Epenthesis in SC Onset Clusters in Persian- English Interlanguage: Linguistic and Extra-linguistic Factors

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Outline

- Previous studies
- The Question
- Background theories
- Persian codas
- The study
- Cluster variation
- Pedagogic Implications

Repair Strategies: Mapping Input onto Structure

- **Deletion**
  gra<u>ndm</u>other -➔ gra<u>nm</u>other

  mi<u>st</u> ➔miss

- **Epenthesis**
  Spanish ➔ espanish

  blond ➔ bəlondə

Production/Perception?

- These data are often cited in *production* tasks
- What about perception?

- **this happens in perception too**

- **When exposed to a string like [ebzo], the Japanese subjects *hear* [ebuzo] whether or not there is a vowel present (Dupoux, et al. 1999): Japanese (72% illusory vowel); French (10% illusory vowel)**

  - **How can you tell? Behavioral tasks, discrimination tasks, etc.**

Perceptual Illusions

- Studies from a number of L1s (Japanese (Dupoux; Matthews & Brown), Korean (Kabak & Idsardi) reveal perceptual illusions

- Japanese: does not allow obstruent consonantal sequences word medially:
  - *ac.tor
  - *chap.ter

- In production, they insert an epenthetic vowel between the obstruents
  - baseball → basubaru

Thai

- Thai does not allow onset clusters either
- It *does* allow medial clusters (like ‘ac.tor’)
- But Thai (unlike Japanese) L1 subjects (since Thai allows medial obstruent strings) do NOT hear an illusory vowel medially (Matthews & Brown)
- When they are presented with [ebzo], they hear [ebzo]

sC Onset Perception

- There is a cottage industry looking at sC clusters in SLA

- Brazilian Portuguese (Cardoso):
  - Does not allow sC clusters
  - Allows Obstruent + Liquid clusters (e.g. [br])
  - Allows maximally single C codas

- Both production and perception studies showed definite differential accuracy effects (and no ceiling effects):
  - Production: sl > sn > st
  - Perception: st > sl > sn

- **The BP L1 subjects had difficulty (performing at chance) discriminating accurately between forms which began with:**
  - **sC and isC**

- **(where [i] is the BP epenthetic vowel)**

- The same is true in Thai (Imsri):
  - No sC onsets
  - No branching codas

- In production, they epenthesize to break up the sC:
  - spa ➔ [səpa]

- In perception the advanced learners made 60% errors on discriminating sC strings from SəC strings
  - Even when correct, there were very long Response Times
  - And remember, they did fine on [ebzo]

- **So, these perception errors are real in that they affect representation and processing (in addition to actual speech)**

- **We see epenthesis in perception and in production**

Structural Properties

L1	sC Onsets	Branching Onsets	Branching codas	Errors
Japanese	No	No	No	72%
Thai	No	No	No	60%
Brazilian Portuguese	No	Yes	No	50%
Persian				

The Question

How do Persian ESL speakers perceive and produce English onset consonant clusters when their L1 does not allow branching onsets?

Facts to Consider:

-Persian allows branching codas up to two consonants

-this study deals with sC clusters; specifically /sl/, /sn/,&/st/

-Persian learners add a vowel before these sequences (e.g. ‘snake’ -> ‘esnake’ e.g., Karimi, 1987; Yarmohammadi, 1995) to resolve the difficulty producing these clusters

- linguistic factors: sonority and redeployment
- extra-linguistic factors: 2nd language proficiency and task formality

Background Theories

Linguistic factors (sonority):

- Sonority Sequencing Principle (Clements, 1990)
- Minimal Sonority Distance (Broselow & Finer 1991)
- Redeployment (Archibald, 2005)

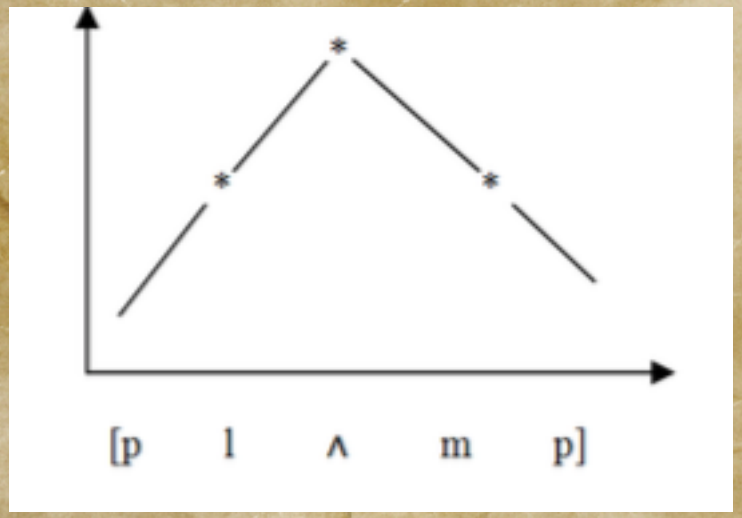
Extra-linguistic factors (proficiency and task formality):

