Acknowledgements

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Order Preference for Reduplicated Words with Differing Vowels

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Have you ever wondered why we say *fiddle-faddle* and not *faddle-fiddle*? Why is it *ping-pong* and *pitter-patter* rather than *pong-ping* and *patter-pitter*? Why *dribs and drabs* rather than vice versa? Why can't a kitchen be *span and spic*? Whence *riff-raff*, *mish-mash*, *flim-flam*, *chit-chat*, *tit for tat*, *knick-knack*, *zig-zag*, *sing-song*, *ding-dong*, *King Kong*, *criss-cross*, *shilly-shally*, *see-saw*, *hee-haw*, *flip-flop*, *hippity-hop*, *tick-tock*, *tic-tac-toe*, *eeny-meeny-miney-moe*, *bric-a-brac*, *clickey-clack*, *hickory-dickory-dock*, *kit and kaboodle,* and *bibbity-bobbity-boo*? The answer is that the vowels for which the tongue is high and in the front always come before the vowels for which the tongue is low and in the back. (Pinker, 1994:167)

1 Introduction

1.1 The phenomenon

Steven Pinker, in his book The Language Instinct, made the above observation concerning a preference, presumably by English speakers, for the order of reduplicated words that contain different vowels. He then revealed the rule that high front vowels *always* come before low back vowels. Any claim that is held to be true in all instances often does not prove to be the case upon further examination, and Pinker's assertion merited closer scrutiny. Additionally, a related question worth investigating is if such a preference only occurs in word pairs that contain high front and low back vowels. Do English speakers have a preferred order for reduplicated words that contain other vowels?

1.2 Theories that explain preference for the order of vowels in reduplicated words

1.2.1 Tsur's Theory Reuven Tsur, in his book What Makes Sound Patterns Expressive (1992), offers a two-part theory as to why front vowels are preferred before back ones in reduplications. The first part of his theory has to do with the formants of vowels. He explains:

> Vowels consist of specific combinations of overtones, called formants. A formant is a concentration of acoustic energy within a restricted frequency region. . . Three or four formants are usually seen in spectrograms of speech. (Tsur, 1992: 9)

He goes on to explain that the frequency of the first and second formants of back vowels are much closer together than in front vowels. This results in the back vowels being more cognitively demanding than the front vowels to process due to the fact that the human ear effectively fuses formants that are close together. This makes it more difficult to discriminate between them.

The second part of Tsur's theory is based on the idea that, "Our cognitive economy tends to relegate to the end of the phrase (or clause) anything that requires relatively great processing effort (Tsur, 1992:25)." Tying these two ideas together, Tsur proposes that back vowels are more difficult to process due to the close proximity of their first two formants, which results in our preference for placing words with back vowels last in reduplicated phrases. This two-part theory would explain Pinker's claim that high front vowels are preferred before low back vowels.

1.2.2 Pinker's Theory

After making the claim that high front vowels are always preferred before low back vowels, Pinker goes on to offer a multi-part theory as to why this possibly occurs. He explains:

> Words that connote me-here-now tend to have higher and fronter vowels than verbs *(sic)* that connote distance from 'me' . . . Words that connote me-here-now tend to come before words that connote literal or metaphorical distance form 'me' . . .The syllogism seems to be: 'me' = high front vowel; me first; therefore high front vowel first (Pinker, 1994: 167).

Pinker's theory does not specify any specific front vowels. The concept of "me" is a central part of this theory, and the vowel in this word is [i] (or in some forms of English [ij]). It should be safe to assume that the vowel in "me", which is the most high of the front vowels, is at least one of the high front vowels that this theory discusses.

1.3 The questions

This study was designed to look more closely at some of the aspects of this claim concerning the order of reduplicated words. The main focus is an attempt to limit the deciding factors to one rather than the original two of height and backness. The questions investigated are:

(1) If semantic value is removed from these reduplicated words, will speakers still prefer high front vowels before low back vowels?
(2) If the backness variable is held the same, do English speakers have a preference for the order of vowels of different heights in reduplicated word pairs?
(3) Is height or backness more important in preference for the order of vowels in reduplicated pairs of words?

2 Methodology

2.1 The data collection test

Subjects were given a test containing 56 pairs of one-syllable nonsense words. The paired words were the same except for the vowel. The subjects were read the words first in one order and then the other. The subjects were then asked to circle the pair that sounded "better" to them. The test paired 14 different combinations of vowels four different times. The vowels compared were:

a) front vowels [i, ɪ, ɛ, æ] to each other (twenty-four words)
b) back vowels [u, ʊ, ɔ, ɑ] to each other (twenty-four words)
c) high front [i] and low back [ɑ] (four words)
d) high back [u] and low front [æ] (four words)

For the pairs containing the same two vowels, twice the high vowel came first and twice the low. A coin was flipped to determine if the high vowel or the low vowel came first for the first two or three pairs. The remaining pair or pairs was ordered so that exactly two of the four pairs were high vowels before low and two were vice versa. Next, the order in which all 56 pairs of words occurred in the test was determined by a computer-generated list of random numbers. The actual words used in this test can be found in the appendix.

The vowels chosen for this test were four English monophthong front vowels and four monophthong back vowels. In an attempt to avoid the variable of monophthong versus diphthong, the vowels that are generally diphthongs in American English were not included. It should be noted, though, that two vowels originally classified as monophthong for this study, [i] and [u], are considered by many phoneticians to also be diphthongs in American English. The diphthongs are [ij] and [uw] respectively.

2.2 The test subjects

The test subjects were 25 native English speakers between the ages of 25 and 75. Sixteen of the subjects were between the ages of 25 and 35. None of the subjects had acquired a second language during childhood although most of them had studied at least one other language later in life. Twelve of the subjects had spent the majority of their lives in the Philadelphia area. One subject was from North Carolina. The remaining subjects currently live in the Washington D.C. area, but most of them have not spent the majority of their lives there.

3 Results

Tables (1) – (3) list a summary of the test results. The vowel pairs are listed in decreasing order of the subjects' preferences. Individual test subjects' responses to each pair of nonsense words can be found in the appendix.

Table 1
Front Vowels: Subjects' preference for word order in reduplications

Preference	Order
69%	[ɪ] [ɛ]
68%	[ɪ] [æ]
62%	[ɪ] [i]
58%	[i] [æ]
53%	[i] [ɛ]
53%	[æ] [ɛ]

Table 2
Back Vowels: Subjects' preference for word order in reduplications

Preference	Order
63%	[ɑ] [ɔ]
60%	[ʊ] [u]
54%	[ɔ] [ʊ]
53%	[ɔ] [u]
53%	[ɑ] [ʊ]
50%	[ɑ] [u] / [u] [ɑ]

Table 3
Front and Back Vowels: Subjects' preference for word order in reduplications

Preference	Order
64%	[u] [æ]
55%	[i] [ɑ]

4 Discussion

4.1 Comparisons of front vowels

Test subjects showed a preference for high [ɪ] before mid [ɛ] 69% of the time and [ɪ] before low [æ] 68% of the time. There were no other significant comparisons, although in most cases the trend was for the higher vowel to be preferred before the lower. Interestingly, the only exception was in the comparison of the two high front vowels. In this case, the trend was to prefer the lower [ɪ] before the higher [i].

4.2 Comparisons of back vowels

The test subjects did not show a really strong preference in any of these categories. There was a trend in many of the comparisons, though, to prefer the lower vowel before the higher. This is the reverse of the trend noticed in the front vowels.

4.3 Comparisons of front and back vowels

The subjects in this study did not adhere to Pinker's claim that high front vowels always come before low back vowels. When [i], the highest front vowel in English, was paired with the lowest back vowel [ɑ], subjects did not show a significant preference for their order.

A possible reason for why these results do not support Pinker's claim could be related to which high front vowel was used in this study. The study used [i] as it is the highest front vowel. The slightly lower front vowel [ɪ] happens to be the front vowel present in twenty-six of the twenty-nine reduplicated word phrases listed by Pinker. Only three contain [i]. It is possible that the phenomenon that Pinker is describing does not hold true for all high front vowels, but only for the specific high front vowel [ɪ].

In the other test comparison of front and back vowels, 64% of the time the test subjects had a significant preference for the order of the high back vowel [u] before the low front vowel [æ]. If height and backness are the only factors that determine a preference, in this case it seems to be more important to be a high vowel than to be a front one. This may provide some insight into question (3), which seeks to determine which variable has more of an influence on preference.

4.4 Tsur's and Pinker's theories in light of these data

Tsur's theory is not supported by the results of the study. Test subjects showed a significant preference for placing the words with the back vowel [u] before words with the front vowel [æ]. Additionally, if this were the only reason for a preference to occur, it would not explain why subjects in this study preferred the front vowel [ɪ] before both of the front vowels [ɛ] and [æ]. As only front vowels were involved in these comparisons, none was more cognitively demanding than the other due to closeness of their formants. This theory would predict that there would not be any preference in these cases.

Pinker's theory was also not supported by the results of this study as [i] was not significantly preferred before the back vowel [ɑ]. Additionally, as with Tsur's theory, Pinker's explanation does not give any insight into why a significant preference was found when the front vowel [ɪ] was compared with the front vowels [ɛ] and [æ].

5 Conclusion

The results of this study provide some insight into the initially proposed questions. It was hoped that the comparison of the highest front vowel [i] with the lowest back vowel [ɑ] would provide some insight into question (1) concerning the effect of semantic value on order preference. Pinker's claim predicted that there would be an order preference when these two vowels occurred in a reduplication. No significant preference was shown by the test subjects in regard to these two vowels. In retrospect, though, this cannot be attributed to the use of nonsense words in the study as no preference was shown for this vowel pair in actual English reduplications. In Pinker's examples, the only two that contained [i] (*see-saw* and *hee-haw*) preferred it before the vowel [ɔ]. The majority of the reduplicated word pairs listed by Pinker contained the vowels [ɪ] and [æ] or [ɪ] and [ɑ]. The vowels [ɪ] and [ɑ] were not paired in this study, but the two front vowels [ɪ] and [æ] were. In this latter case, subjects preferred [ɪ] before [æ] 68% of the time. This would suggest that the semantic value of these reduplicated words is not the reason fo the preference when these two vowels occurred in a reduplication.

In response to question (2), subjects had a preference for the high front vowel [ɪ] before both the mid front vowel [ɛ] and the low front vowel [æ]. No other significant preferences were found between other front vowels, and none were found between any of the back vowels. When the backness variable is held constant, the test subjects had a preference for the order of a few, but not all, of the vowels of different heights.

The pairing of the vowels [u] and [æ] in the study may provide some information concerning question (3) that asks if height or backness is more important for order preference. In reduplicated words containing high, back [u] and not high, front [æ], subjects preferred the high, back [u] before the front [æ] 64% of the time. This suggests that when front and back vowels are paired, the height of the vowels may be more instrumental than backness in determining a preference for their order in reduplications.

The study results in addition to the examples listed by Pinker suggest that English speakers prefer the vowel [ɪ] before the vowels [ɛ], [æ], and [ɑ] in reduplicated words. Pinker's claim, though, predicts that there should also be a preference for the higher front vowel [i] to come first in such word pairs. This was not seen in the results of the study. As diphthongs were not included in this study, [i] was the only traditional long vowel that was examined. Additionally, if [i] is reclassified as the diphthong [ij] as some phoneticians feel that it should be for American English, this would mean that this vowel was longer than most of the others examined. It is possible that this preference phenomenon only occurs when short vowels are compared.

Neither of the two theories of vowel order preference discussed lends any insight into why English speakers would have a preference for the high front vowel [ɪ] before the non-high front vowels [ɛ] and [æ], and the low back vowel [ɑ]; and have a preference for the high back vowel [u] before the low front vowel [æ]; but not have a preference for the highest front vowel [i] before the low back vowel [ɑ] or before any of the front vowels. For the most part, this study only compared monophthong front vowels to each other and monophthong back vowels to each other. Possibly a study that pairs all of the front and back vowels, including the diphthongs, would provide important pieces to the puzzle and would lead to a claim that could predict all cases where an English speaker vowel order preference would occur. This claim could then in turn be used to evaluate the validity of theories that propose to explain why such a phenomenon would occur.

This study has demonstrated that Pinker's claim that high front vowels are always preferred before low back vowels is not correct. It further suggests that semantic value is not the determining factor for vowel order preference, that height may be a more significant factor than backness, and that a preference seems to exist when various front vowels are compared.

References

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Appendix: Study Data

Figures 1 – 14 follow this page and contain the data from the study. The nonsense words used in the test are listed along with where those pairs occurred in the test. The responses of all twenty-five subjects to each of the word pairs are recorded. Subjects are identified both by number and by their initials.

Fig. 1	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST FRONT [i] - LOW BACK [ɑ]																											
# 10 peeg pog	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	0	0	1	1	0	0	0	1	0	15	60%
pog peeg	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	1	1	0	0	1	1	1	0	1	10	40%
# 33 fleem flom	1	0	1	1	1	1	0	1	1	1	0	0	0	1	1	0	1	1	1	0	0	0	1	0	1	15	60%
flom fleem	0	1	0	0	0	0	1	0	0	0	1	1	1	0	0	1	0	0	0	1	1	1	0	1	0	10	40%
# 42 deez doz	1	1	1	0	1	0	1	1	1	1	0	1	0	1	1	0	0	0	1	0	0	0	1	0	0	13	52%
doz deez	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	1	1	1	0	1	1	1	0	1	1	12	48%
# 44 sweef swof	1	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	12	48%
swof sweef	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	1	0	1	13	52%

	AVERAGE	P-VALUE
[i] - [ɑ]	55%	0.76959
[ɑ] - [i]	45%	

Fig. 2	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
LOW FRONT [æ] - HIGH BACK [u]																											
# 13 tav tuve	0	0	0	1	0	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	1	8	32%
tuve tav	1	1	1	0	1	0	0	1	1	1	1	0	0	1	1	0	1	1	1	1	1	0	1	1	0	17	68%
# 28 fap fupe	0	1	0	0	0	1	1	1	0	0	0	1	1	1	1	1	0	1	0	0	0	1	1	0	0	12	48%
fupe fap	1	0	1	1	1	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	1	0	0	1	1	13	52%
#37 jat jute	1	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0	8	32%
jute jat	0	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	0	1	0	0	1	1	1	1	1	17	68%
# 43 baf bufe	1	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	8	32%
bufe baf	0	1	1	1	1	1	0	0	0	1	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	17	68%

	AVERAGE	P-VALUE
[æ] - [u]	36%	0.00563
[u] - [æ]	64%	

Fig. 3	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST FRONT [i] - HIGH FRONT [I]																											
# 6 feem fim	0	1	1	1	0	0	0	0	0	0	1	1	0	1	1	0	0	1	0	0	0	0	0	0	1	9	36%
fim feem	1	0	0	0	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	1	1	1	1	1	0	16	64%
# 9 reen rin	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	10	40%
rin reen	1	0	0	1	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	1	1	0	15	60%
# 30 geep gip	1	0	1	0	1	1	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	1	0	1	0	10	40%
gip geep	0	1	0	1	0	0	1	1	0	1	0	1	1	0	1	0	1	1	1	1	1	0	1	0	1	15	60%
# 55 zeed zid	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	1	1	1	0	9	36%
zid zeed	1	1	0	1	0	1	0	1	1	1	0	1	1	1	1	1	0	0	1	1	1	0	0	0	1	16	64%

