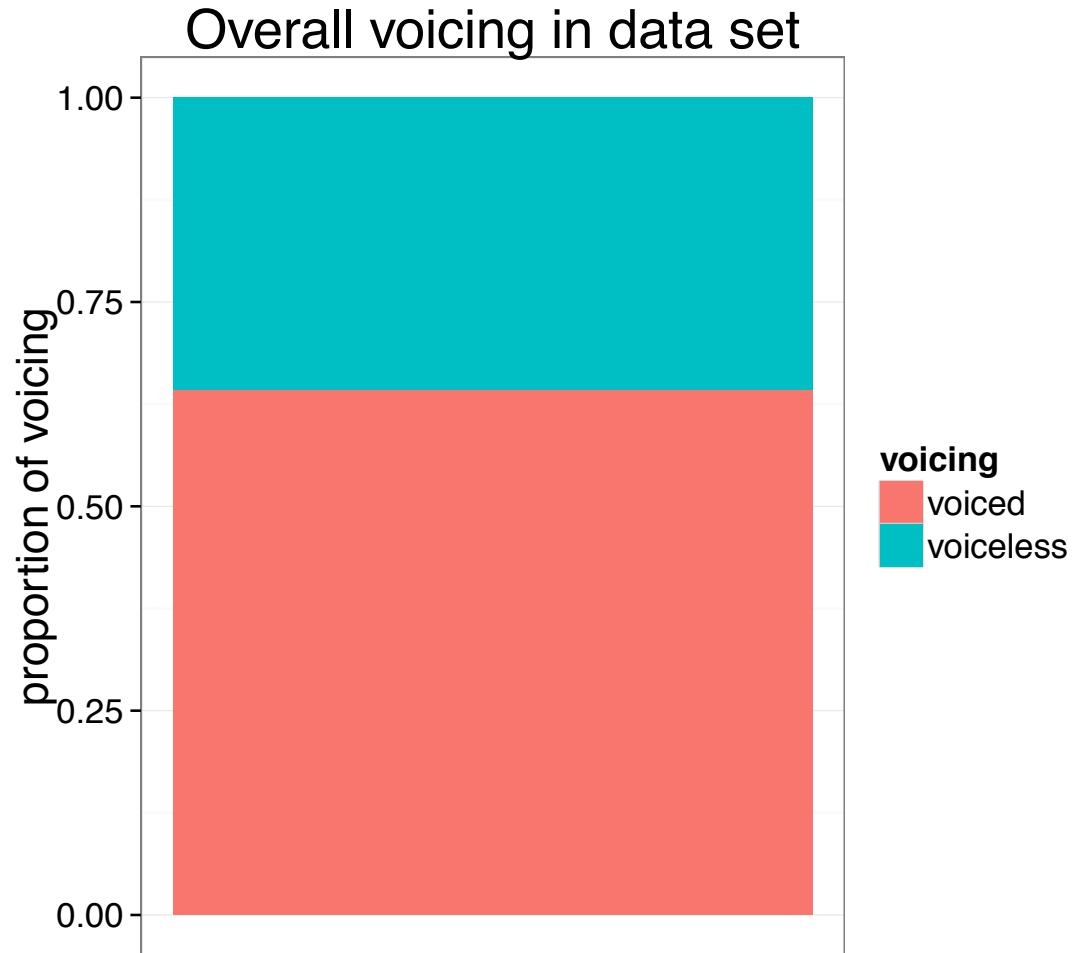
clubhouses, greenhouses, courthouses

Methodology

Modelling predictors

- speaker year of birth
- compound status
- corpus
- frequency of plural form in most common orthography, from SUBTLEX (Brysbaert & New 2009)
- stem identity (random effect)