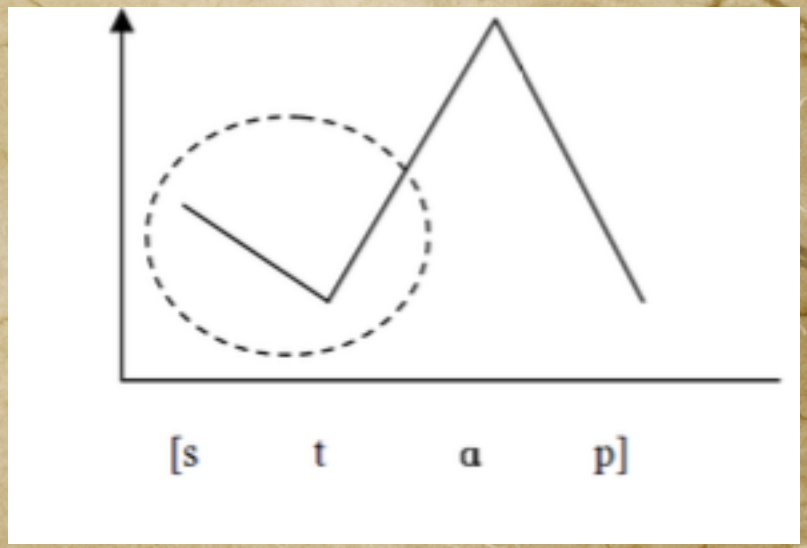
- Ontogeny Phylogeny Model (Major, 2001)

Background Theories

Sonority Sequencing Principle (Clements, 1990)

- preferred syllables typically display a continuous rise in sonority towards the peak and a decrease in sonority towards the edges, as is illustrated by the syllable structure of the English word ‘plump’ in (1)
- dispreferred syllables such as the /st/ sequence in the English word ‘[st]op’ in (2), exhibit a sonority decrease (reversal) from the first member /s/ to the second member /t/ of the onset, as indicated by the dotted circle in (2)
- (1) Syllable structure: Sonority Sequencing (2). Syllable structure: Sonority violation





Sonority hierarchy (Selkirk, 1982)

Class	Scale
Stops	1
Fricatives	2
Nasals	3
Liquids	4
Glides	5

Minimal Sonority Distance (Broselow & Finer 1991)

- **Markedness relationships with respect to Minimal Sonority Distance Parameter: clusters with a larger sonority distance are easier than those which are relatively close in sonority. Example:**

- **Less marked……more marked**
- **Cj……Cr**
- **pC……bC……fC**

MSD setting	Onset types
MSD setting (sonority distance)	*Consonant cluster*
5	No consonant cluster
4	'stop-glide' /pj/
3	'stop-glide', 'fricative-glide', 'stop-liquid'/pj/,/sw/, /pr/
2	'stop-glide', 'fricative-glide', 'stop-liquid', 'fricative-liquid', 'nasal-glide'/ pj/,/sw/, /pr/ /fj/,/mj/
1	All types of consonant combination

Redeployment (Archibald, 2005)

- **L2 learners are able to redeploy existing L1 features present in the grammar to acquire L2 contrasts**
- Example (Mah & Archibald,2003 for production, and Summerell, 2007 for perception): the acquisition of Japanese length contrast by English speakers
- English speakers have an L1 grammar where coda clusters are licensed by weak mora for reasons of weight. In Japanese, geminate consonants are licensed by a weak mora.
- The feature vowel length is present in English. E.g., beat vs. bit

- "English speakers are able to acquire both Japanese vowel length and consonantal length contrasts based on the licensing properties of their L1. They can *redeploy* the weak mora licensing from their L1 to new uses in the L2." P.1017

Japanese length contrasts:

a. [t] vs. [tt]

b. [ç] vs. [ç:]

English length contrasts:

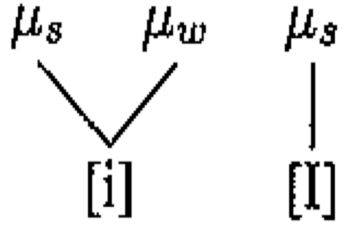


Table 1. Sonority of segments (+ means rising and – means falling sonority)

Stops (1) < Fricatives(2) < Nasals(3) < Liquids(4) < Glides(5) < Vowels(6) (Clements, 1990)

segment	Sonority rank	cluster	Sonority distance
s	2	**sl**	**+2**
l	4	**sn**	**+1**
n	3	**st**	**-1**
t	1		