	AVERAGE	P-VALUE
[i] - [I]	38%	0.10499
[I] - [i]	62%	

Fig. 4		1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST FRONT [i] - MID FRONT [ɛ]																												
# 2	steeb steb	1	1	1	0	1	0	1	1	1	1	0	0	1	0	1	1	0	1	1	0	0	1	0	1	0	15	60%
	steb steeb	0	0	0	1	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	1	1	0	1	0	1	10	40%
# 3	pleem plem	1	1	1	0	1	1	0	1	0	1	0	0	1	1	1	1	0	0	1	0	0	1	0	0	1	14	56%
	plem pleem	0	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	1	1	0	1	1	0	1	1	0	11	44%
# 21	teeg teg	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	1	0	1	1	0	0	1	1	0	1	12	48%
	teg teeg	1	1	0	0	0	1	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	0	0	1	0	13	52%
# 41	jeek jek	0	1	1	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	12	48%
	jek jeek	1	0	0	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	13	52%

	AVERAGE	P-VALUE
[i] - [ɛ]	53%	0.90105
[ɛ] - [i]	47%	

Fig. 5		1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST FRONT[i]-LOW FRONT [æ]																												
# 4	skeef skaf	1	1	1	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	12	48%
	skaf skeef	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0	1	1	1	13	52%
# 14	kleeg klag	1	1	1	0	1	1	0	1	0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	0	0	15	60%
	klag kleeg	0	0	0	1	0	0	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	1	0	1	1	10	40%
# 20	weeb wab	1	1	1	0	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	0	0	1	1	0	1	17	68%
	wab weeb	0	0	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	1	0	0	1	0	8	32%
# 29	treeb trab	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1	0	1	0	14	56%
	trab treeb	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	1	0	1	11	44%

	AVERAGE	P-VALUE
[i] - [æ]	58%	0.23588
[æ] - [i]	42%	

Fig. 6		1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15 MS)	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGH FRONT [I] - MID FRONT [ɛ]																												
# 8	yig yeg	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0	1	19	76%
	yeg yig	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	1	0	6	24%
# 22	wim wem	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	14	56%
	wem wim	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	11	44%
# 49	mif mef	1	0	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	0	1	1	0	1	19	76%
	mef mif	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0	6	24%
# 50	plik plek	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	0	17	68%
	plek plik	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	1	8	32%

	AVERAGE	P-VALUE
[I] - [ɛ]	69%	0.0000058
[ɛ] - [I]	31%	

Fig. 7	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGH FRONT [I] - LOW FRONT [æ]																											
# 5 zish zash	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	13	54%
zash zish	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	11	46%
# 19 gich gach	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0	0	1	1	0	1	0	1	1	1	1	19	76%
gach gich	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	0	1	0	0	0	0	6	24%
# 34 jid jad	1	0	1	1	1	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	1	1	0	0	14	56%
jad jid	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0	0	1	1	11	44%
# 52 brip brap	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	1	1	1	0	1	1	1	1	1	21	84%
brap brip	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	4	16%

	AVERAGE	P-VALUE
[I] - [æ]	68%	0.000000938
[æ] - [I]	32%	

Fig. 8	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
MID FRONT [ɛ] - LOW FRONT [æ]																											
# 12 cheb chab	0	0	1	1	1	1	1	1	0	0	1	0	0	1	0	1	0	1	0	0	0	1	0	0	0	11	44%
chab cheb	1	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1	1	1	0	1	1	1	14	56%
# 17 zel zal	0	0	0	0	1	1	1	1	0	1	0	0	1	1	0	0	0	1	0	0	0	1	1	0	1	11	44%
zal zel	1	1	1	1	0	0	0	0	1	0	1	1	0	0	1	1	1	0	1	1	1	0	0	1	0	14	56%
# 35 prev prav	1	1	1	1	1	0	0	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0	1	0	0	12	48%
prav prev	0	0	0	0	0	1	1	1	0	1	0	1	1	0	0	0	0	1	1	1	1	1	0	1	1	13	52%
# 36 tef taf	1	0	1	1	1	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	13	52%
taf tef	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	12	48%

	AVERAGE	P-VALUE
[ɛ] - [æ]	47%	0.98008
[æ] - [ɛ]	53%	

Fig. 9	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST BACK [u] - HIGH BACK [U]																											
# 16 muke mook	0	1	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	8	32%
mook muke	1	0	0	0	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	1	0	17	68%
# 27 zune zoon	0	0	1	1	1	0	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	10	40%
zoon zune	1	1	0	0	0	1	1	1	1	1	0	1	1	0	1	0	0	1	1	1	1	0	0	0	1	15	60%
# 32 rupe roop	0	1	1	1	0	0	0	0	1	1	1	1	0	1	1	0	0	0	1	0	0	0	1	0	0	11	44%
roop rupe	1	0	0	0	1	1	1	1	0	0	0	0	1	0	0	1	1	1	0	1	1	1	0	1	1	14	56%
# 54 fube foob	1	1	0	0	1	1	0	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	1	1	0	11	44%
foob fube	0	0	1	1	0	0	1	0	0	1	0	1	1	1	0	0	1	1	1	1	1	1	0	0	1	14	56%

	AVERAGE	P-VALUE
[u] - [U]	40%	0.19468
[U] - [u]	60%	

Fig. 10	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST BACK [u] - MID BACK [ɔ]																											
# 15 strupe strawp	1	0	1	1	0	1	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	9	36%
strawp strupe	0	1	0	0	1	0	1	1	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	16	64%
# 25 hube hawb	1	1	0	1	1	0	0	1	1	1	1	1	1	1	0	1	0	0	0	1	0	0	1	0	0	14	56%
hawb hube	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	1	1	11	44%
# 26 chufe chawf	1	0	0	1	1	0	0	1	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	9	36%
chawf chufe	0	1	1	0	0	1	1	0	1	1	1	0	0	0	0	1	1	1	1	0	1	1	1	1	1	16	64%
# 47 glune glawn	1	1	1	1	0	1	0	0	0	1	1	0	1	1	0	0	0	1	1	0	0	1	1	1	1	15	60%
glawn glune	0	0	0	0	1	0	1	1	1	0	0	1	0	0	1	1	1	0	0	1	1	0	0	0	0	10	40%

	AVERAGE	P-VALUE
[u] - [ɔ]	47%	0.15951
[ɔ] - [u]	53%	

Fig. 11	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST BACK [u] - LOW BACK [ɑ]																											
# 11 shufe shof	1	0	1	1	1	1	0	1	0	0	1	0	1	1	0	0	0	0	0	1	0	1	0	0	1	12	48%
shof shufe	0	1	0	0	0	0	1	0	1	1	0	1	0	0	1	1	1	1	1	0	1	0	1	1	0	13	52%
# 40 zute zot	1	0	1	1	1	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	10	40%
zot zute	0	1	0	0	0	1	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	15	60%
# 53 duve dov	0	0	1	1	1	1	0	0	1	1	0	0	1	1	1	0	0	1	0	0	1	1	1	1	0	14	56%
dov duve	1	1	0	0	0	0	1	1	0	0	1	1	0	0	0	1	1	0	1	1	0	0	0	0	1	11	44%
# 56 puze poz	1	0	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	1	0	1	0	1	1	1	1	14	56%
poz puze	0	1	0	0	0	0	1	1	0	0	1	1	1	0	1	1	1	0	1	0	1	0	0	0	0	11	44%

	AVERAGE	P-VALUE
[u] - [ɑ]	50%	0.84013
[ɑ] - [u]	50%	

Fig. 12	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGH BACK [U] - MID BACK [ɔ]																											
# 1 shoog shawg	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	7	28%
shawg shoog	1	1	0	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	18	72%
# 7 ploot plawt	1	1	0	0	0	1	0	0	1	1	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	10	40%
plawt ploot	0	0	1	1	1	0	1	1	0	0	0	1	1	0	1	1	1	0	0	1	1	0	1	1	1	15	60%
# 48 chood chawd	1	0	1	0	1	1	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	1	1	1	0	14	56%
chawd chood	0	1	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	1	1	1	1	0	0	0	1	11	44%
# 51 drook drawk	1	1	1	0	0	1	0	0	1	1	1	1	0	1	1	0	0	1	0	1	0	1	1	0	1	15	60%
drawk drook	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	1	1	0	1	0	1	0	0	1	0	10	40%

	AVERAGE	P-VALUE
[U] - [ɔ]	46%	0.04249
[ɔ] - [U]	54%	

Fig. 13	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	**TOTAL**	**AVERAGE**
HIGH BACK [U] - LOW BACK [ɑ]																											
# 23 frooz froz	1	0	1	1	0	1	1	0	1	1	1	0	0	0	0	1	0	1	0	0	0	1	1	0	0	12	48%
froz frooz	0	1	0	0	1	0	0	1	0	0	0	1	1	1	1	0	1	0	1	1	1	0	0	1	1	13	52%
# 24 yood yod	0	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	9	36%
yod yood	1	0	0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	0	16	64%
# 38 bloog blog	1	1	1	1	1	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	1	1	0	12	48%
blog bloog	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	1	13	52%
# 45 woop wop	1	1	1	1	1	0	1	0	1	1	1	0	0	1	1	1	0	0	0	0	0	1	0	1	0	14	56%
wop woop	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	1	1	1	1	1	0	1	0	1	11	44%

	AVERAGE	**P-VALUE**
[U] - [ɑ]	47%	0.69353
[ɑ] - [U]	53%	

Fig. 14	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	**TOTAL**	**AVERAGE**
MID BACK [ɔ] - LOW BACK [ɑ]																											
# 18 mawf mof	0	0	1	0	1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	6	24%
mof mawf	1	1	0	1	0	0	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	19	76%
# 31 brawb brob	0	0	1	1	0	0	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	1	0	0	1	9	36%
brob brawb	1	1	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	1	1	0	1	1	0	16	64%
# 39 zawsh zosh	0	0	1	0	1	1	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0	0	0	1	1	11	44%
zosh zawsh	1	1	0	1	0	0	1	1	0	0	0	1	1	1	0	1	0	1	0	1	1	1	1	0	0	14	56%
# 46 fawk fok	0	0	1	1	1	1	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	11	44%
fok fawk	1	1	0	0	0	0	1	1	0	0	1	1	1	0	1	0	1	1	1	1	1	1	0	0	0	14	56%

	AVERAGE	**P-VALUE**
[ɔ] - [ɑ]	37%	0.00735
[ɑ] - [ɔ]	63%	

Epenthesis and Fricatives in Final Consonant Clusters

PETER T. RUFFNER

1 Introduction

The aim of this paper is to draw a parallel between the production of word-final fricatives in consonant clusters and the occurrence of epenthesis after clusters ending in stops. Evidence is presented that speakers whose native languages disallow CC syllable codas show a preference for phonetic "release" when producing these clusters. This release is considered here as being the equivalent of a phonological continuant. It is important to note at the outset that in this study, the breadth of the category for the distinctive feature "continuant" is expanded beyond its typical scope to include the processes of aspiration and vowel epenthesis. The justification for this is that these two processes are similar to the productions of fricatives, vowels, glides, and liquids in that all are characterized by continuous airflow through the mouth.

Briefly, the data from this study show that when subjects are asked to pronounce final clusters of the type C + stop, they frequently resort to the syllable simplification processes of epenthesis, deletion, and substitution. Most often, when they are able to produce the cluster successfully, some type of the aforementioned release occurs word-finally. However, when a release is already provided in the cluster by the presence of a final fricative, the subjects are less likely to go through syllable simplification processes.

This last point could be considered quite controversial, mainly because it challenges the widely accepted Sonority Sequencing Constraint (SSC). The SSC states that the segments in a syllable become progressively less sonorous as they move away from the syllable's nucleus. On Broselow and Finer's (1991) Sonority Index, fricatives are ranked as more sonorous than stops.

(1) Sonority Index

1 – Stops	(least sonorous)
2 – Fricatives	
3 – Nasals	
4 – Liquids	
5 – Glides	(most sonorous)

Thus, stop + fricative clusters in coda position represent a violation of the SSC. Since clusters which violate the SSC are more marked than clusters which abide by it, the claim that these L2 learners will experience relatively little difficulty in producing C + fricative clusters is at odds with the SSC.

2 Epenthesis

Speakers whose native languages disallow consonant clusters in syllable codas clearly have no knowledge from their L1 of how to produce these complex codas. Therefore, when they attempt to pronounce monosyllabic words ending in CC, such as those used in this study, it is to be expected that they will often commit errors. As mentioned above, these errors – epenthesis, deletion, and substitution – demonstrate a common trend of simplifying syllable structure for the speaker. Of these three processes, only epenthesis (the insertion of a segment) plays a central part in this study. As with the term "continuant," in this paper the scope of the epenthesis category is expanded beyond the norm. As can be seen in the data presented below, subjects produced numerous examples of vowel epenthesis and aspiration. In this study, though they are represented differently in transcription, both of these processes have been combined in analysis and are referred to simply as epenthesis. This view is consistent with Weinberger (2000), who concluded:

(2) a. aspiration = [h]
    b. [h] = vowel
    c. ∴ aspiration = vowel.

Thus, aspiration is treated here as a type of voiceless vowel epenthesis.

To summarize this section, then, vowel epenthesis, voiceless vowel epenthesis and aspiration are considered to be essentially the same process for the purposes of this paper. They will be referred to here simply as epenthesis.

3 Fricatives

Roca and Johnson (1999) define a fricative as "a consonant sound that involves friction noise made by the air escaping through a narrow obstacle." As with epenthesis, the continuant property of fricatives means that there is a desirable phonetic release (airflow) in production. It is argued, then, in contrast with the SSC, that final clusters that end in fricatives should generally be easier for subjects to produce correctly than final clusters that end in stops.

4 Subjects

Three Japanese speakers, three Spanish speakers, two Mandarin speakers, and two Indonesian speakers (Subjects 1 – 10) were used for this study. All are adult students of English as a Second Language (ESL) at an Intensive English Program located in Arlington, Virginia. They were chosen specifically because consonant clusters do not appear in coda position in their languages. English is the only language they speak which allows final consonant clusters. In addition to Subjects 1 – 10, one native speaker of American English was tested to act as a control. Below are the profiles for each subject and the control.

Table 1
Subject profiles

Subject	Birthplace	L1	Age	Onset age	Sex	Residence
S1	Santiago, Chile	Spanish	29	12	Female	1.5 years
S2	S. Cristobal, Venezuela	Spanish	23	11	Female	7 months
S3	Lima, Peru	Spanish	29	12	Male	3.25 years
S4	Iwata, Japan	Japanese	36	14	Male	2.75 years
S5	Tokyo, Japan	Japanese	20	13	Female	6 months
S6	Fukuoka, Japan	Japanese	22	13	Female	1.5 years
S7	Beijing, China	Mandarin	28	16	Male	1.75 years
S8	Shanghai, China	Mandarin	41	30	Male	1 year
S 9	Sumatra, Indonesia	Indonesian	29	27	Male	6 months
S10	Jakarta, Indonesia	Indonesian	25	14	Female	5 months
Control	Philadelphia, USA	American English	47	0	Male	47 years

5 Methodology

The subjects in this study were informed that they would be providing data for a phonological study by reading a list of nonsense words. They were told that they would be recorded on audiotape but were not made aware of the specific focus of the study.

Each subject was asked to pronounce 35 nonsense words, all of which ended in consonant clusters. Nonsense words were used instead of English words to ensure that errors based in morphology would be avoided. The structure of each word was CVCC, with all segments allowable in English. As indicated above, for the purposes of this study, the final consonant of each cluster could only be a fricative or a stop. English "silent *e*," affricates, θ, etc. were not used so that all words would be structurally uniform, all orthographically ending in two independently pronounceable consonants.

Each word was presented to the subjects on index cards one at a time. The subjects first stated the carrier phrase "Now I say…" and then read each word aloud for the recording. The carrier phrase was used to provide a consistent phonological environment before each target word, making it less likely that subjects would link words and thus form larger clusters.