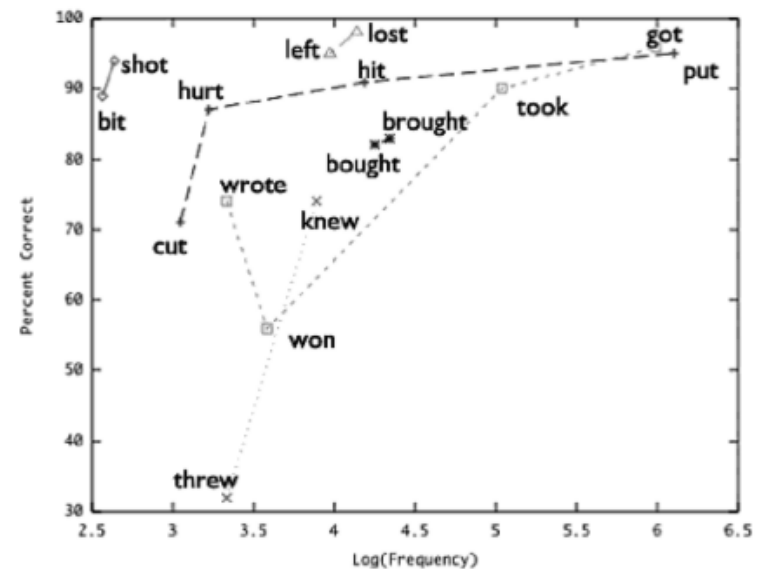
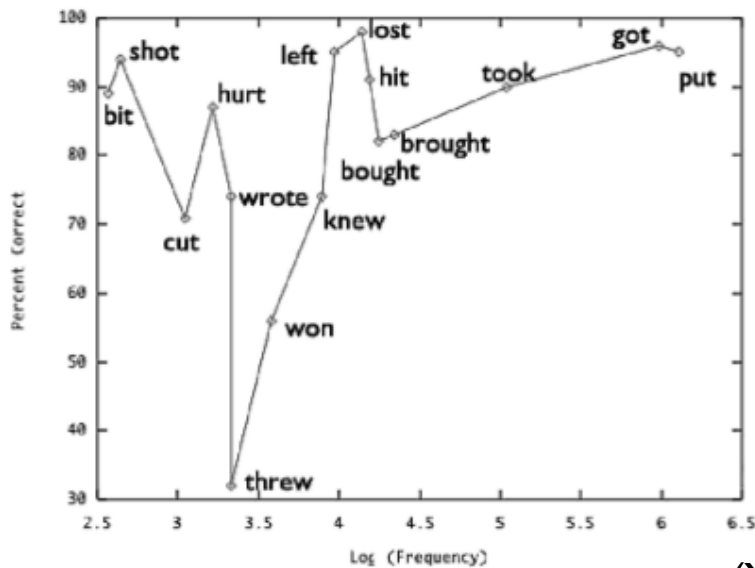
Results



Salvation by Volume

A child is more likely to successfully learn an irregular form

- if the form itself is frequent
- and the class it belongs to is frequent



(Yang 2005a:304)

Results

	proportion of voicing	median frequency of words in class	significant by-word frequency effect?
-f	0.78	4900	yes ($p < 0.001$)
-s	0.52	975	no
-θ	0.41	161	no

The present-day rule

IF word in

{/wɔlfz/ ‘wolves’,

/pæθz/ ‘paths’,

/haʊ:səz/ ‘houses’, ...}

THEN [-vd +ant +cont] → [+vd]