Persian Codas

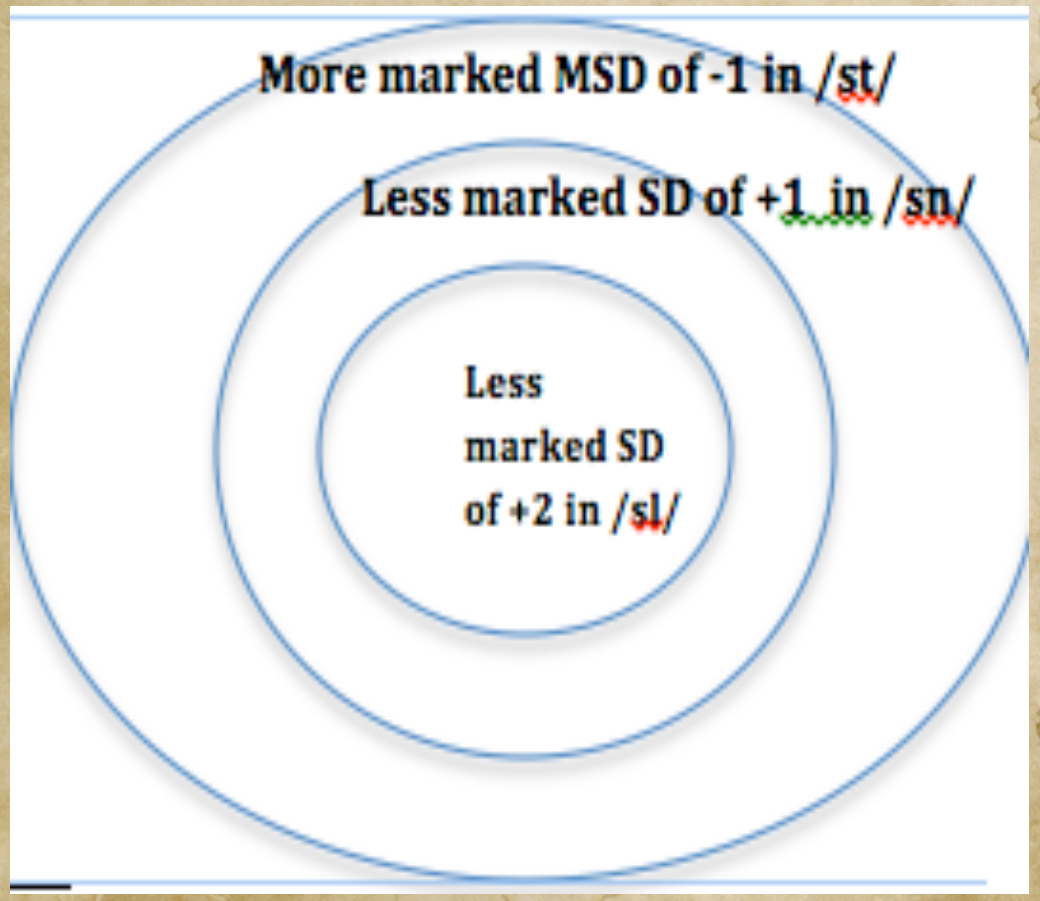
Table 2. Persian Sonority Distance in Codas (data from Kambuziya & Zolfaghari 2006, - means fall and + means rise in sonority)

Stop<fricative<nasal<liquid<glide<vowel

SD	-4	-3	-2	-1	0	+1	+2	+3
Strings	**yb**	**rk**	**nd**	**St**	**tb**	**bh**	**zl**	**br**
	yd	**rd**	**rs**	**ʃt**	**bʔ**	**bx**	**fl**	**dr**
		lb	**ng**	**ft**	**mn**	**bʃ**	**sl**	**kl**
				xt	**fʃ**	**gʃ**	**xl**	**tr**
words					**tk**	**dv**	**tn**	
	eyb			**nz**	**sf**	**ds**	**fr**	bæbr
	eyd	Xark	Kand		**sx**	**bz**	**sr**	zebr
		Kard	Fars	**sk**	**Sh**	**mr**	**ʃr**	sedr
		qalb	rang		**fv**	**zm**	**km**	gædr
				ʃk	**fz**	**Sn**	**hr**	ʃekl
						zn	fæzl	
				Rast	gotb	**ml**	tefl	
				Daʃt		**xm**	gosl	
				Raft	tæbʔ	æbx	boxl	
				Rixt	ʔæmn	næbʃ	mætn	
				Tanz	kæfʃ	hæml	kofr	
				usk	potk	zebh	mesr	
				kuʃk	mesf	Sobh	geʃr	
					mæsx	bædv	hokm	
					mæsh	gods	mohr	
						næbz		

Markedness predictions on the acquisition of sC clusters:

Figure 3. Implicational relations between the three clusters

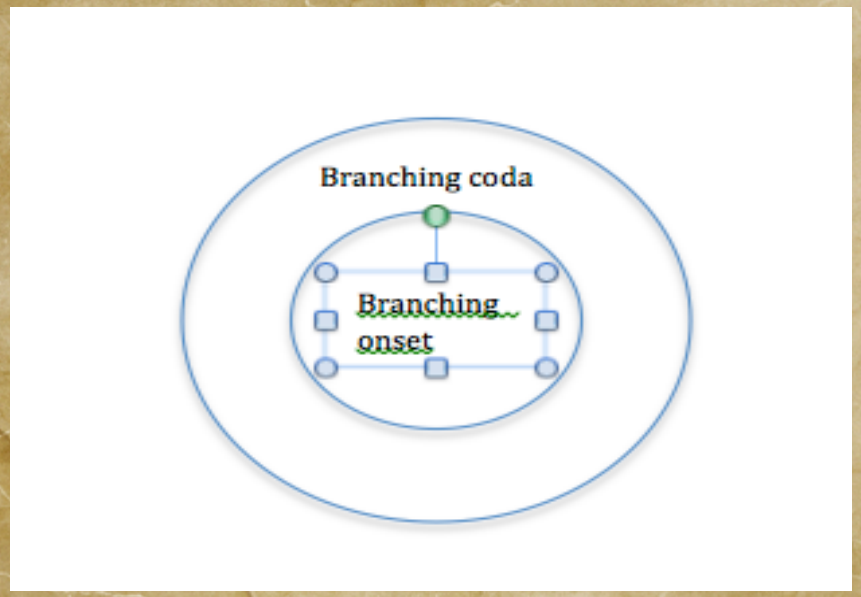


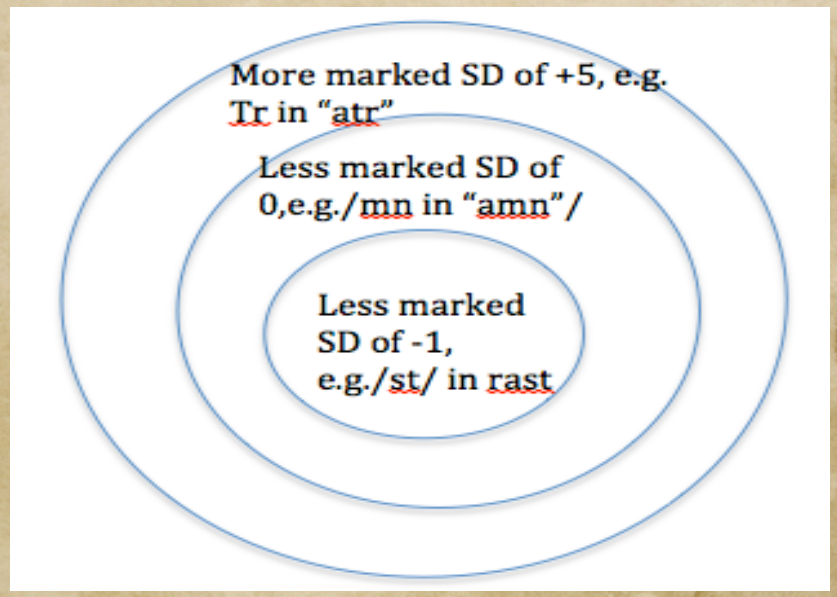
Hypothesis 1. Predicted developmental path of sC onset sequences based on markedness on sonority: /sl/ > /sn/ > /st/

Redeployment predictions on the acquisition of the sC clusters:

- **Persian learners of English can redeploy their L1 coda MSD knowledge to the L2 onsets where all English onset sequences will be licensed.**
- **Redeployment will predict high accuracy but no differences between strings**

Figure 4. Knowledge of Persian MSD and branching codas redeployed in learning English





Hypothesis 2: Predicted path based on redeployment theory: /sl/=/sn/=/st/

Extra-linguistic Factors (Proficiency& Task style)
Ontogeny Phylogeny Model (OPM; Major, 2001)

- developing interlanguages are comprised of both L1 and L2 features, which are mediated by universal (developmental) phenomena.
- IL develops *chronologically* such that features from the L2 increase, LI patterns decrease, and developmental phenomena increase and then decrease in the course of L2 development.
- initial state will strictly correspond to the phonology of Persian, in which sC clusters will syllabify via e-epenthesis (just like in the L1).
- At more advanced stages, however, the frequency of e-epenthesis will decrease

- Figure 5. The Ontogeny Phylogeny Model of L2 acquisition (adopted from Boudaoud, 2008)

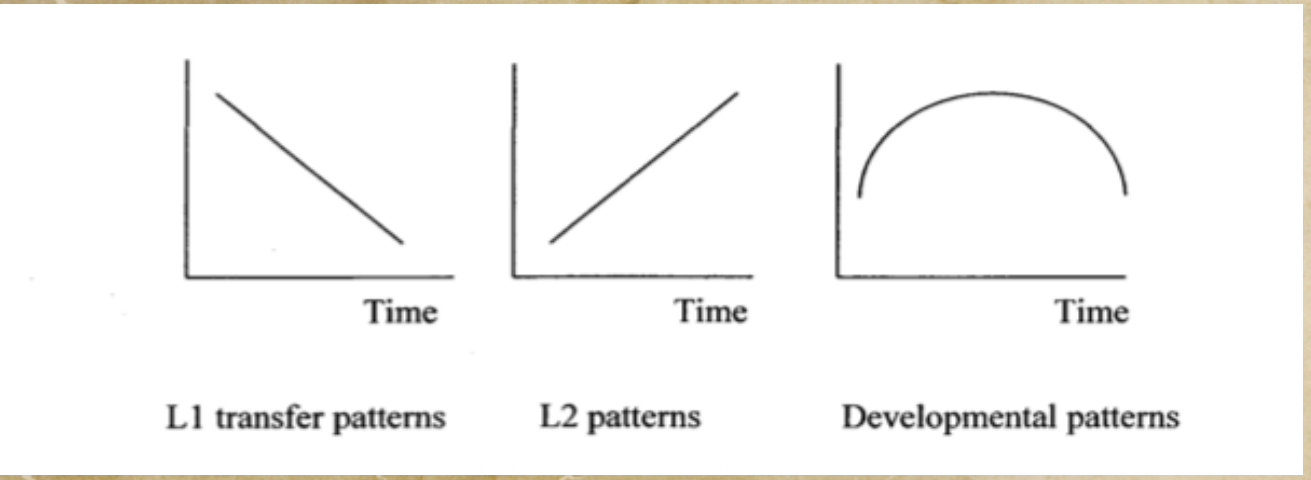


Table 6. Error patterns in L2 acquisition (Archibald, 1998. p.5)

Level of proficiency	Transfer errors	Developmental errors
Beginner	High	Low
Intermediate	Medium	High
Advanced	low	Low

- OPM claims that IL varies *stylistically* such that in more formal styles, L2 structures increase, LI features decrease, and developmental phenomena increase and then decrease.