6 Predictions

In accordance with the observations already made in this paper, the following results were predicted for the final clusters in the data:

6.1 C + fricative clusters:

a. high rate of faithfulness to cluster; i.e., no syllable simplification errors in cluster (fricative = word-final release)
b. low rate of epenthesis because fricative provides final release

6.2 C + stop clusters:

a. low rate of faithfulness to cluster due to absence of final release
b. high rate of epenthesis following intact clusters (epenthesis = release)

7 Results

The transcriptions for the ten subjects and one control who were tested are given at the end of this paper. In reviewing the data, it should be remembered that processes other than epenthesis, deletion, and substitution were not counted as errors in cluster faithfulness. For example, the production of the cluster in “konz” as [ns] was considered a case of devoicing rather than one of substitution. Thus, it was treated as a correctly produced cluster.

7.1 C + fricative clusters:

a. A high cluster faithfulness rate was predicted because of the final fricative present in the target words. To qualify as correct, the coda cluster had to be pronounced intact with no word-final epenthesis. The subjects’ mean faithfulness rate for these clusters was 39.3%. The rate for the control was 86.7%.

b. A low rate of word-final epenthesis was predicted following intact C + fricative clusters because of the release already provided by the fricative in final position. The subjects’ mean rate was 24.4%. The control’s was 13.3%.

7.2 C + stop clusters:

a. A low cluster faithfulness rate was predicted because of the absence of a word-final continuant in the target words. Again, to be counted as correct, the cluster had to be pronounced intact with no word-final epenthesis. The subjects' mean faithfulness rate was 5.5%. The control's rate was 45%.

b. A high rate of epenthesis following intact clusters was predicted to provide subjects with a word-final continuant. The subjects' mean rate was 88.9%. The control's rate was 55%.

8 Discussion

Table 2
Cluster faithfulness (no epenthesis)

C + fricative clusters	Subject mean = 39.3% Control = 86.7%
C + stop clusters	Subject mean = 5.5% Control = 45%

As can be seen in Table 2, a significantly higher rate of cluster faithfulness occurred (with both the subjects and the control) for the C + fricative clusters than for the C + stop clusters. This was predicted because it was believed that subjects would have less difficulty correctly producing clusters that already ended in a continuant. Because 39.3% may not appear to represent a high rate of cluster faithfulness, it is important to reiterate that the subjects' native languages allow no final clusters. Therefore, what is significant here is the fact that the subjects had much greater difficulty producing final clusters that did not end in fricatives – a faithfulness rate of only 5.5%.

As should be expected, the control, whose native language does allow final clusters, had a much higher faithfulness rate than the subject mean for both cluster types. However, the control's results were consistent with those of the subjects in that C + fricative clusters were far easier to produce correctly (86.7%) than C + stop clusters (45%).

Table 3
Intact clusters + epenthesis

C + fricative clusters	Subject mean = 24.4% Control = 13.3%
C + stop clusters	Subject mean = 88.9% Control = 55%

The data in Table 3 refer to cases in which clusters were kept intact, but were followed by word-final epenthesis. As predicted, subjects epenthesized at a much lower rate for C + fricative clusters (24.4%) than for C + stop clusters (88.9%). At first glance, the subject mean of 24.4% for C + fricative clusters may seem high when it is considered that the target words already have a release provided by the fricative. However, it is important to note that for all but one case (19/20 or 95%) in which epenthesis follows a fricative, the fricative in question was either [v] or [z]; that is, the epenthesis occurred after *voiced* fricatives. The significance of this should not be understated. Although both voiced and voiceless fricatives are continuants and, therefore, provide the type of final release described in this paper, apparently there is more of a parallel between epenthesis and voiceless (as opposed to voiced) fricatives. It seems that this observation must be accounted for if any further studies of this type are to be conducted. Nevertheless, the data still strongly support the point that epenthesis after cluster-final fricatives is comparatively uncommon.

Epenthesis after cluster-final fricatives was also uncommon in the control's productions (13.3%). However, the rate for C + stop clusters was 55%. What is most significant here, of course, is the fact that the control violated cluster faithfulness *most of the time*, as did the subjects.

9 Conclusion

As was stated in the Introduction, the aim of this paper was to draw a parallel between the production of cluster-final fricatives and a tendency for epenthesis following C + stop clusters. In the process of exploring this parallel, the definition of epenthesis was broadened to include aspiration.

Essentially, two major predictions were made for this study, and it appears that both have turned out to be true. First, subjects made fewer errors in cluster production with C + fricative clusters than with C + stop clusters. Second, subjects epenthesized at a low rate after cluster-final fricatives and at a high rate after cluster-final stops. While a deeper analysis within the framework of the SSC could certainly be conducted with the data compiled in this study, the results seem to present an intriguing challenge to Broselow and Finer's Sonority Index. For this challenge to be stronger, however, similar results would have to be found using more clusters that end in fricatives other than [s] and [z], since these are already known to be common violators of the SSC in both onsets and codas.

Nevertheless, in view of the results of this study, it seems reasonable to claim that the subjects were generally consistent in their treatment of word-final clusters. That is, they consistently produced word-final continuants at a high rate – whether the continuant was already present in the cluster as a word-final fricative, or was added by the subject through epenthesis.

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APPENDIX A
Transcriptions

	S1 (Spanish)	S2 (Spanish)	S3 (Spanish)
konz	ko[nzə]	ko[ns]	ko[nzə]
sork	so[rkʰ]	so[ɹkʰ]	so[ɹk]
dast	da[stʰ]	da[stʰ]	da[stʰ]
larf	la[rf]	la[f]	la[ɹf]
holp	ho[lpʰ]	ho[lpʰ]	ho[lpʰ]
fips	fi[ps]	fi[ps]	fi[ps]
burz	bu[ɹzə]	bu[ɹs]	bu[ɹzə]
nild	ni[ldə]	ni[ldə]	ni[ld]
rict	ri[kə̥tʰ]	ri[kʰ]	ri[kətʰ]
morp	mo[rpʰ]	mo[pʰ]	mo[ɹpʰ]
gomz	go[mzə]	go[ms]	go[ms]
nept	ne[ptʰ]	ne[ptʰ]	ne[ptʰ]
fets	fe[ts]	fe[ts]	fe[ts]
visk	vi[skʰ]	vi[skʰ]	vi[skʰ]
nudz	nu[dɪz]	nu[dəs]	nu[ts]
lefs	le[fsts]	le[fstʰ]	le[fs]
tavz	ta[vəzə]	ta[f]	ta[vzə]
bimp	bi[mpʰ]	bi[mpə]	bi[mpʰ]
lunk	lu[ŋkʰ]	lu[ŋkə]	lu[ŋkʰ]
melf	me[lf]	me[lf]	me[lf]
tasp	ta[spʰ]	ta[spə]	ta[spʰ]
zarb	za[rbə]	za[ɹbə]	za[ɹbə]
valt	va[ltə]	va[ltʰ]	va[lt]
lant	la[ntʰ]	la[ntə]	la[nt]
folz	fo[lzə]	fo[ls]	fo[lzə]
nord	no[ɹdə]	no[ɹdə]	no[ɹdə]
tegz	te[gəzə]	te[kx]	te[gzə]
bift	bi[fə̥tʰ]	bi[f]	bi[ftʰ]
zoks	zo[kə̥s]	zo[ks]	zo[ks]
pulk	pu[lkʰ]	pu[lk]	pu[lkʰ]
lart	la[rtʰ]	la[ɹtʰ]	la[ɹtʰ]
parg	pa[ɹgɪ]	pa[ɹx]	pa[ɹgə]

zelb	ze[ləbə]	ze[lbə]	ze[lbə]
lubz	lu[bɪzə]	lu[ps]	lu[bzə]
berv	be[ɹvə]	be[ɹf]	be[ɹvə]

	S4 (Japanese)	S5 (Japanese)	S6 (Japanese)
konz	ko[nzə]	ko[ns]	ko[nzə]
sork	so[k^h]	so[k^h]	so[kə]
dast	da[st^h]	da[st^h]	da[st^h]
larf	la[f]	la[f]	la[f]
holp	ho[pə]	ho[lp^h]	ho[p^h]
fips	fi[pəts]	fi[ps]	fi[ps]
burz	bu[zə]	bu[s]	bu[s]
nild	ni[də]	ni[də]	ni[ldə]
rict	ri[kt]	ri[kət^h]	ri[kə̥tə̥]
morp	mo[k^h]	mo[p^h]	mo[p^h]
gomz	go[mzə]	go[məs]	go[ns]
nept	ne[pt]	ne[pət^h]	ne[pət^h]
fets	fe[ts]	fe[ts]	fe[ts]
visk	vi[sk^h]	vi[sk^h]	vi[sk^h]
nudz	nu[dzə]	nu[z]	nu[z]
lefs	le[fs]	le[fts]	le[fs]
tavs	ta[və̥z]	ta[fs]	ta[və̥zə]
bimp	bi[m]	bi[ps]	bi[mp^h]
lunk	lu[ŋkə]	lu[ŋk]	lu[ŋk^h]
melf	me[lf]	me[f]	me[f]
tasp	ta[sp^h]	ta[sp^h]	ta[sp^h]
zarb	za[bə̥]	za[bə]	za[bə]
valt	va[lt^h]	va[t^h]	va[ltə̥]
lant	la[nt^h]	la[nt^h]	la[ntə]
folz	fo[zə]	fo[ls]	fo[ls]
nord	no[də]	no[də]	no[tə]
tegz	te[gəzə]	te[gəs]	te[ns]
bift	bi[ft^h]	bi[ft^h]	bi[ftə]
zoks	zo[ks]	zo[ks]	zo[ks]
pulk	pu[k^h]	pu[k^h]	pu[ləkə̥]
lart	la[t^h]	la[t^h]	la[tə]

parg	pa[gə]	pa[gə]	pa[kə]
zelb	ze[bə]	ze[bə̥]	ze[bə]
lubz	lu[bə̥zə̥]	lu[bəs]	lu[bəs]
berv	be[və]	be[f]	be[f]
	S7 (Mandarin)	S8 (Mandarin)	
konz	ko[ns]	ko[ns]	
sork	so[kətə]	so[k^{h}]	
dast	da[stə]	da[st^{h}]	
larf	la[f]	la[f]	
holp	ho[p]	ho[p^{h}]	
fips	fi[ps]	fi[ps]	
burz	bu[ts]	bu[s]	
nild	ni[ldə]	ni[də]	
rict	ri[kə̥t^{h}]	ri[kət^{h}]	
morp	mo[pə]	mo[p^{h}]	
gomz	go[mis]	go[mps]	
nept	ne[p^{h}]	ne[ptə]	
fets	fe[s]	fe[ts]	
visk	vi[sk^{h}]	vi[sk^{h}]	
nudz	nu[dɪs]	nu[z]	
lefs	le[fs]	le[fs]	
tavz	ta[vɪs]	ta[vs]	
bimp	bi[mp^{h}]	bi[mp^{h}]	
lunk	lu[ŋk^{h}]	lu[ŋk^{h}]	
melf	me[f]	me[f]	
tasp	ta[sp^{h}]	ta[sp^{h}]	
zarb	za[p^{h}]	za[bə]	
valt	va[t^{h}]	va[t^{h}]	
lant	la[t^{h}]	la[nt^{h}]	
folz	fo[t^{h}]	fo[s]	
nord	no[də]	no[də]	
tegz	te[ks]	te[ks]	
bift	bi[f]	bi[ft^{h}]	
zoks	zo[ks]	zo[ks]	
pulk	pu[kə]	pu[k^{h}]	

lart	la[tə]	la[t^h]
parg	pa[kə̥]	pa[kə̥]
zelb	ze[p^h]	ze[bə̥]
lubz	lu[ps]	lu[bəs]
berv	be[ve]	be[və]

	S9 (Indonesian)	S10 (Indonesian)
konz	ko[ns]	ko[ns]
sork	so[gə̥]	so[kə]
dast	da[s]	da[s]
larf	la[f]	la[f]
holp	ho[l]	ho[p]
fips	fi[s]	fi[ps]
burz	bu[s]	bu[s]
nild	ni[ldə]	ni[l]
rict	ri[ts]	ri[tʃ]
morp	mo[p]	mo[p]
gomz	go[mzə]	go[mps]
nept	ne[f]	ne[p^h]
fets	fe[s]	fe[t]
visk	vi[s]	vi[sk]
nudz	nu[dzə]	nu[ts]
lefs	le[vzə]	le[f]
tavz	ta[zə]	ta[f]
bimp	bi[m]	bi[m]
lunk	lu[ŋk]	lu[ŋ]
melf	me[l]	me[f]
tasp	ta[s]	ta[ps]
zarb	za[bə]	za[p̚]
valt	va[l]	va[t̚]
lant	la[nt]	la[n]
folz	fo[ls]	fo[s]
nord	no[ɹt^h]	no[t̚]
tegz	te[ks]	te[tʃ]
bift	bi[vzə]	bi[f]
zoks	zo[gs]	zo[ks]

pulk	pu[lkə]	pu[k^{h}]
lart	la[ɹtə]	la[t^{h}]
parg	pa[ɹgə]	pa[gə]
zelb	ze[bə]	ze[p˺]
lubz	lu[vzə]	lu[ps]
berv	be[və]	be[pf]

	Control (Am. English)
konz	ko[nz]
sork	so[ɹk]
dast	da[st^{h}]
larf	la[ɹf]
holp	ho[lp^{h}]
fips	fi[ps]
burz	bu[ɹz]
nild	ni[ld]
rict	ri[kt^{h}]
morp	mo[ɹp]
gomz	go[mz]
nept	ne[pt^{h}]
fets	fe[ts]
visk	vi[sk]
nudz	nu[dzə]
lefs	le[fs]
tavz	ta[vzə]
bimp	bi[mp^{h}]
lunk	lu[ŋk]
melf	me[lf]
tasp	ta[sp^{h}]
zarb	za[ɹb]
valt	va[lt]
lant	la[ntə]
folz	fo[lz]
nord	no[ɹd]
tegz	te[gz]
bift	bi[ft^{h}]

zoks	zo[ks]
pulk	pu[lkə]
lart	la[ɹtʰ]
parg	pa[ɹg]
zelb	ze[lbə]
lubz	lu[bz]
berv	be[ɹv]

APPENDIX B
Cluster Faithfulness

I. C + fricative clusters
(1 = cluster maintained with no epenthesis; 0 = cluster not maintained)

Target	S1 (Spanish)	S2 (Sp.)	S3 (Sp.)	S4 (Ja.)	S5 (Ja.)
Konz	0	1	0	0	1
Larf	1	0	1	0	0
Fips	1	1	1	0	1
Burz	0	1	0	0	0
Gomz	0	1	1	0	0
Fets	1	1	1	1	1
Nudz	0	0	1	0	0
Lefs	0	0	1	1	0
Tavz	0	0	0	0	1
Melf	1	1	1	1	0
Folz	0	1	0	0	1
Tegz	0	0	0	0	0
Zoks	0	1	1	1	1
Lubz	0	1	0	0	0
Berv	0	1	0	0	0
	4/15 = 26.7%	10/15 = 66.7%	8/15 = 53.3%	4/15 = 26.7%	6/15 = 40%

Target	S6 (Ja.)	S7 (Ma.)	S8 (Ma.)	S9 (In.)	S10 (In.)	(control)
Konz	0	1	1	1	1	1
Larf	0	0	0	0	0	1
Fips	1	1	1	0	1	1
Burz	0	0	0	0	0	1
Gomz	0	0	0	0	0	1
Fets	1	0	1	0	0	1
Nudz	0	0	0	0	1	0
Lefs	1	1	1	0	0	1
Tavz	0	0	1	0	0	0
Melf	0	0	0	0	0	1
Folz	1	0	0	1	0	1
Tegz	0	1	1	1	0	1
Zoks	1	1	1	1	1	1
Lubz	0	1	0	0	1	1
Berv	0	0	0	0	0	1
	5/15 = 33.3%	6/15 = 40%	7/15 = 46.7%	4/15 = 26.7%	5/15 = 33.3%	13/15 = 86.7%