ELSE [+vd] → [α vd] / [α vd] _

The present-day rule

IF word ends in /-f/ and is in {/wɔlfz/, /ɛlfz/...}

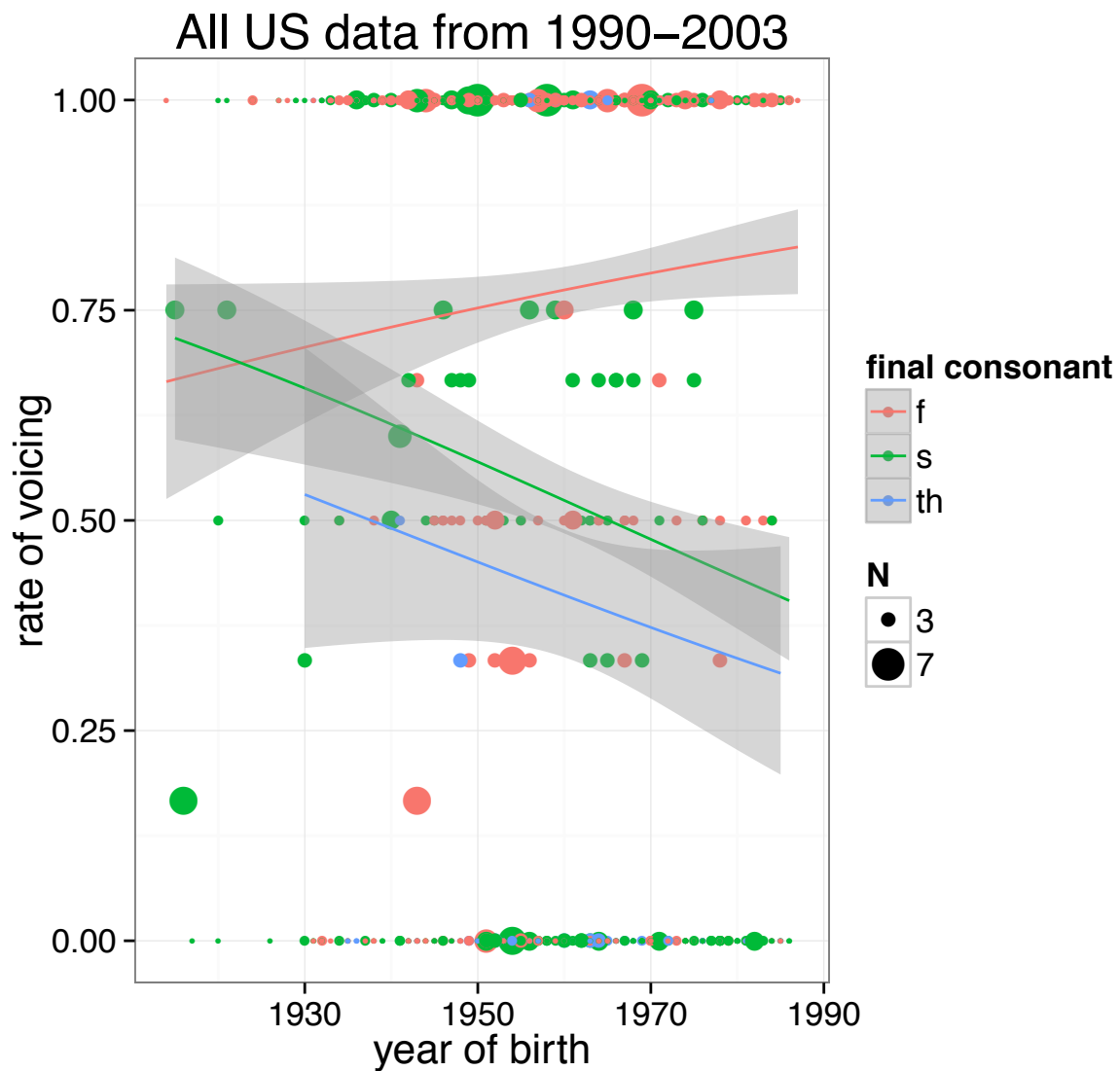
ELSE IF word ends in /-θ/ and is in {/pæθz/, /mɔθz/...}

ELSE IF word ends in /-s/ and is in {/haʊ:səz/...}

THEN [-vd +ant +cont] → [+vd]

ELSE [+vd] → [αvd] / [αvd] _

Results



In sum

In the case of regressive fricative voicing,

- diachronic development may reflect acquirers' ability to handle exceptions
- synchronic patterning may reflect acquirers' sensitivity to frequency of irregulars

Processes of acquisition can shed light on patterns of change and variation.

Thank you!

Amy Hughes & Lucy Giannasi,
UG RAs extraordinaire



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