- L2 learners have more accuracy in pronouncing isolated words (formal style) than in conversation (informal style) because in running speech learners often revert to their L1 patterns, making their foreign accent more prevalent

- the more monitoring, the greater the accuracy

- "In different situations, an L2 learner has different competencies; an L2 learner may show all indications of being nativelike in an extremely formal style but may show L1 patterns in a more casual style"

Hypothesis 3: The amount of e-epenthesis will decrease as proficiency increases.

Hypothesis 4: There will be more e-epenthesis in less formal tasks.

Research Questions and Hypotheses

1. Are there any differences between the perception and production of English sC onset clusters in Persian ESL speakers?
2. What theory markedness or redeployment can best account for sC cluster acquisition in Persian speakers of English?
3. How is accuracy on sC clusters patterned across the three proficiency groups (beginner, intermediate, advanced)?
4. To what extent is e-epenthesis determined by task style?

Hypothesis 1. Predicted developmental path of sC onset sequences based on markedness on sonority: /sl/ > /sn/ > /st/

Hypothesis 2: Predicted path based on redeployment theory: /sl/=/sn/=/st/

Hypothesis 3: The amount of e-epenthesis decreases as proficiency increases.

Hypothesis 4: There is more e-epenthesis in less formal tasks

The study

-Participants

-Materials
 -Background Questionnaire
 -Production test
  -Formal task
  -Informal task
-Perception test
  -Identification task
  -Discrimination task

-Procedure

-Data Collection and Transcription

-Data Analysis

Proficiency

- Self rate proficiency scale in background questionnaire.
- report any proficiency score from a standardized test (e.g. IELTS, TOEFL, CLB)
- native speaker judgment

Participant	Self-rate	Standard score	NS judgment	Final level
1	Poor	560TOEFL(PBT)	Beginner	beginner
2	Poor	2 CLB	Beginner	beginner
3	average	6 IELTS	Beginner	beginner
4	average	5 CLB	Beginner	beginner
5	average	5 CLB	Beginner	beginner
6	average	6.5 IELTS	intermediate	intermediate
7	Good	6.5 IELTS	intermediate	intermediate
8	average	88 TOEFL(IBT)	intermediate	intermediate
9	Good	6.5 IELTS	intermediate	intermediate
10	Good	5 CLB	intermediate	intermediate
11	Good	105TOEFL(IBT)	Advanced	advanced
12	Good	-	Advanced	advanced
13	Good	99 TOEFL(IBT)	Advanced	advanced
14	Good	106TOEFL(IBT)	Advanced	advanced
15	Very good	116TOEFL(IBT)	Advanced	advanced

Production Test

Formal Task

29 sentences in all, the target clusters /st/, /sn/, /sl/ occurred 10 times for each cluster

Example: Instructions: Read aloud the following sentences, please.

Dan slept early today

Informal Task

12 pictures consisted of 3 words for each cluster (i.e. 3 /sn/, 3 /st/, and 3/sl/) as well as three distracters

Example: Pictures of the item “slippers” and ‘stars” in the informal production task.

Perception Test

Identification Task

- a forced choice identification experiment adapted from Cardoso et al. (2007)

- discriminate between sC-initial and vowel-initial clusters .i.e. participants decided whether the stimuli that they heard began with a consonant (i.e., sC) or with a vowel (i.e., [e]sC).

- The 30 items selected included 10 /sl/, 10 /st/, and 10/sn/ tokens which in turn included 5 /s/ and 5/es/ combinations.

Example: 1. a. esnip b. snip c. ?
The word participants heard: "snip". The correct response was <u>b.</u>