II. C + stop clusters

Target	S1 (Sp.)	S2 (Sp.)	S3 (Sp.)	S4 (Ja.)	S5 (Ja.)
Sork	0	0	1	0	0
Dast	0	0	0	0	0
Holp	0	0	0	0	0
Nild	0	0	1	0	0
Rict	0	0	0	1	0
Morp	0	0	0	0	0
Nept	0	0	0	1	0
Visk	0	0	0	0	0
Bimp	0	0	0	0	0
Lunk	0	0	0	0	1
Tasp	0	0	0	0	0
Zarb	0	0	0	0	0
Valt	0	0	1	0	0
Lant	0	0	1	0	0
Nord	0	0	0	0	0
Bift	0	0	0	0	0
Pulk	0	1	0	0	0
Lart	0	0	0	0	0
Parg	0	0	0	0	0
Zelb	0	0	0	0	0
	0/20 = 0%	1/20 = 5%	4/20 = 20%	2/20 = 10%	1/20 = 5%

Target	S6 (Ja.)	S7 (Ma.)	S8 (Ma.)	S9 (In.)	S10 (In.)	(control)
Sork	0	0	0	0	0	1
Dast	0	0	0	0	0	0
Holp	0	0	0	0	0	0
Nild	0	0	0	0	0	1
Rict	0	0	0	0	0	0
Morp	0	0	0	0	0	1
Nept	0	0	0	0	0	0
Visk	0	0	0	0	1	1
Bimp	0	0	0	0	0	0
Lunk	0	0	0	1	0	1
Tasp	0	0	0	0	0	0
Zarb	0	0	0	0	0	1
Valt	0	0	0	0	0	1
Lant	0	0	0	1	0	0
Nord	0	0	0	0	0	1
Bift	0	0	0	0	0	0
Pulk	0	0	0	0	0	0
Lart	0	0	0	0	0	0
Parg	0	0	0	0	0	1
Berv	0	0	0	0	0	0
	0/20 = 0%	0/20 = 0%	0/20 = 0%	2/20 = 10%	1/20 = 5%	9/20 = 45%

APPENDIX C
Intact Clusters + Epenthesis

I. C + Fricatives

1 = intact cluster + epenthesis; 0 = intact cluster + no epenthesis (faithfulness) OR cluster error

Target	S1 (Sp.)	S2 (Sp.)	S3 (Sp.)	S4 (Ja.)	S5 (Ja.)
Konz	1 / Intact	0 / Intact	1 / Intact	1 / Intact	0 / Intact
Larf	0 / Intact	0	0 / Intact	0	0
Fips	0 / Intact	0 / Intact	0 / Intact	0	0 / Intact
Burz	1 / Intact	0 / Intact	1 / Intact	0	0
Gomz	1 / Intact	0 / Intact	0 / Intact	1 / Intact	0
Fets	0 / Intact	0 / Intact	0 / Intact	0 / Intact	0 / Intact
Nudz	0	0	0 / Intact	1 / Intact	0
Lefs	0 / Intact	0 / Intact	0 / Intact	0 / Intact	0
Tavz	0	0	1 / Intact	0	1 / Intact
Melf	0 / Intact	0 / Intact	0 / Intact	0 / Intact	0
Folz	1 / Intact	0 / Intact	1 / Intact	0	0 / Intact
Tegz	0	0	1 / Intact	0	0
Zoks	0	0 / Intact	0 / Intact	0 / Intact	0 / Intact
Lubz	0	0 / Intact	1 / Intact	0	0
Berv	1 / Intact	0 / Intact	1 / Intact	0	0
	*5/10 = 50%	0/11 = 0%	7/15 = 46.7%	3/7 = 42.9%	1/6 = 16.7%

* 10 clusters were produced intact. 5 out of these 10 had word-final epenthesis.

Target	S6 (Ja.)	S7 (Ma.)	S8 (Ma.)	S9 (In.)	S10 (In.)	(control)
Konz	1 / Intact	0 / Intact	0 / Intact	0 / Intact	0 / Intact	0 / Intact
Larf	0	0	0	0	0	0 / Intact
Fips	0 / Intact	0 / Intact	0 / Intact	0	0 / Intact	0 / Intact
Burz	0	0	0	0	0	0 / Intact
Gomz	0 / Intact	0	0	1 / Intact	0	0 / Intact
Fets	0 / Intact	0	0 / Intact	0	0	0 / Intact
Nudz	0	0	0	1 / Intact	0 / Intact	1 / Intact
Lefs	0 / Intact	0 / Intact	0 / Intact	1 / Intact	0	0 / Intact
Tavz	0	0	0 / Intact	0	0	1 / Intact
Melf	0	0	0	0	0	0 / Intact
Folz	0 / Intact	0	0	0 / Intact	0	0 / Intact
Tegz	0	0 / Intact	0 / Intact	0 / Intact	0	0 / Intact
Zoks	0 / Intact	0 / Intact	0 / Intact	0 / Intact	0 / Intact	0 / Intact
Lubz	0	0 / Intact	0	1 / Intact	0 / Intact	0 / Intact
Berv	0	0	0	0	0	0 / Intact
	1/7 = 14.3%	0/6 = 0%	0/7 = 0%	4/8 = 50%	0/5 = 0%	2/15 = 13.3%

C + stop clusters

Target	S1 (Sp.)	S2 (Sp.)	S3 (Sp.)	S4 (Ja.)	S5 (Ja.)
Sork	1 / Intact	1 / Intact	0 / Intact	0	0
Dast	1 / Intact	1 / Intact	1 / Intact	1 / Intact	1 / Intact
Holp	1 / Intact	1 / Intact	1 / Intact	0	1 / Intact
Nild	1 / Intact	1 / Intact	0 / Intact	0	0
Rict	0	0	0	0 / Intact	0
Morp	1 / Intact	0	1 / Intact	0	0
Nept	1 / Intact	1 / Intact	1 / Intact	0 / Intact	0
Visk	1 / Intact	1 / Intact	1 / Intact	1 / Intact	1 / Intact
Bimp	1 / Intact	1 / Intact	1 / Intact	0	0
Lunk	1 / Intact	1 / Intact	1 / Intact	1 / Intact	0 / Intact
Tasp	1 / Intact	1 / Intact	1 / Intact	1 / Intact	1 / Intact
Zarb	1 / Intact	1 / Intact	1 / Intact	0	0
Valt	1 / Intact	1 / Intact	0 / Intact	1 / Intact	0
Lant	1 / Intact	1 / Intact	0 / Intact	1 / Intact	1 / Intact
Nord	1 / Intact	1 / Intact	1 / Intact	0	0
Bift	0	0	1 / Intact	1 / Intact	1 / Intact
Pulk	1 / Intact	0 / Intact	1 / Intact	0	0
Lart	1 / Intact	1 / Intact	1 / Intact	0	0
Parg	1 / Intact	0	1 / Intact	0	0
Zelb	0	1 / Intact	1 / Intact	0	0
	17/17 = 100%	15/16 = 93.8%	15/19 = 78.9%	7/9 = 77.8%	6/7 = 85.7%

Target	S6 (Ja.)	S7 (Ma.)	S8 (Ma.)	S9 (In.)	S10 (In.)	(control)
Sork	0	0	0	0	0	0 / Intact
Dast	1 / Intact	1 / Intact	1 / Intact	0	0	1 / Intact
Holp	0	0	0	0	0	1 / Intact
Nild	1 / Intact	1 / Intact	0	1 / Intact	0	0 / Intact
Rict	0	0	0	0	0	1 / Intact
Morp	0	0	0	0	0	0 / Intact
Nept	0	0	1 / Intact	0	0	1 / Intact
Visk	1 / Intact	1 / Intact	1 / Intact	0	0 / Intact	0 / Intact
Bimp	1 / Intact	1 / Intact	1 / Intact	0	0	1 / Intact
Lunk	1 / Intact	1 / Intact	1 / Intact	0 / Intact	0	0 / Intact
Tasp	1 / Intact	1 / Intact	1 / Intact	0	0	1 / Intact
Zarb	0	0	0	0	0	0 / Intact
Valt	1 / Intact	0	0	0	0	0 / Intact
Lant	1 / Intact	0	1 / Intact	0 / Intact	0	1 / Intact
Nord	0	0	0	1 / Intact	0	0 / Intact
Bift	1 / Intact	0	1 / Intact	0	0	1 / Intact
Pulk	0	0	0	1 / Intact	0	1 / Intact
Lart	0	0	0	1 / Intact	0	1 / Intact
Parg	0	0	0	1 / Intact	0	0 / Intact
Zelb	0	0	0	0	0	1 / Intact
	9/9 = 100%	6/6 = 100%	8/8 = 100%	5/7 = 71.4%	0/1 = 0%	11/20 = 55%

Emergence of the Unmarked in Interlanguage Coda Production

CHRISTINA VILLAFAÑA

Either then he has at some time acquired the knowledge which he now has, or he has always possessed it. – Plato

1 Introduction

1.1 Overview – The Availability of Negative Constraints in IL Phonology

In his dialogue between Socrates and Meno, Plato argues that Meno's knowledge has not been taught to him, but is instead innate. We find similar arguments posed by Ingram (1995) in his discussion of negative constraints, which "restrict the child's learning space through restrictions on Universal Grammar," Kager (1999) in his review of Optimality Theory, in which "all constraints are part of the grammars of all natural languages," and Pinker (1984) in his discussion of default settings that are maintained until altered by input. A crucial implication of all such arguments is the notion that grammatical constraints are not acquired, and that it is positive evidence from native language input that "leads the child to the correct grammar" (Ingram 1995).

While the theory of Universal Grammar (UG) is widely accepted, there is some debate as to the accessibility of UG to the adult language learner. Schachter (1991) discusses the ability of a learner who has abandoned a default setting or negative constraint in his first language to "re-adopt" the default setting in the second language. She admits that such an ability would constitute positive evidence for the availability of UG in adults, but cites a number of studies (Finer & Broselow 1986; Rutherford 1989; White 1989a) that fail to produce such positive evidence.

The data in this study support a theory of innate, universal negative constraints that are continually accessible to the adult language learner. I will go farther and claim that without such a theory it would be difficult to explain the study's results.

1.2 Focus of the Study

This study specifically tests for and analyzes the types of syllable-final segments (codas) produced by native English speakers in the early stages of Italian acquisition. Testing was accomplished using a language game (ludling) as a diagnostic tool and analysis of the results focuses on determining sonority preferences in the speakers' coda production. It is shown that the English speakers' coda production exhibits a strong preference for sonorant segments in syllable-final position, contradicting the surface patterns of native English phonology. Such a preference indicates that English speakers possess knowledge of a negative constraint that resurfaces in their interlanguage phonology.

1.3 Outline of the Paper

In the first section of this paper I will review the phonological theories relevant to this study, specifically sonority and its implications for syllable structure, and use them to illustrate a difference between English and Italian. In section two I will discuss the methodology used to gather data for this study, note any logistical problems and explain the manner in which raw data were analyzed. I will present the results of the data analysis in section three. Lastly, in section four I will discuss possible explanations for the study's results.

2 PHONOLOGICAL BACKGROUND

2.1 A Discussion of Sonority

Sonority can be defined as the amount of acoustic energy carried by a segment. Ladefoged (1975) defines the sonority of a sound as "its loudness relative to that of other sounds with the same length, stress and pitch." Implicit in this definition is the notion that sounds will vary in sonority and thus may be "ranked along a scale according to the degree to which they possess the property of sonority" (Clements 1992). This ranking constitutes the foundation of the *Sonority Principle,* allowing for the characterization of sounds in a hierarchy, as proposed by Clements and illustrated in (1).

(1)	Most sonorous	Vowel
		Glide
		Liquid
		Nasal
	Least Sonorous	Obstruent

It should be noted that the types of sounds in (1) have been further categorized in terms of relative sonority (Selkirk 1982; Broselow and Finer 1991; Eckman and Iverson 1993). For the purposes of this study, however, it is sufficient to collapse the hierarchy rather than expand it. Roca and Johnson (1999) define sonorants as unobstructed sounds and obstruents as obstructed sounds. This definition allows us to draw a line between two discreet categories as in (2).

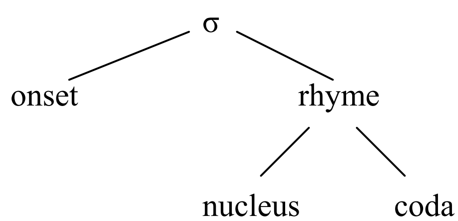
(2)	+Sonorant	Vowel
		Glide
		Liquid
		Nasal
	-Sonorant	Obstruent

From here on I will refer to the sounds in question as either *sonorants* or *obstruents*, ignoring any relative variations in sonority within each class.

2.2 Sonority as a Factor in Syllable Structure (Constraints)

A further implication of the Sonority Principle is its role in the formation of syllables. Blevins (1996) and Clements (1992) discuss the syllabification in terms of peaks and falls in sonority. The general observation is that syllables contain peaks of sonority which constitute their nuclei and may be surrounded by less sonorous material. A widely accepted syllable structure presented by Blevins is given in (3).

(3)



Clements *Dispersion Principle* proposes a cross-linguistic asymmetry within this structure, where sonority "rises maximally towards the peak and falls minimally towards the end." We should then see a preference for sonorant codas over obstruent codas in the world's languages. Such a preference is, in fact, exemplified in Blevins and given this we may conclude that obstruent codas are more marked than sonorant codas.

2.3 English and Italian Syllable Structure Constraints

English and Italian can be shown to have differing syllable structures in terms of allowable segments in coda position (Basbøll 1974) as noted in (4).

(4)	English:	C_1VC_2	C_2 may be any English consonant
	Italian:	C_1VC_2	C_2 is a sonorant[1]

Nagy and Napoli (1995) propose the Harmonic Coda Principle (HCP) to account for sonority preferences. The HCP states that the more sonorous a consonant is, the less marked it will be in coda position. This principle can be restated as an Optimality Theory constraint (5) that is more active in Italian than English.

(5) NoObstCoda[2]

For the purposes of this study, a thorough analysis of Italian coda constraints is somewhat unnecessary. The relevant fact is that a constraint against obstruency in syllable-final position exists, as exemplified by Italian, but is dormant in English. This study indicates that an inactive constraint like NoObstCoda may become active under certain conditions.

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[1] The segment [s/z] presents a perpetual problem, which Basbøll solves by categorizing [s/z] as a sonorant Note that [s/z] is found to be an irritant in other instances.

[2] Nagy and Napoli claim that Italian does allow obstruent codas when they occupy the first part of a geminate pair and other exceptional positions. Extensive analysis of this claim is outside the scope of this study. Further, the claim has no effect on the generalizations formed from data gathered in this study.

3 METHODOLOGY

3.1 The Subjects

Subjects consisted of nine native English speakers in the early stages of Italian acquisition[3] (< two months) and one native Italian speaker used as the control. None of the native English-speaking subjects was bilingual and none began acquisition of Italian earlier than 18 years of age. For details on subject background see Appendix A.

3.2 The Diagnostic Device

Subjects were instructed in a common Italian language game (*Farfallina*) of the infixation type. The rules of the game and an example are given in (6).

(6) Insert the sequence [fV] after each syllable of an input word.
Harmonize the V to the existing vowel.

Example*:* mano [mano] *(hand)* → ma **fa** no **fo** [mafanofo]

It should be noted that these rules were not used in subject instruction. At no point prior to the data elicitation were the subjects informed of the study's goal, and the word "syllable" was intentionally omitted from all discussions with subjects. Instruction, therefore, consisted of providing subjects with bisyllabic, CVCV words such as the example word in (6). No sample word contained a coda, cluster, or geminate consonant.

3.3 The Data-gathering Process

Subjects were provided with a list of minimal pairs where the gemination of a word-internal consonant served as the contrasting element in each pair. Words were read by the investigator in random order and subjects were asked to repeat the input word and subsequently perform the language game on the input word. All subjects were audio-recorded. The list of input words is given in Table 1 below. Note that five of the input word minimal pairs contain mid-word obstruents and six contain mid-word sonorants.

[3] One of the nine subjects is in the advanced stage of Italian acquisition (four years). No significant variance from early stage speakers was noted.

Table 1

	Nongeminate	*Gloss*	Geminate	*Gloss*
Obstruents:	Bruto	*Brutus*	brutto	*Ugly*
	mogio	*dejected*	moggio	*Bushel*
	papa	*Pope*	pappa	*thick soup*
	tato	*Daddy (infantile)*	tatto	*Tact*
	tuto	*secure*	tutto	*everything, all*
Sonorants:	fumo	*smoke*	fummo	*(we) were*
	mole	*massive shape*	molle	*soft/week*
	nona	*ninth (fem.)*	nonna	*Grandmother*
	pena	*pain*	penna	*Pen*
	sono	*(I) am*	sonno	*Sleepiness*
	stele	*stele*	stelle	*Stars*

4 DATA ANALYSIS

Analysis of the data consisted of noting two observations: subjects' recognition of geminate consonants and subjects' treatment of the first segment in the geminate during the language game process. Subjects' recognition of lengthened consonants was assessed in three ways: first, by listening to subjects' speech samples; second, by measuring rough distance between vowel segments using an audio-editing device; and third, by measuring length of time taken to produce each utterance in a non-geminate/geminate pair. The first method was relied on more heavily than the second two, which served for purposes of confirmation.

Given geminate recognition by a subject, there are two possible ways to treat the geminate's first segment. If the geminate is not split as a result of [fV] infixation, as in (7a), no coda will be produced in the first syllable. If the geminate is split, the first segment of the geminate will constitute a coda of the first syllable, as in (7b).

(7) a. brutto [brutto] *(ugly)* → [brufutofo]
b. brutto [brutto] *(ugly)* → [brutfutofo]

Note that the geminate consonant, even though not split, was not maintained in the control's production of output words. For the purposes of this study, I am not considering maintenance of the geminate or the usual accompanying vowel shortening.

5 RESULTS

5.1 Geminate Recognition

The speakers differentiated consonant lengths in the non-geminate and geminate words in each minimal pair. The average Geminate Recognition Rate (GRR) was 3% for non-geminates and 83% for geminates, with no significant difference between GRR within obstruent word and sonorant words.

5.2 Coda Production

Overall Coda Production Rate (CPR), or the number of codas produced as a percentage of total output words, was relatively low for both non-geminate and geminate words – 10% and 24%, respectively. These low numbers imply a general avoidance of geminate-splitting (and the resulting coda production) on the part of the speakers[4]

Given the scope of this study is to analyze the types of codas produced by speakers whose NL constraints seemingly make no distinction, we must consider not just overall coda production, but coda production within classes of sounds. When we take into consideration only the codas that were produced, the number of obstruent codas and sonorant codas as a percentage of total codas (crucially not total output words) varies: average Obstruent Coda Production Rate (O-CPR) was 13% for non-geminate words and 16% for geminate words while average Sonorant Coda Production Rate (S-CPR) was 87% for non-geminates and 84% for geminates These numbers exhibit a high level of significance ($p < .01$) and indicate a strong preference for sonorant codas over obstruent codas. Tables 2 and 3 summarize overall GRR, CPR, O-CPR and S-CPR for non-geminates and geminates, respectively. Detailed information on geminate recognition and coda production by individual subjects may be found in Appendices C and D.

Table 2

	S1	S2	S3	S4	S5	S6	S7	S8	S9	Averages
Overall GRR	0%	27%	0%	0%	0%	0%	0%	0%	0%	*3%*
Overall CPR	0%	45%	9%	27%	0%	9%	0%	0%	0%	*10%*
O-CPR	N/A	20%	0%	33%	N/A	0%	N/A	N/A	N/A	*13%*
S-CPR	N/A	80%	100%	67%	N/A	100%	N/A	N/A	N/A	*87%*

[4] Hisagi (1999) gives an account of geminate treatment in the production of language game utterances in Japanese. She suggests a pre-game stage in which the Obligatory Contour Principle (OCP) motivates geminate reduction to a singleton, thus altering the input to the language game process, which would result in failure to split geminates (and thus produce codas). Hisagi notes that nasals are not accounted for by the OCP. If an OCP account is used to explain the subjects' geminate treatment and subsequent coda production in this study, it requires that liquids also be considered exceptional. Further investigation into the representation of geminate structures may help to explain this study's data, but at present I am uncomfortable with any rule requiring exceptional treatment of at least two classes of sounds. I will regard underlying representation of geminates, and any pre-game representations, as the same for all input words.

Table 3

Fig. 10	1) TD	2) EL	3) EB	4) KT	5) LA	6) DIP	7) RS	8) DS	9) ES	10) LL	11) CHS	12) LH	13) KW	14) CLS	15) MS	16) EDS	17) BS	18) SM	19) ROS	20) RM	21) KM	22) DPJ	23) JW	24) MC	25) DP	TOTAL	AVERAGE
HIGHEST BACK [u] - MID BACK [ɔ]																											
# 15 strupe strawp	1	0	1	1	0	1	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	9	36 %
strawp strupe	0	1	0	0	1	0	1	1	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	16	64 %
# 25 hube hawb	1	1	0	1	1	0	0	1	1	1	1	1	1	1	0	1	0	0	0	1	0	0	1	0	0	14	56 %
hawb hube	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	0	1	1	11	44 %
# 26 chufe chawf	1	0	0	1	1	0	0	1	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	9	36 %
chawf chufe	0	1	1	0	0	1	1	0	1	1	1	0	0	0	0	1	1	1	1	0	1	1	1	1	1	16	64 %
# 47 glune glawn	1	1	1	1	0	1	0	0	0	1	1	0	1	1	0	0	0	1	1	0	0	1	1	1	1	15	60 %
glawn glune	0	0	0	0	1	0	1	1	1	0	0	1	0	0	1	1	1	0	0	1	1	0	0	0	0	10	40 %

	AVERAGE	P-VALUE
[u] - [ɔ]	47 %	0.15951
[ɔ] - [u]	53 %	

Note that the control was deliberately excluded from all geminate recognition and coda production analyses. This control recognized geminates in all of the geminate words but produced no codas in the language game variations. Such an avoidance of geminate-splitting is not necessarily characteristic of Italian speakers, as documented by Nagy & Napoli (1995) and Bertinetto (1992).[5]

6 DISCUSSION

6.1 Language Game as Language

It is important to note that the language game used as a diagnostic tool in this study is not exceptional. Bagemihl (1988) describes ludlings (language games) as "utilizing various forms of nonconcatenative morphological manipulations" and cites evidence that "points to the conclusion that surrogate systems are in fact a natural linguistic behavior." Given this view of language games as natural processes, there is every reason to believe that the subjects' behavior documented in this paper conforms to normal linguistic processes and can be explained by generally accepted linguistic principles.

6.2 Why a preference for sonorant codas?

The data support a preference for sonorant codas over obstruent codas in native English speakers' production of Italian. Why would this be the case when the constraint NoObstCoda clearly does not apply in English? We might hypothesize that although NoObstCoda is not an *active* English constraint, it nonetheless exists in the English speakers' grammar and something triggers its resurfacing in an exceptional phonology such as interlanguage.

First, it is necessary to rule out both NL transfer and TL knowledge as motivating factors in the subjects' avoidance of obstruent codas. Transfer is not a satisfactory explanation, as the NL, English, in this case, provides no evidence for a preference in coda sonority. Such a lack of evidence is clear from the empirics of English lexical entries. The argument that TL knowledge is not at work is weaker – the subjects could, in theory, have formulated a NoObstCoda constraint from Italian evidence, however, this does not seem probable for two reasons. First, it is highly unlikely that the subjects would have been explicitly taught that Italian prefers sonorous codas or that they would have inferred this from linguistic evidence in the short period of their exposure to Italian. Second, the methodology used to elicit coda production was such that it precluded any

[5] Nagy and Napoli gathered data using a language game and found a tendency for speakers to ambisyllabify geminates, noting that 96% of sonorant geminates were ambisyllabified, as compared with 87% of obstruent geminates. Bertinetto, also using a language game diagnostic, found a similar tendency to split geminates, but did not examine different treatments among obstruent and sonorant classes.

conscious effort on the part of the subjects to determine coda sonority and subsequently select different values of sonority in their coda production. Replication of this study using English speakers with no exposure to languages that have an active NoObstCoda constraint would certainly rule out TL knowledge as a factor in determining coda preferences. For the moment, I am comfortable assuming that knowledge of sonority constraints in coda position was neither transferred from knowledge of NL surface forms nor learned from TL evidence.

The case for a resurfacing of markedness constraints, or "emergence of the unmarked" is made by McCarthy & Prince (1994) and argued by Broselow et al (1998) and Bhatt & Bhatt (1997). They claim that phonological phenomena in interlanguage may be explained by principles of Universal Grammar, specifically by assuming that negative constraints are present in all speakers' grammars and that some of these constraints are dominated by higher-ranked constraints in the NL. Fluctuation of constraint rankings in a speaker's interlanguage then allows for the resurfacing of previously low-ranked constraints. This provides a sound explanation for the presence of NoObstCoda in my subjects' productions. All that remains is to motivate such an emergence of the unmarked.

A simple theory based on competition between markedness and faithfulness constraints in an Optimality Theory framework may suffice to explain the sonority preferences discussed in this paper. If we assume that constraints are universal, we must explain the inactivity of the NoObstCoda constraint in English; in other words, what is such a constraint outranked by? It seems reasonable to assume, given a theory of richness of the base, that faithfulness to the input is a primary factor in nullifying NoObstCoda constraints in English, therefore, will be ranked as in (8).

(8) IDENT-IO >> NoObstCoda

If the ranking in (8) is sound, then the demotion of the faithfulness constraint IDENT-IO will allow the markedness constraint NoObstCoda to emerge. Such a demotion would imply that faithfulness is less active in some speakers' IL grammars. This deranking of faithfulness seems to be evident in some speakers' preferences for deletion over epenthesis, as mentioned in Ingram 1995. The fact that variation in coda production occurs is a further instantiation of constraint re-ranking in an OT account: as subjects move from the NL grammar to the TL grammar their constraint rankings fluctuate at the individual level (Broselow et al, 1998).

6.3 Methodology problems and observations

A number of issues arose during this study that could have effects on the data or their interpretation. The first is the non-native Italian proficiency of the interviewer, which could have two possible effects: it could bias the subjects' geminate recognition by providing input with little contrast between geminate and non-geminate pairs or could result in a less accurate judgement of geminate recognition. Because the control recognized geminates consistently and provided a benchmark for geminate recognition judgements, the interviewer's non-native speech may not have posed a problem.

It is possible that another rule of English phonology (at least one operating at the lexical level) has a role in the subjects' avoidance of obstruent codas. The Syllable Contact Law, which favors the sequence <sonorant,obstruent> where the coda and onset of two syllables are juxtaposed, would prohibit a sequence [Cf] where C is an obstruent. This observation calls for a second study using different segments in the consonant position of the ludling's inserted material.

The majority of subjects did not follow the vowel harmonization rules of the language game and sometimes altered the vowel segments in the input word (see Appendix B for details). Any unsatisfactory performance of the game, however, did not pose a problem for the purposes of this study, as the only relevant consideration is subjects' treatment of the geminates. The data gathered allow for the analysis of the subjects' production of syllable codas.

7 CONCLUSION

At the start of this paper I presented several accounts of the universality of negative constraints and introduced Schachter's hypothesis that an emergence of such constraints would constitute evidence for continued accessibility of UG to post-critical period speakers. This study has presented evidence of sonority preferences on the part of speakers whose native language surface forms do not show such preferences. Of three possible explanations for these results, namely, NL transfer, TL knowledge and UG availability, only the latter seems plausible, and has been rationalized within a simplified framework of Optimality Theory where inactive markedness constraints are permitted to emerge as higher-ranked constraints are demoted. If such an emergence can be held to account for the data in this study, Schachter's challenge has been met and UG is available to adults.

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APPENDIX A
Subject Profiles

Subject	Testing Pool	Age/ Gender	Other Languages/ Proficiency	Age of TL Onset	Time TL Studied
1	NVCC Alexandria Italian 101	19/M	Spanish/1.5	19	6 weeks
2	NVCC Alexandria Italian 101	?/F	-	?	6 weeks
3	NVCC Alexandria Italian 101	20/F	Spanish/2.5	20	6 weeks
4	NVCC Alexandria Italian 101	57/F	Latin/1 Thai/1 German/1 French/2	57	6 weeks
5	NVCC Alexandria Italian 101	30/F	Russian/2	30	6 weeks
6	NVCC Alexandria Italian 101	42/F	-	42	6 weeks
7	NVCC Alexandria Italian 101	36/M	Spanish/2 French/1	36	6 weeks
8	NVCC Alexandria Italian 101	21/F	French/2 Spanish/1 Hebrew/1	21	6 weeks
9	Casa Italiana, Wash. DC Advanced Conversation	44/F	French/1	38	5 years
10 (Control)	Italian NS (Tuscany)	59/M	French/4 English/4 Spanish/2 German/2	n/a	n/a

APPENDIX B
IPA Transcriptions of Language Game Productions
Subjects 1-5

Input	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5
bruto	bɹufotufo	bɹufatufo	bɹufotofo	bɹufotufo	bɹufutofo
mogio	mofodʒofo	mofadʒofo	mofodʒofo	mofodʒofo	mofodʒofo
papa	pafapafa	pafapafa	pafapafa	papfapafa	pafapafa
tato	tafotafo	tafatofo	tafotofo	tafotafo	tafatofo
tuto	tufotufo	tutfatufo	tufotufo	tufotofo	tufutofo
fumo	fufomufo	fumfamofo	fufamufa	fufomufo	fufumufo
mole	mofelefe	mofalefo	mofolefo	mofelofe	mofolefe
nona	nofonofa	nonfanafa	nonfanonfa	nonfononfo	nofonafa
pena	-	penfanafa	pefanefa	penfanenfa	pefenafa
sono	sofonofo	sofanofo	sofonofo	sofonofo	sofonofo
stele	stefelefe	stelfalefa	stefalefa	stefelefe	stefelefe
brutto	bɹufotufo	bɹufatufo	bɹufotofo	bɹutfotufo	bɹufutofo
moggio	mofodʒofo	mofadʒofo	mofodʒofo	mofodʒofo	mofodʒofo
pappa	pafapafa	pafapafa	pafapafa	papfapapfa	pafapafa
tatto	tafofato	tafatofo	tafotofo	tæfofafo	tafatofo
tutto	tufotufo	tufatufo	tufotofo	tutfotufa	tufutofo
fummo	fufomufo	fumamufo	fufomofo	fufomufo	fufumofo
molle	mofolefe	mofalefe	mofalofa	mofelofe	mofolefe
nonna	nofonafa	nonfanonfo	nonfanonfa	nonfanonfa	nofanafa
penna	pefenefe	penfanafa	penfanenfa	penfanenfa	pefenafa
sonno	sofonofo	sonfanonfo	sofonofo	sonfononfo	sofonofo
stelle	stelfeelfe	stelfalefa	stelfolelfo	stelfelelfe	stefelefe