Perception Test

Discrimination Task

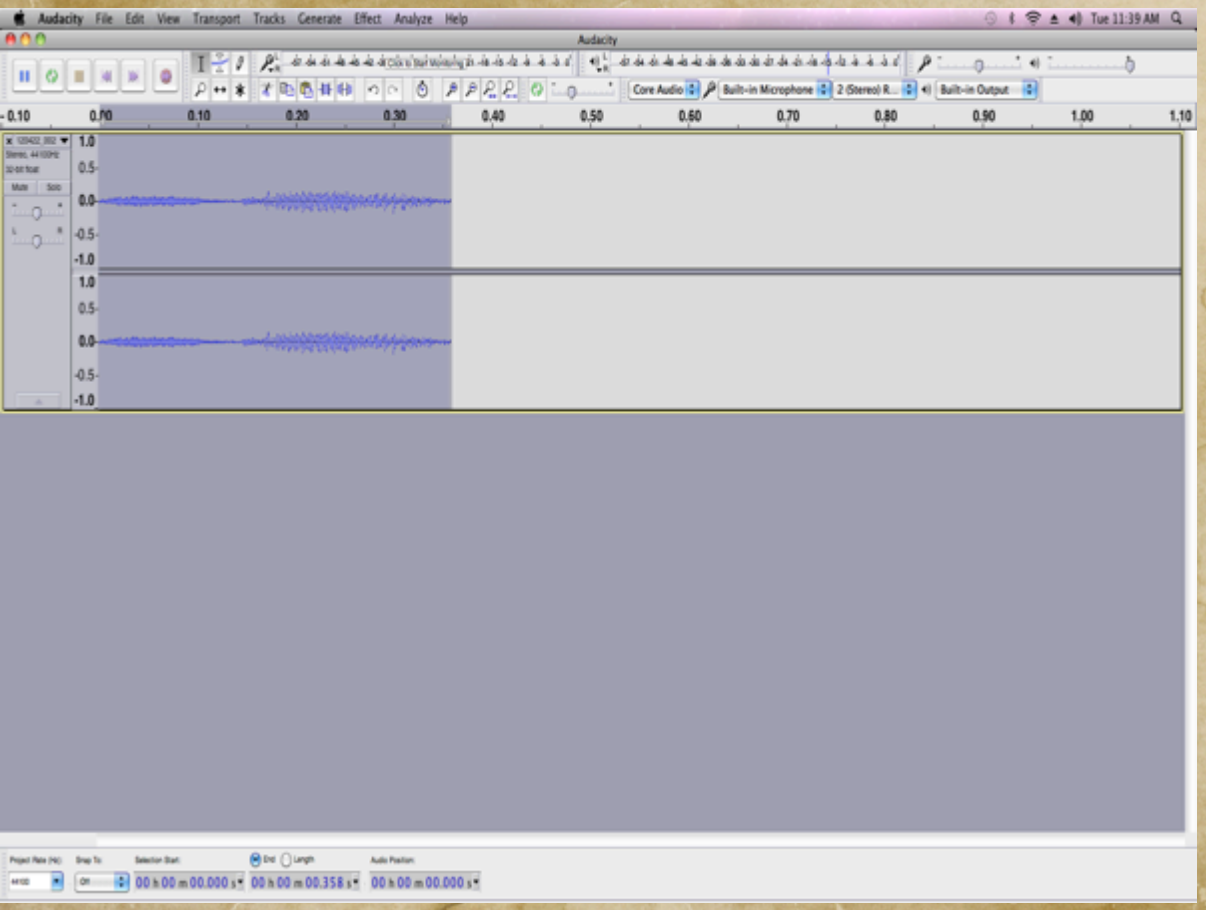
-discriminate between /s/ and /es/, via an ABX discrimination task.
-This task had 30 items; 10 /sl/, 10 /sn/, and 10 /st/ tokens of pseudowords randomly ordered and took approximately 10 minutes, including a 3-minute training.

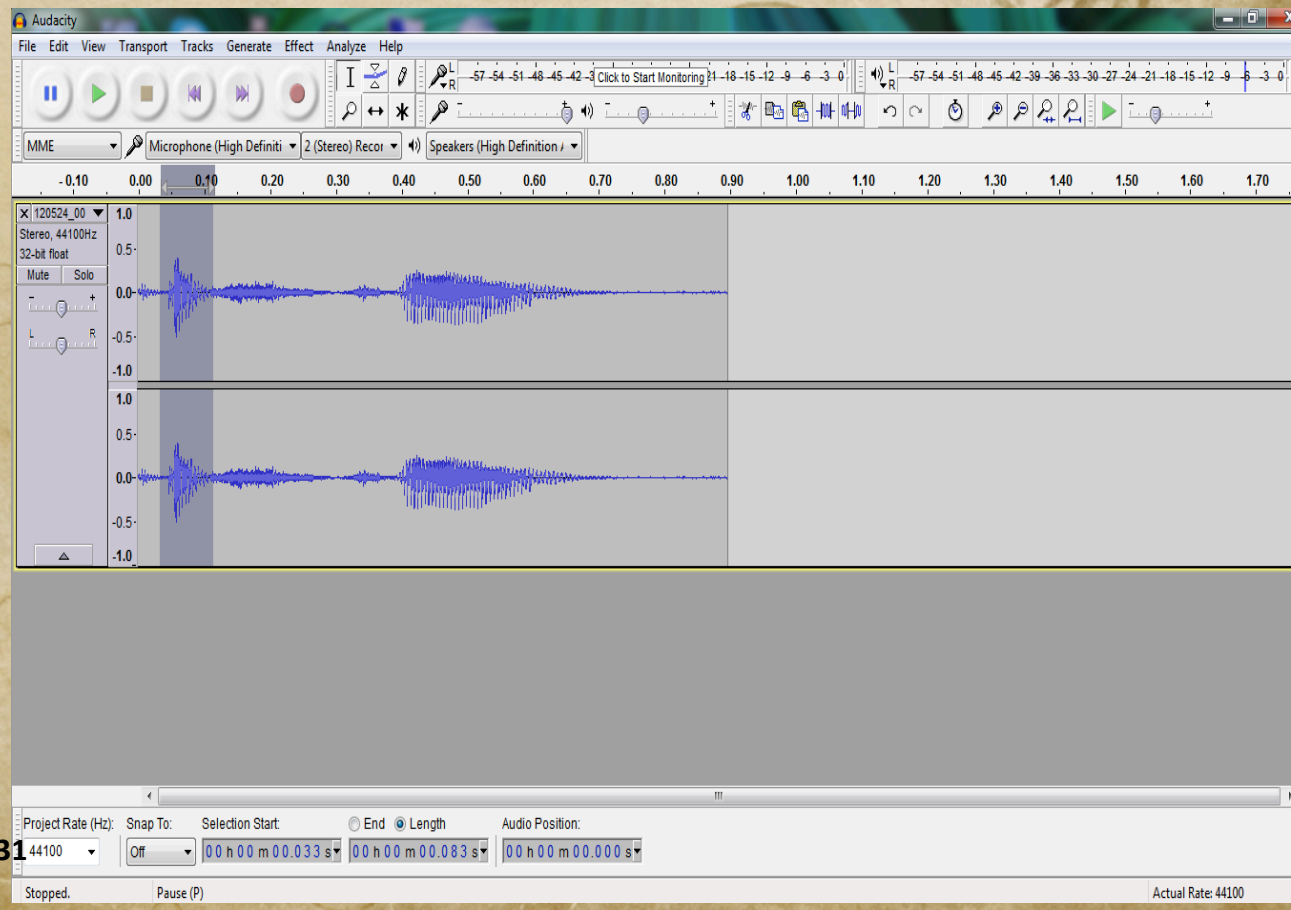
***Example*: 1. A B**
The tokens participants heard for this question were: “esnip-snip-esnip”. The correct response was A.