APPENDIX B (continued)
IPA Transcriptions
Subjects 6-10

Input	Subject 6	Subject 7	Subject 8	Subject 9	Subject 10
bruto	brufatafa	brufatofa	brufotufo	brufatofa	brufotofo
mogio	mofadʒofa	mofadʒofa	mofodʒofo	mofadʒofa	mofodʒofo
papa	pafapafa	pafapafa	pafopafo	pafapafa	pafapafa
tato	tafatofa	tafatofa	tafotofo	tafatofa	tafotofo
tuto	tufatofa	tufatofa	tufotufo	tufatofa	tufatafa
fumo	fufamofa	fufamofa	fufomufo	fufamofa	fufomofo
mole	mofelefe	mofalefa	mofolofo	mofalefa	mofolefo
nona	nofanofa	nofanofa	nofanofa	nofanofa	nofanafa
pena	pefanefa	pefanafa	pefonefo	pefanefa	pefenafe
sono	sonfanofa	sofanofa	sofonofo	sofanofa	sofonofo
stele	stefalefa	stefalefa	stefolefo	stefalefa	stefelefe
brutto	brufatofa	brufatofa	brufotufo	brufatofa	brufotofo
moggio	modfadʒafa	mofadʒofa	mofodʒofo	madfadʒofa	mofodʒofo
pappa	pafapafa	pafapafa	pafapafa	pafapafa	pafapafa
tatto	tafatafa	tafatofa	tafofafo	tafatofa	tafotofo
tutto	tufatofa	tufatofa	tufotofo	tufatofa	tufotofo
fummo	fufamofa	fufamofa	fufomufo	fufamofa	fufomofo
molle	mofelefe	mofalefa	mofolefo	mofalefa	mofelefe
nonna	nonfanonfa	nofanofa	nofolefo	nonfanafa	nofanafa
penna	penfanafa	pefanefa	pefonefo	penfanafa	pefenafe
sonno	sonfanofa	sofanofa	sofonofo	sofanofa	sofonofo
stelle	stelfalafa	stefalefa	stefelefe	stefalefa	stefelefe

APPENDIX C
Geminate Recognition Data

Non-geminates

Input	Sonority	S1	S2	S3	S4	S5	S6	S7	S8	S9	GRR by word
bruto	O	N	N	N	N	N	N	N	N	N	*0%*
mogio	O	N	N	N	N	N	N	N	N	N	*0%*
papa	O	N	N	N	N	N	N	N	N	N	*0%*
tato	O	N	N	N	N	N	N	N	N	N	*0%*
tuto	O	N	Y	N	N	N	N	N	N	N	*11%*
fumo	S	N	Y	N	N	N	N	N	N	N	*11%*
mole	S	N	N	N	N	N	N	N	N	N	*0%*
nona	S	N	N	N	N	N	N	N	N	N	*0%*
pena	S	-	N	N	N	N	N	N	N	N	*0%*
sono	S	N	N	N	N	N	N	N	N	N	*0%*
stele	S	N	Y	?	N	N	N	N	N	N	*11%*

	S1	S2	S3	S4	S5	S6	S7	S8	S9	Averages
Average Overall GRR	*0%*	*27%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*3%*
Average O-GRR	*N/A*	*33%*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*33%*
Average S-GRR	*N/A*	*67%*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*67%*

Geminates

Input	Sonority	S1	S2	S3	S4	S5	S6	S7	S8	S9	GRR (by word)
brutto	O	Y	Y	N	Y	Y	Y	Y	N	Y	*78%*
moggio	O	Y	Y	N	Y	Y	Y	Y	Y	Y	*89%*
pappa	O	Y	Y	N	Y	Y	Y	Y	N	Y	*78%*
tatto	O	N	Y	Y	Y	Y	N	Y	Y	Y	*78%*
tutto	O	Y	Y	Y	Y	Y	Y	Y	N	Y	*89%*
fummo	S	Y	Y	N	Y	Y	N	N	N	Y	*56%*
molle	S	Y	N	N	Y	Y	Y	N	N	Y	*56%*
nonna	S	Y	Y	Y	Y	Y	Y	N	Y	Y	*89%*
penna	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	*100%*
sonno	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	*100%*
stelle	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	*100%*

	S1	S2	S3	S4	S5	S6	S7	S8	S9	Averages
Average Overall GRR	*91%*	*91%*	*55%*	*100%*	*100%*	*82%*	*73%*	*55%*	*100%*	*83%*
Average O-GRR	*40%*	*50%*	*33%*	*45%*	*45%*	*44%*	*63%*	*33%*	*45%*	*44%*
Average S-GRR	*60%*	*50%*	*67%*	*55%*	*55%*	*56%*	*38%*	*67%*	*55%*	*56%*

APPENDIX D
Coda Production Data

Non-geminates

Input	Sonority	S1	S2	S3	S4	S5	S6	S7	S8	S9	CPR (by word)
bruto	O	N	N	N	N	N	N	N	N	N	*0%*
mogio	O	N	N	N	N	N	N	N	N	N	*0%*
papa	O	N	N	N	Y	N	N	N	N	N	*11%*
tato	O	N	N	N	N	N	N	N	N	N	*0%*
tuto	O	N	Y	N	N	N	N	N	N	N	*11%*
fumo	S	N	Y	N	N	N	N	N	N	N	*11%*
mole	S	N	N	N	N	N	N	N	N	N	*0%*
nona	S	N	Y	Y	Y	N	N	N	N	N	*33%*
pena	S	-	Y	N	Y	N	N	N	N	N	*22%*
sono	S	N	N	N	N	N	Y	N	N	N	*11%*
stele	S	N	Y	N	N	N	N	N	N	N	*11%*

	S1	S2	S3	S4	S5	S6	S7	S8	S9	Averages
Average Overall CPR	*0%*	*45%*	*9%*	*27%*	*0%*	*9%*	*0%*	*0%*	*0%*	*10%*
Average O-CPR	*N/A*	*20%*	*0%*	*33%*	*N/A*	*0%*	*N/A*	*N/A*	*N/A*	*13%*
Average S-CPR	*N/A*	*80%*	*100%*	*67%*	*N/A*	*100%*	*N/A*	*N/A*	*N/A*	*87%*

Geminates

Input	Sonority	S1	S2	S3	S4	S5	S6	S7	S8	S9	CPR (by word)
brutto	O	N	N	N	Y	N	N	N	N	N	*11%*
moggio	O	N	N	N	N	N	Y	N	N	Y	*22%*
pappa	O	N	N	N	Y	N	N	N	N	N	*11%*
tatto	O	N	N	N	N	N	N	N	N	N	*0%*
tutto	O	N	N	N	Y	N	N	N	N	N	*11%*
fummo	S	N	Y	N	N	N	N	N	N	N	*11%*
molle	S	N	N	N	N	N	N	N	N	N	*0%*
nonna	S	N	Y	Y	Y	N	Y	N	N	Y	*56%*
penna	S	N	Y	Y	Y	N	Y	N	N	Y	*56%*
sonno	S	N	Y	N	Y	N	Y	N	N	N	*33%*
stelle	S	Y	Y	Y	Y	N	Y	N	N	N	*56%*

	S1	S2	S3	S4	S5	S6	S7	S8	S9	Averages
Average Overall CPR	*9%*	*45%*	*27%*	*64%*	*0%*	*45%*	*0%*	*0%*	*27%*	*24%*
Average O-CPR	*0%*	*0%*	*0%*	*43%*	*N/A*	*20%*	*N/A*	*N/A*	*33%*	*16%*
Average S-CPR	*100%*	*100%*	*100%*	*57%*	*N/A*	*80%*	*N/A*	*N/A*	*67%*	*84%*

Synonymy: Not the Sole Cause of Blocking

KATHLEEN BAKER

Aronoff claims that "the lexicon is arranged according to stems, and that for each stem there is a slot for each canonical meaning . . . [and] there cannot be more than one item in each meaning slot" (Di Sciullo & Williams 1987:10; henceforth D&W). Aronoff cites the example of *gloriousness* and *gloriosity*, where *gloriousness* is grammatically correct and located in the lexicon, but *gloriosity*, a possible synonym, is blocked. D&W claim (1987:10) that "a word is blocked only by the existence of a synonym." But, synonymy doesn't appear to be the sole cause of blocking.

D&W expand Aronoff's claim of synonymy (1987:11) by stating that "blocking occurs across the syntax/morphology boundary." They cite the following English comparative formation rules and examples (1987:11):

(1) Morphologic: Add the suffix *-er* to monosyllables or disyllables ending in *-y*

hot → hotter happy → happier **blocked:** colorful → *colorfuller

and,

(2) Syntactic: Adjoin the adverb *more* to a multisyllabic adjective

more colorful **blocked:** *more hot

These examples allow D&W to make the claim that the second comparative rule (syntactic) is blocked by the first rule (morphologic) and that "blocking is characteristic, not of words in particular, but potentially of any kind of unit." (1987:11-12)

The claims of these authors might lead us to believe that **anytime** *-ness* affixation occurs, *-ity* affixation with the same stem is blocked due to synonymy; and the adjunction of the adverb *more* to a monosyllabic adjective is blocked due to semantic and functional synonymy, as is *-er* affixation to multisyllabic adjectives not ending in *-y*.

Consider the following words:

dense → dense*ness* (n.) The dense*ness* of the fog obscured our vision.
timid → timid*ness* (n.) The timid*ness* of the rabbit disappeared quickly.

dense → dens*ity* (n.) The dens*ity* of the fog obscured our vision.
timid → timid*ity* (n.) The timid*ity* of the rabbit disappeared quickly.

These examples show that *-ness* affixation to the same stem does not block *-ity* affixation, despite synonymy.

Further, adjunction of the adverb *more* to a monosyllabic adjective is also grammatical.

dense → *more* dense This cake is much *more dense* than that.

And, *-er* affixation to multisyllabic words not ending in *-y* are also grammatical.

timid → timider This child is *timider* than a rabbit.

In conclusion, the synonymy of words doesn't seem to be the only cause for blocking with *-ness* and *-ity* affixation. Nor does semantic and functional synonymy be the only cause for blocking of *-er* affixation with multisyllabic adjectives not ending in *-y* or the adjunction of the adverb *more* with monosyllabic adjectives. There must, therefore, be a deeper cause for the blocking of these forms.

References

Di Sciullo, Anna-Maria, and Edwin Williams. 1987. *On the Definition of Word.* Cambridge, Massachusetts: MIT Press.

Semantics in Support of the Quantifier Float

MELISSA R. OLT

Baltin (1980) rejects Jackendoff's (1977) posited constituency structure in (1) in favor of the Quantifier Phrase structure in (2).

(1) all [three of the men]
(2) [all three] of the men

Baltin points out that if three were properly the constituent of the NP three of the men, then (3) below should not be possible, since it would involve the movement of a nonconstituent:

(3) The men had all three been in love with Garbo. (Baltin's (21))

Baltin's constituency structure in (2) is based on the existence of a Quantifier Phrase (QP) that floats, as proposed by Bresnan (1973).

A brief examination of the constituency structures in (1) and (2) reveals that the heads of the NPs are three and men respectively. In either case, the syntactic and semantic properties of both phrases spell out as plural. Consider the following, however.

(4) Each [one of the children] runs.
(5) [Each one] of the children runs.

The syntactic properties of (4) and (5) spell out as singular. The semantic properties, on the other hand, spell out as singular for (4) and plural for (5). The semantic alternation in (4) and (5) is attributed to their respective heads: one, which is singular, and children, which is plural. Since the semantics of the NP each one of the children is plural – more than one child ran – and only the constituency structure in (5) affords a plural semantic reading, the better constituency structure for the NP is obviously the Quantifier Phrase structure, as argued by Baltin.

References

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Bresnan, Joan. 1973. Syntax of the comparative clause construction in English. *Linguistic Inquiry* 4, 275-343.

Jackendoff, Ray. (1977) *X Syntax: A study of phrase structure.* Linguistic Inquiry Monograph 2, MIT Press, Cambridge, Massachusetts.

A Lexicalist Approach To Absolute Reflexives

SZILVIA OSZKO

Lees and Klima (1963; henceforth L&K) note that English has absolute reflexive verbs, which constitute a separate category of verbs whose objects can only be reflexive pronouns, e.g. *absent oneself, perjure oneself, bestir oneself*. L&K call the base verbs reflexive intransitives, and claim that through transformation, these verbs get an object that is identical with the subject, and in a subsequent step this object is pronominalized.

This series of rules clearly contradicts the Principle of Economy that claims that language always uses the minimum number of steps to form a structure. L&K's analysis presupposes that the base word that is contained in the lexicon is an item that never gets realized without the two additional obligatory rules that determine its actual form. The following example illustrates their analysis:

(1) a. Lexical entry: perjure (v)   Example: O.J. perjures.
    b. Obligatory transformation: O.J. perjures O.J.
    c. Obligatory pronominalization: O.J. <u>perjures himself</u>.

I propose that instead of deriving the underlined item by an operation on a simple -- and non-existing -- verb's argument structure, we consider it as a complex item that constitutes a separate entry in the lexicon. It just happens to be two words, but we see many similarly complex units in the lexicon, e.g. verb+particle constructions like *put off*, or compound words like *pot luck.* This approach is more economical, since it allows these complex verbs to occupy one slot in the lexicon and does not require additional rules -- as opposed to L&K's approach which provides the bare verbs one slot in the lexicon, plus requires two rules to get the reflexive form. Basically, what L&K consider a phenomenon that needs to be dealt with and constrained in syntax, becomes a simple lexical axiom in this framework.

The following two arguments support the alternative analysis outlined here:

(i) L&K observe that reflexive verbs cannot be separated from the reflexive pronouns under conjunction, whereas non-reflexive verbs followed by reflexive pronouns can:

(2) * John excused and behaved himself. (=L&K (103))
(3) John cut and scratched himself. (=L&K (104))

Their theory could not explain why the following sentence is bad:

(4) * O.J. cut and perjured himself.

The approach advocated here states that unlike *scratched himself,* the item *perjured himself* is one lexical unit, therefore it cannot lend its second half (*himself)* to another verb, because it is not an argument that can be shared. The same explanation is held for *behaved himself* in (2). Hence, we can consider (3) an elliptical sentence, whereas in (2) and (4) we have verbs whose second halves are missing.

(ii) Language after language we see that the same class of verbs can be followed by a reflexive pronoun, e.g. *to cut oneself*. The occurrence of absolute reflexives, however, seems rather idiosyncratic, it cannot be attributed to meaning; therefore it is more of a random phenomenon which meaning is expressed in an absolute reflexive verb in a certain language. This characteristic of the absolute reflexives makes it necessary to list them as inseparable objects in the lexicon.

References

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Subject Prominence in English Middles

CHRISTINA VILLAFAÑA

Surface subjects (henceforth S-subjects) of middle and ergative constructions exhibit different levels of prominence in their roles as subjects. While the S-subject in each construction is generally accepted as an internal argument of its verb, the degree of agentivity varies when this internal argument raises to subject position. Given the following

(1) a. Bureaucrats bribe easily.
    b. Ships sink.

the middle S-subject bureaucrat in (1a) does not function as an agent in the act of bribing while the ergative S-subject ship in (1b) does.

Following Burzio (1986), we might refer to (1a,b) as BV members of AVB/BV alternations, where the internal θ-role of the AVB construction has been externalized alà Williams (1981a) to produce BV. Assuming this derivation, it is interesting to note that a difference in S-subject prominence is also obvious in the AVB forms of (1a,b) where an explicit agent is present, as shown by the paraphrasing of the AVB sentences in (2a,b) as (3a,b).

(2) a. X bribed the bureaucrat.
    b. X sank the ship.

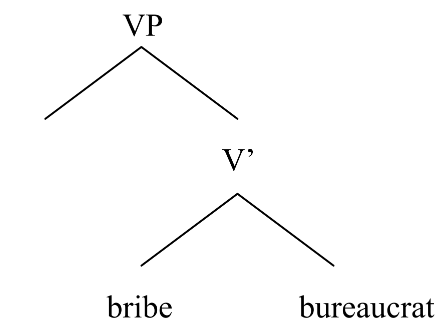
(3) a. * X caused the bureaucrat to bribe easily.
    b. X caused the ship to sink.

The direct objects in (2a,b) are different in that the object of (2a) is prohibited from being the subject of an embedded causative complement clause in (3a) while the object of (2b) is not and paraphrases as the grammatical (3b). To account for this difference, I propose that the objects of (2a,b) are different types of internal arguments and are base-generated in different positions relative to their respective verbs. If this is true, and the AVB forms in (2a,b) are fundamentally different in terms of the internal argument position of their verbal complements, the noted difference in subject prominence of middle and ergative S-subjects may be explained in a simple way.

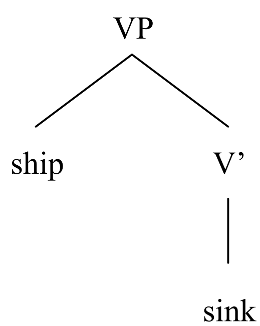
Among the arguments presented to explain the difference between middle and ergative behavior are lexical transitivity differences (Keyser & Roeper 1984; henceforth K&R); stative/eventive contrasts (Fagan 1988); and unergativity/unaccusativity contrasts (Akema & Schoorlemmer 1995; henceforth A&S). These arguments do not take into account the difference in subject prominence presented above and as a result do not consider a difference in internal argument status. While both K&R and Fagan acknowledge the middle and ergative S-subject as an internal argument of the verb, they explain differences by location of movement in different domains (K&R) or stative/eventive semantic contrasts (Fagan), but crucially not by differentiating between the relationship of the verb and its internal argument. A&S, while recognizing a significant difference in the relationships between the two S-subjects and their respective verbs, make the claim that the middle S-subject is a logical subject and the ergative S-subject a logical object. This is essentially the opposite of the claim that I make here, which is that the D-structure of middles and ergatives reflects the stronger subject status of the ergative S-subject.

In this paper I will examine only the difference in S-subject prominence of middles and ergatives and attempt to explain it by locating each construction's S-subject in a different VP-internal position in the basic AVB forms. I will argue that S-subject behavior of middles and ergatives can be explained by one parsimonious assumption: whether the domain of derivation is lexical or syntactic, middle S-subjects are derived from a VP-internal object position, while ergative S-subjects are derived from a VP-internal subject position. The assumed base-generated structures are similar to those presented in Larson (1988), Hale & Keyser (1993) and Basilico (1998), where the verb's internal argument may be either a VP-internal object, as in (4a) or a VP-internal subject, as in (4b).

(4) a. Middles



b. Ergatives



There are two phenomena, affectedness and predication, which taken together will motivate the structures in (4a,b). We may first locate the NP arguments inside the VP via affectedness and subsequently distinguish them via differences in predication types.

Affectedness, noted by Hopper (1985) as a fundamental test for transitivity, and therefore internal argument status, seems a strong justification for establishing the NPs in (4a,b) in their VP-internal positions. Taken alone, however, the semantic notion of affectedness or change-of-state does not suffice to generate different structures within VP. Note that *ship* in each of the following cases is an affected argument of its verb,

(5) a. X sank the ship / The ship sank / The ship sank easily
b. X destroyed the ship / *The ship destroyed / The ship destroyed easily
c. X painted the ship / *The ship painted / The ship painted easily

but the ergatives in (5b,c) are ungrammatical while the middles are fine. Clearly, affectedness cannot be the sole basis for differentiating between middle and ergative S-subjects, as we run into a problem categorizing internal arguments by measuring the degree to which they are affected. It is worth noting that Fagan's semantic analysis of middles as generic and ergatives as eventive also fails to point out any difference between the two constructions' internal arguments, and breaks down further given the fact that stative ergatives behave differently than stative middles on the repetitive *away* and *out*-prefixation tests introduced by K&R, as in (6a,b) and (7a,b).

(6) a. Ships sink away (when hit by cannonballs).
b. * Bureaucrats bribe away (when presented with lavish gifts).

(7) a. Ships outsink sailboats.
b. * Bureaucrats outbribe managers.

Something more than semantics is required to distinguish types of internal arguments and predict the grammaticality of ergative alternations. (I should note here that there are syntactic tests for internal argument status, notably auxiliary selection and object cliticization in languages where these occur (Burzio 1986). I must point out that such tests are more along the lines of *a posteriori* diagnostics for internal arguments, but crucially not motivating factors for the location of arguments inside VP.)

The second step in motivating the representations in (4a,b) is based on Basilico's (1998) claim that different predication forms correspond to different positions of objects within VPs. Basilico supports his claim via syntactic scope differences between alternations in creation/transformation, locative and double-object constructions, but we can extend the association of predication forms and object position to middle and ergative S-subjects and use it in support of the structures in (4a,b). In fact, Roeper and van Hout (1999) notice a similar scope difference in middles and ergatives, explicated by the structures in (8a,b).

(8) a. These suitcases open up easily.
b. These suitcases easily open up.

Roeper and van Hout's claim is that only the adverbial in post-verbal position (8a) results in a middle reading, while the adverbial in pre-verbal position (8b) results in an ergative (unaccusative per Roeper and van Hout). If this is correct, we have syntactic evidence to extend Basilico's argument to the domain of middles and ergatives.

Basilico contrasts between two forms of VP-internal predication, thetic and categorical, where only the latter singles out a VP-internal argument:

> When an object occupies an internal position, this corresponds to a 'thetic predication' within the inner predication in which an assertion is being made as to the existence of an object or of an event involving the object. When an object occupies an external position, this corresponds to a 'categorical predication' within the inner predication, in which a property is being ascribed to the object.

There is a sense in which the categorical predication's "individuation" (Basilico's term) of an argument corresponds to the argument's ability to function in a subject role. It is clear that of the objects in (5a,b,c), only the *ship* in (5a) is uniquely related to the verb *sink* in the sense that it is not only a part of the action of sinking, but also a performer of such action. The *ship* is, regardless of the presence or absence of an agent, doing, or experiencing, the *sinking*. This participation of the object in the action of its verb is the basis for locating the NP of the AVB structure in (4b) outside of V' and for the subsequent BV/ergative alternation of (1b). The failure of the verbs *destroy* and *paint* in (5b,c) to ergativize might simply be due to the type-of-predication subcategorization of these verbs: *destroy* and *paint* call for a thetic predication with their objects.

We might consider, on the basis of such affectedness and predication arguments, ergatives as constructions with a VP-internal subject. This would seem to indicate a third class of verbs, in addition to accusatives and unergatives, in which an NP enjoys both a subject and object role. Once again, complement-clause paraphrases like those in (3a,b) may be used to demonstrate the differences among these classes.

(9) a. X bribed Y.
b. * X caused Y to bribe.

(10) a. * X laughed Y.
b. X caused Y to laugh.

(11) a. X sank Y.
b. X caused Y to sink.

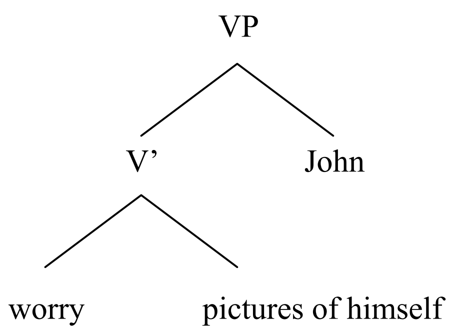
Note that the grammaticality of (9a,b) and (10a,b), the accusatives and unergatives, respectively, is in complementary distribution – (9b) is ruled out because Y is an object and only an object; (10a) fails because Y is a subject and only a subject. Both constructions in (11), however, would be allowed if Y functions as both a subject and object of its verb. I will note here that A&S's argument for middle S-subjects as logical subjects would predict that (9) and (10) exhibit the same patterns of grammaticality. They do not.

The creation of a third category of verbs is not as ad-hoc as it seems, as ergative S-subject behavior resembles that of psych-verb Experiencer objects. Belletti & Rizzi's (1988) (henceforth B&R) representation of psych-verbs is that of verbs with two internal objects, where the Experiencer *John* has more thematic prominence than the Theme *pictures of himself* in (12).

(12) Pictures of himself worry John.

B&R hypothesize the structure in (13), where asymmetrical c-command, use of arbitrary *pro*, and embedded causatives follow from the location of the psych-verb Experiencer in a VP-internal subject position.

(13)



This structure is essentially similar to that of (4b) if we consider only the location of the VP-internal subjects (*ship* in (4b) and *John* in (13)) in relation to their verbs. It would follow that ergatives pattern in some respects with psych-verbs, which in fact they seem to do.

Psych-verbs of the *worry* class exhibit the alternations in (14a,b).

(14) a. X worries Y.
b. Y worries.

This AVB/BV pattern is exactly the same as that found in ergatives. There are additional similarities between the *worry* psych-verbs and ergatives which are not apparent in middles, specifically, the ability to embed psych-verbs and ergatives in a causative construction (15); the possibility of a passive agent (16); and *si*-clitic use in Italian (17).

(15) a. Psych-verb: X worries Y. (X causes Y to worry)
b. Ergative: X sinks Y (X causes Y to sink)
c. Middle: X bribes Y (*X causes Y to bribe)

(16) a. Psych-verb: Flaws in his character worry John
b. Ergative: Holes in their hulls sink ships.
c. Middle: *Financial greed bribes bureaucrats.

(17) a. Psych-verb: Y si preoccupa. (Y worries.)
b. Ergative: Y (si) affonda. (Y sinks.)
c. Middle: Y SI legge facilmente. (Y reads easily.)

Regarding (17a,b,c), Burzio (1986) claims that psych-verbs and ergatives (Burzio's term for the BV alternations of AVB/BV pairs) both select for the non-thematic ergative *si* (sometimes optional in the case of ergatives). Italian "middles", however, select for thematic subject *SI*, which is never optional, and often require an adverbial in object-preposing cases such as that of (17c). In combination with the English evidence in (15) and (16), the *si/SI* alternations substantiate the claim that ergative S-subjects relate to their verbs differently than middle S-subjects.

It seems the difference in middle and ergative subject prominence may be explained by a crucial distinction between the two constructions' internal arguments: middle S-subjects originate as VP-internal objects; ergative S-subjects are, in a sense, subjects all along. Evidence in support of such a distinction comes from form-of-predication arguments and comparisons with certain psych-verbs, and seems to indicate a fundamental difference in the subcategorizations of verbs that can ergativize and verbs that cannot. In fact, the hypothesis presented in this paper suggests that middle and ergative S-subjects are different even when the ergative contains the canonical middle adjunct *easily*, as in (18a,b), where despite the adjunct in (18b) no agent is implied.

(18) a. Bureaucrats bribe easily.
b. Ships sink easily.

It is possible that such an analysis of internal argument structure may explain further variations in middle and ergative syntactic behavior. If this is the case, we could avoid lexical movement analyses that utilize syntax-like derivations in the lexicon to generate new D-structures and simply rely on different basic VP structures for different classes of verbs.

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“What happened to my Yiddish?”

ABBY BROWN

Extrapolating from research on language attrition, the author describes the process by which her father—who migrated from Russia to the United States at age eight—"lost" his native language, Yiddish, to his second language, English, and the reasons for the loss. Among the variables associated with his language loss were his young age at time of migration, his long separation from speakers of Yiddish, his strong desire to assimilate, and the negligible extent to which he viewed maintenance of his Yiddish as essential to his Jewish identity.

Introduction

How is it possible to forget one's native language? It is a question that has interested linguists specializing in language loss for decades, but which drew my attention only a few years ago when, sorting through some papers of my recently deceased father, I found his handwritten "memories" (Chapkis). I had read them before, but this time I was riveted by five words I had not focused on earlier: *"What happened to my Yiddish?"* In this paper I attempt to answer my father's question by examining what research shows about the process of language loss and the likely reasons my father lost his native language.[1]

1 Background

In 1909, when my father, Fibel, was eight years old, he migrated from his village of Kakhovka, in the southern part of Russia, to the United States. He arrived, along with three sisters and his parents, speaking Yiddish and a smattering of Hebrew and Russian. The family settled in Pittsburgh, Pa., where they had relatives and where there was a sizable community of Eastern European Jews. Fibel was soon enrolled in the public school, where his name was Anglicized to "Frank." By the time Frank quit school five years later, he was speaking fluent, unaccented English, according to his American-born sister, Anna (Rafael). In his memoir, which Frank wrote in his eighty-ninth year (he died at age ninety-five), he said he quit school because of a teacher and bullying students who ridiculed his stutter. He also quit, he said, because he wanted to work at his father's harness shop, which was about to convert to one of the country's first automobile repair facilities.

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[1] I did not attempt in this paper to speculate on which elements of my father's Yiddish may have been more permeable to loss and displacement than other elements. However, H. Seliger postulates a principle that states: "In the case where L2 [second language] becomes the dominant language of the bilingual and there is attrition in L1 [first language], those grammatical rules that serve the same semantic function, but which are simple linguistically, will displace similar but more complex rules in L1." He calls this the Redundancy Reduction Principle. As a corollary to this principle, Seliger offers this: "Transfer from L2 those rules that are similar and can be utilized to serve multiple functions in L1 while lessening the burden on memory to retain less generalizable rules." (1989:182)

When Frank was seventeen-years-old, he and an uncle drove across the country in an ancient Ford. They settled in Los Angeles, where they found work. A few years later, they opened their own garage. In 1924 Frank married my mother, Theodora Goosen, with whom he eventually had seven children. In 1946 the family left our East Los Angeles Jewish/Chicano neighborhood of Boyle Heights and moved to a predominantly gentile suburban neighborhood. There my parents developed friendships and lives divergent from their Yiddish-speaking relatives (including Frank's uncle) and had gradually fewer contacts with them. I recall my father speaking a mixture of Yiddish and English at extended family gatherings during the 1940's and 1950's. However, as these gatherings became less frequent and as more relatives died or moved elsewhere, there were fewer opportunities for him to speak his native language. Years went by without his speaking Yiddish.

In December 1979, when my father was in his late-seventies, his cousin Sam, from Pittsburgh, whom he had not seen in decades, came to visit. I, too, was there with my husband and children. We watched as Sam tried to communicate with Frank in Yiddish. I vividly recall my father's red face and his stammering and stuttering as he struggled to respond to Sam in kind. He appeared not to understand much of what Sam was saying, his responses were halting, and he corrected himself several times. They switched to English. It must have been a poignant moment for my father because he briefly recalls the incident in his memoir, ending with the lament, "What happened to my Yiddish?"

In attempting to answer my father's question, I am constrained by the fact that he no longer is available to observe, test, or question. I can't document the extent of his first language (L1) loss or explain with any certainty the reasons for it. However, a survey of the research on language attrition, augmented by his memoir, interviews with relatives, and my own recollection of past conversations with and observations of him, enable me to make what I believe are plausible explanations for the attrition of his Yiddish.

2 Terminology

Many studies use the terms "language loss" and "language attrition" interchangeably, and I see no reason to do otherwise in this paper. By language loss/attrition I mean "the disintegration or attrition of the structure of a first language in contact situations with a second language" (Seliger & Vago 1991: 3). In other words, the person is no longer as fluent in L1 as one would expect a native speaker to be. Also, many studies distinguish "language loss" from "language shift," with "loss" defined as a psycholinguistic process that occurs intragenerationally and "shift" defined as a sociolinguistic process that occurs intergenerationally (Clyne & Jaehrling: 64). However, I find the distinction unnecessary for my purpose, which is to shed light on possible reasons for my father's L1 attrition. Thus, I have relied on some studies of language shift in this paper.