Data Recording and Transcription

Figure 7. Waveform for store

Figure 8. Waveform for [e]store with the epenthesized /e/ highlighted





Procedure

- Production: Number of correct productions scored by the first rater; 20% of data scored by the second rater
- 90% agreement

- Perception: Number of correct choices
- Each participant and each cluster

- a related-sample Friedman's two-way analysis of variance was performed. Friedman's test is the non-parametric equivalent of analysis of variance (ANOVA)

Results

The impact of Markedness on sonority on production

Table 9.Descriptive Statistics of the production of sC clusters

Table 10. Friedman test of significance

	N	Minimum	Maximum	Mean	Std. Deviation
/sl/ total production	15	.00	20.00	8.8553	7.23753
/sn/ total production	15	.00	20.00	9.9420	7.61052
/st/ total production	15	.00	20.00	9.7313	7.12713
Valid N (listwise)	15				

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distributions of slprotot, snprotot and stprotot are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.368	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 11. The difference between /sl/, /sn/, and /st/ in perception. Descriptive Statistics of the perception of sC clusters

Table 12. Friedman test of significance

	N	Minimum	Maximum	Mean	Std. Deviation
/sl/* total perception	15	6.00	20.00	15.6000	4.04969
/sn/ total perception	15	9.00	20.00	17.5333	3.54293
/st/ total perception	15	11.00	20.00	17.1333	3.13657
Valid N (listwise)	15				

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distributions of slpertot, snpertot and stpertot are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.036	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Graph 13. Accuracy of perception and production of /sl/, /sn/, and /st/