3 What Was Going On: The Process of First Language Attrition

Answering my father's question requires an examination of both the *process* of language attrition and the *reasons* for it. This section looks at what researchers say about the general process of language loss.

Seliger and Vago would say that the two languages spoken by my father, Yiddish and English, came to "compete with one another, metaphorically, for a finite amount of memory and processing space" in his mind (1991:4). Applying their analysis to Frank, the competition probably was not apparent at first. His sister Anna recalls that, despite his difficulties at school (the stutter, the teasing and bullying, the unsympathetic teacher), he appeared to have acquired fluency in English and, for a while, he could speak both languages with ease.[2] Anna remembers that he spoke English at school, on the street and playground, and at home among his siblings; he reserved Yiddish for his parents and older relatives and some customers at his father's harness shop. She recalls that her parents also spoke a mixture of English and Yiddish at home.

Were it possible to have observed and tested Frank during his childhood and youth, evidence of his L2 dominance likely would have shown up in the phonology, lexicon and syntax of his L1. Extrapolating from Seliger (1989), there probably would have been signs of a reduction in his ability to retrieve elements from his Yiddish grammar and some substitution of elements from English. At an early stage of his Yiddish attrition, his comprehension might not have appeared impaired, but it is likely that his ability to judge the grammaticality of deviant utterances in that language would have been affected. In short, some evidence of first language attrition would have been there.

Had a researcher been able to follow Frank for decades thereafter—through his youth, middle age, indeed to the moment he realized he no longer could communicate with his cousin in Yiddish—the researcher might have concluded that English had displaced Frank's Yiddish and little ability to produce speech in his native language remained. My memory of his rare and halting attempts to speak Yiddish during his later years supports such a conclusion and fits squarely with Seliger's description of what is found in early sequential childhood bilingualism (1989).

3.1 Stage One: Transfer

Understanding the process of Frank's language attrition requires some account of the changing relationship between the grammars of the two languages he spoke and the role that universal grammar may have played at three stages of his bilingual development. Seliger & Vago (1991a) outline these stages, which I have applied to Frank as follows:

At the first stage of an increasingly complex continuum, Frank would have just begun the process of acquiring an additional linguistic system; that is, learning English. At his incipient stage of bilingualism, he would have used the knowledge of his native language, Yiddish, as a source for hypotheses about the target language, English (see, for

[2] It is not clear, however, if Frank ever fit Seliger's description of a "balanced bilingual" (1989:176); that is, one whose L1 and L2 co-exist and who maintains native-like fluency in both.

example, Gass, as cited by Seliger & Vago 1991:5). His hypotheses probably would have been wrong at first, resulting, among other things, in pronunciation difficulties for him. For example, the hard English "er" ending to a word is unknown to Yiddish. So, at first, Frank likely would have rendered "father" as *fathair* or "dancer" as *dansair*, and so on. Similarly, since the Yiddish pronunciation of "ch" is like the Scottish *loch* or the German *ach!* (the unvoiced velar/uvular fricative), his pronunciation of words such as "cheddar" also would have immediately revealed his foreignness.[3] Frank probably benefited, however, from some outstanding similarities between Yiddish and English grammar. For example, he might have noticed that English, like Yiddish, applies the possessive to nouns denoting animate objects, or that English sentence construction, like that of Yiddish, generally keeps the verb in close proximity to the subject (Weinreich).

Another source of linguistic knowledge that Frank might have drawn upon is universal grammar, assuming that these universals are valid for English grammar (see, for example, Chomsky; Cook, as cited by Seliger and Vago 1991:5; and Hyltenstam). At this stage in his bilingual development, a common base of knowledge would have served both grammars from Yiddish and transfer would have been a primary processing and acquisition strategy. However, also at this first stage, Frank may have made the same kinds of errors in English as the kid next to him in class, whose native language was Polish. If so, at least according to some researchers, (see, for example, Hyltenstam), the errors may have been the result of innate principles for the acquisition of language that were independent of Frank's first language, Yiddish.

3.2 Stage Two: A Gradual Separation of Grammars

The second stage of Frank's linguistic attrition, based on Seliger and Vago's analysis (1991a), suggests that there would have been a gradual separation of the two grammars, Yiddish and English. This would have been the result of his testing transfer hypotheses

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[3] In the preface to his classic book, *The Joys of Yiddish* (Simon & Schuster, 1968, xxviii.), Leo Rosten notes that the teaching of English to Jewish immigrants was "an undertaking pregnant with surprises." He points out, for instance, a host of pronunciational shifts that affect a whole range of vowels and some consonants. Here are a few of Rosten's examples, along with his commentary on them:

(i) The short *a* becomes a short *e*: "cat" is pronounced *ket*, and "pat" becomes *pet*.

(ii) The short *e*, in turn, emerges as a short *a*: "pet" is rendered as *pat* and "a bad bed" becomes *a bed bad*.

(iii) The long English *oo* undergoes a transformation to a short *u*: a "pool" becomes a *pull*—and vice versa. To say that a dumbbell is drunk, Rosten says, a virtuoso might declaim, "That full is fool *shnaps*!"

(iv) The *w* regularly becomes a *v*: "We went to Willie's wedding" would be vivified, according to Rosten, into "Ve vent to Villie's vaddink."

(v) The short *i* becomes a long *e*—and vice versa: "pill" is pronounced *peel*. Thus, says Rosten, an Ashkenazic dentist might make this euphoric promise: "Rilex! I'll feel your cavity so you von't even fill it!"

(vi) The final *g* becomes a *k*. Thus, "walking the Muggs' pug dog" becomes "valkink the Muck's puck duck"—a metamorphosis "most unholy," comments Rosten.

(vii) Voiced final consonants tend to become unvoiced. "In such a vagarious world," observes Rosten, "one eats corn on the *cop*, spreads butter on *brat*, and consumes potato chips by the *back*."

against English language data and developing an independent set of English rules distinct from those of Yiddish. The researchers base this part of their analysis on the work of Corder, who distinguished between two different processes involved in second language acquisition: *restructuring* and *recreation*. Restructuring involves the adaptation of L1 hypotheses to L2 data; that is, transfer. Recreation involves the construction of special rules for the L2 without reference to the L1. Seliger and Vago refer to this second stage of language evolution as the *coordinate* stage of bilingual development because the grammars of the two languages begin to develop independently, even though there is still a role for L1 transfer and universal principles (1991:5).

3.3 Stage Three: Reverse Transfer

Extrapolating still from Seliger and Vago (1991a), the final stage of Frank's bilingual development would have involved an intermingling of the two language grammars. Frank would have become quite fluent in English, and English would have begun to encroach on his Yiddish. In short, the direction of transfer found in the first stage of bilingual development would have become reversed (1991:6) and there would have been a restructuring of Frank's Yiddish according to grammatical principles found in his English. It is not clear whether universal principles still would have influenced his English as they might have in the previous stages. Rather, it appears that they would have impacted Frank's Yiddish. (See, for example, Silva-Corvalan; Dressler; and Vago.) It is at this stage that language attrition would have been most evident for Frank.

3.4 Attrition or Code Switching?

Instead of language attrition, the intrusion of English into Frank's Yiddish could have been a case of "code mixing" or "code switching." If so, he would have been able to switch at will to one or the other of the two languages, depending on the topic or the person with whom he was speaking. However, code mixing/switching may not have been what occurred when my father attempted to speak Yiddish with his cousin Sam in 1979 because I could see that he was struggling to find the appropriate Yiddish words, and English kept insinuating itself into the conversation. In other words, my father seemed to have lost control of the conditions that constrain the mixing of the two languages, and he couldn't maintain the grammatical autonomy of each of them (Seliger & Vago1991:6). Were Frank around, it might be possible to test his knowledge by administering metalinguistic tests requiring him to judge the grammaticality of Yiddish sentences that reflect the intermixing of grammatical rules from English (see, for example, de Bot 1991).

4 Why Did Frank Lose His Yiddish?

Implicit in Frank's lament "What happened to my Yiddish?" is the question of *why* he lost his first language. Many studies focused on the causes of language attrition are sociolinguistic in nature and are concerned with what variables play a role in these processes. In my research, I found little agreement on which factors are closely tied to L1 loss. In a survey of literature on language contact, Weltens et al (1986:100) concluded that there is "an extremely long list of overlapping and interacting social factors … considered relevant…in different cases and by different scholars." These factors include, among others, age at time of migration, length of stay, level of education, gender, size of ethnic group, social contacts with other L1 speakers, rural vs. urban dwellers, and attitude toward the L1. From these, I have selected four variables that seem to have particular relevance to Frank's situation. They have to do with the following:

- his age at time of migration (which is more a cognitive than a sociolinguistic variable)
- his long separation from speakers of Yiddish
- his strong desire to assimilate and the ease with which he could do so
- the extent to which he viewed maintenance of his Yiddish as a core value inseparable from his Jewish identity.

4.1 Age and the "Critical Period" Hypothesis

Frank was only eight years old when he migrated to the United States and thus still within the "critical period" zone during which children can achieve native-like, that is, accent-less proficiency in a second language. He must have succeeded because neither my siblings nor I ever detected a trace of accent in my father's English. On the other hand, his cousin Sam, who arrived in America with my father and who was only five years older than Frank, retained a slight Yiddish accent throughout his life.

Evidence of the critical period phenomenon among immigrants comes from the psychologist Elissa Newport and her colleagues. They tested Korean- and Chinese-born students and faculty at the University of Illinois who had spent at least ten years in the United States. On grammaticality tests, the immigrants who came to the United States between the ages of three and seven performed identically to American-born students. Those who arrived between the ages of eight and fifteen did increasingly worse the later they arrived, and those who arrived between seventeen and thirty-nine did the worst of all, and showed huge variability unrelated to their age of arrival.

Although the critical period hypothesis may help account for the ease with which Frank acquired his second language and his accent-less English, it doesn't, of itself, explain why he lost his first language. However, an understanding of the process of language attrition described earlier, plus the following sociolinguistic variables, brings us closer to an answer.

4.2 Separation and the Diminished Role of Yiddish

The diminished role of Frank's Yiddish in use and function**,** exacerbated, first, by his long separation from the Yiddish-speaking community of his childhood and, second, by his decades of residency in the mainly Anglicized suburbs of Los Angeles**,** are among the most important variables accounting for his first language attrition. Once he left Pittsburgh Frank had little opportunity to practice two skills crucial to production of his Yiddish: repetition and imitation. Researchers on the speech production process, such as de Bot, would say that, lacking opportunities to repeat and imitate his native language, Frank wound up getting his Yiddish and English "mixed up" (1998). [4]

Several researchers address the issue of separation and language use in their analysis of first language attrition among immigrants. Among them are Jaspaert and Kroon, who indicated that length of stay in the L2 country was among the most relevant sociolinguistic variables accounting for L1 loss. De Bot et al, in their investigation of the loss of L1 metalinguistic skills in Dutch Frenchmen (1991), looked at time elapsed since migration and frequency of contact with native speakers of Dutch, concluding that time becomes relevant only when there is not much contact with the language. Their finding has relevance in Frank's case. As noted in the earlier discussion of age at time of migration, Frank and his cousin Sam spent the same length of time in the United States. However, Sam remained in constant contact with the Yiddish-speaking community in Pittsburgh (because he lived there); thus, he retained his Yiddish. Frank, on the other hand, migrated as a teenager to Los Angeles and spent most of his remaining years in Anglicized suburbs; thus, he had far fewer opportunities than Sam to practice Yiddish.

4.3 The Urge to Assimilate

Veltman examined the "macrosociological process" of assimilation to the L2 by various ethnic groups in the United States, comparing his own findings to data from previous research (using various sources from 1940 to 1976). He concluded that all ethnic groups in the United States show considerable "Anglicization" (that is, the L1 is subordinated to English), but the rate of Anglicization differed between groups. Veltman did not focus directly on the rate of Anglicization among Jewish migrants. However, the historian Irving Howe provides anecdotal evidence that the desire of Jewish immigrants to assimilate into the dominant American culture was strong, even if it meant subordinating their Yiddish to the dominant language, English. In *World of our Fathers* Howe said of the early Jewish immigrant's fascination with American culture: "To be an American, dress like an American, look like an American, and even, if only in fantasy, *talk* like an

[4] De Bot has attempted to adapt existing theories on language production to what happens when languages become "mixed up." In the Dutch language newspaper *De Volkskrant* (Nov. 1998) a reporter citing de Bot wrote: "Our mind contains a vocabulary of about 60,000 to 80,000 words in our native language. Usually an extra 20,000 words are added from other languages. We speak about five words a second. That means we have 200 milliseconds to find the right word out of a possible 100,000." If true, this might explain why my father seemed to blurt out whatever Yiddish words came to his mind during that memorable reunion conversation with his cousin Sam, after decades of not speaking Yiddish. De Bot, like Seliger (1989, 1991), seems to be suggesting that there is some competition between words during memory access that occurs in language attrition. This competition increases, according to de Bot, when we hear less of our native language, and further increases when we don't speak it often.

American became a collective goal, at least for the younger immigrants" (128).[5] As early as 1905, Jewish community worker, David Blaustein, noted, "Today, English is more and more the language spoken on the East Side [NYC], whereas eight years ago it was rare to hear that tongue" (as cited by Howe: 128). Such observations suggest that by the time Frank migrated to Pittsburgh in 1909 even more Yiddish-speaking Jewish immigrants would have been heard speaking English.

4.4 Jewish Identity and the Theory of Language as a Core Value

Like many assimilated American Jews, Frank held on to much of his Jewish identity at the same time that, ironically, he lost his ability to speak the Jewish language.[6] He went to synagogue, celebrated the major Jewish holidays, and loved lox and bagels, Jewish comedians, and Jewish literature. He occasionally uttered in Yiddish short Yiddish sayings and proverbs, but he didn't produce much ordinary speech in Yiddish that I was aware of after the 1950's.

Is it possible to retain one's Jewish identity, yet abandon—or worse, *forget*— all but a few phrases and proverbs in one's native language? Some researchers see no inconsistency in this; it all depends, they say, on whether language is a "core value" of the group or individual. Smolicz, for example, found that cultural groups differ in the extent to which they emphasize their native tongues as core values. Citing studies by O'Buachalla and by Harris and Murtagh, he observes, "One may [for example] be an Irish nationalist and be unable to speak Irish Gaelic, although the Irish language continues to act as a potent symbol of ethnic identity, even for those who are either unable to speak it or who have learned it at school but do not use it for everyday purposes" (280). In much the same way, continues Smolicz, "There are people …with a strongly developed sense of Jewish identity who uphold the continuity of Jewish tradition, but who speak neither Hebrew nor Yiddish, nor, indeed, any other specific Jewish-developed language or dialect" (280) .

One might question whether one's native language could be a core value if it is abandoned, yet with some effort might have been retained. Undeniably, Frank seemed to have had no practical use for Yiddish once he left his father's harness shop. He didn't need it to communicate with his schoolmates; he didn't need it for his work; and he didn't need it for social acceptance, either within his circle of Jewish friends or outside of it.

Still, it must have saddened my father to lose so much agility in his native language because it is with an unmistakable tone of regret that he asks near the end of his life, "What happened to my Yiddish?"

[5] My father shared this fascination for all things American: blue jeans; big, fast cars; ice cream; baseball; Jimmy Cagney talk. Perhaps to his discredit, he took unabashed pleasure in being mistaken for an American "goy" (gentile), an error that my mother attributed to his light skin, hair, and eyes …and, of course, to his accent-less speech.

[6] Although my father could at one time speak fluent Yiddish, I doubt that he was literate in the language. My grandfather, who lived with us until his death, always left a copy of the Yiddish-language newspaper, *The Daily Forward,* around the house. I never saw my father reading it.

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