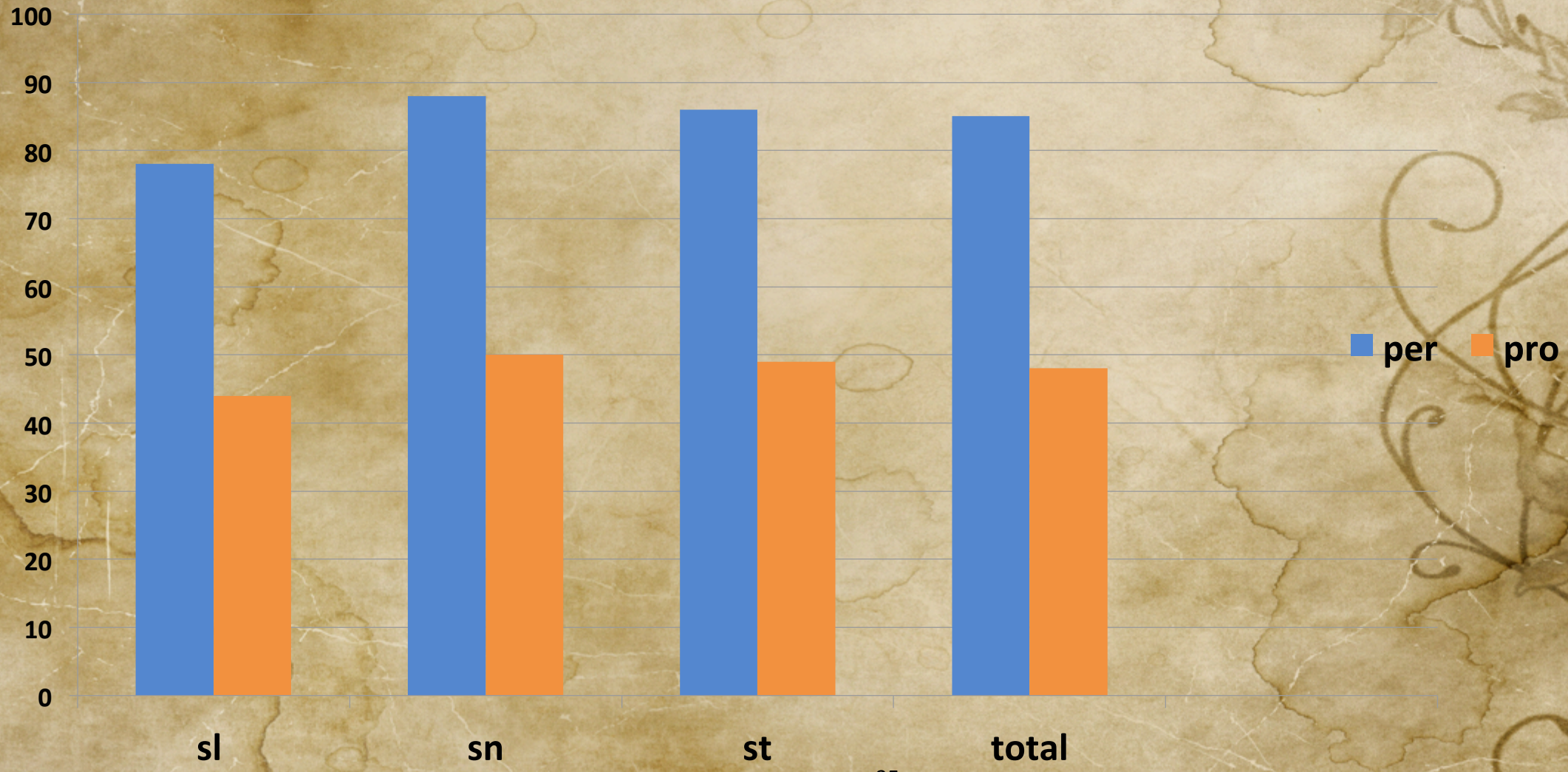


Table 14. Descriptive Statistics of the difference between perception and production.

Table 15. Friedman test of significance

Descriptive Statistics of the difference between perception and production.					
	N	Minimum	Maximum	Mean	Std. Deviation
perception	15	17.50	30.00	25.4333	4.43954
production	15	.50	30.00	14.3290	10.90843
Valid N (listwise)	15				

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The median of differences between perception and production equals 0	Related-Samples Wilcoxon Signed Rank Test	.004	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Table 16. Correlation between perception and production

		perception	production
perception	Pearson Correlation	1	.536*
	Sig. (2-tailed)		.040
	N	15	15
production	Pearson Correlation	.536*	1
	Sig. (2-tailed)	.040	
	N	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

Table 17. Test of significance on the difference between perception & production based on proficiency

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of perception is the same across categories of proficiency.	Independent-Samples Kruskal-Wallis Test	.170	Retain the null hypothesis.
2	The distribution of production is the same across categories of proficiency.	Independent-Samples Kruskal-Wallis Test	.008	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

18. Proficiency impact on perception and production

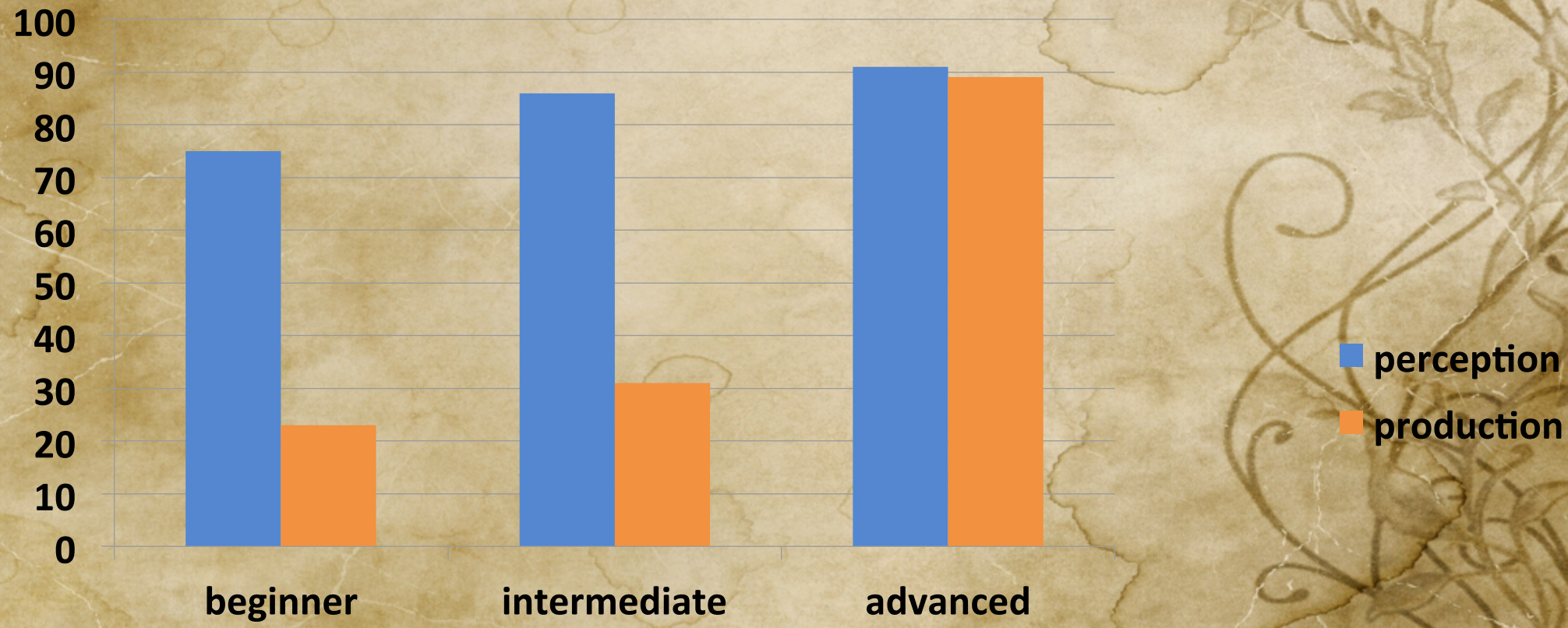


Table 19. Descriptive statistics of formal and informal production tasks

	informal	formal
Mean	15.0180	13.5333
N	15	15
Std. Deviation	10.98779	11.36327

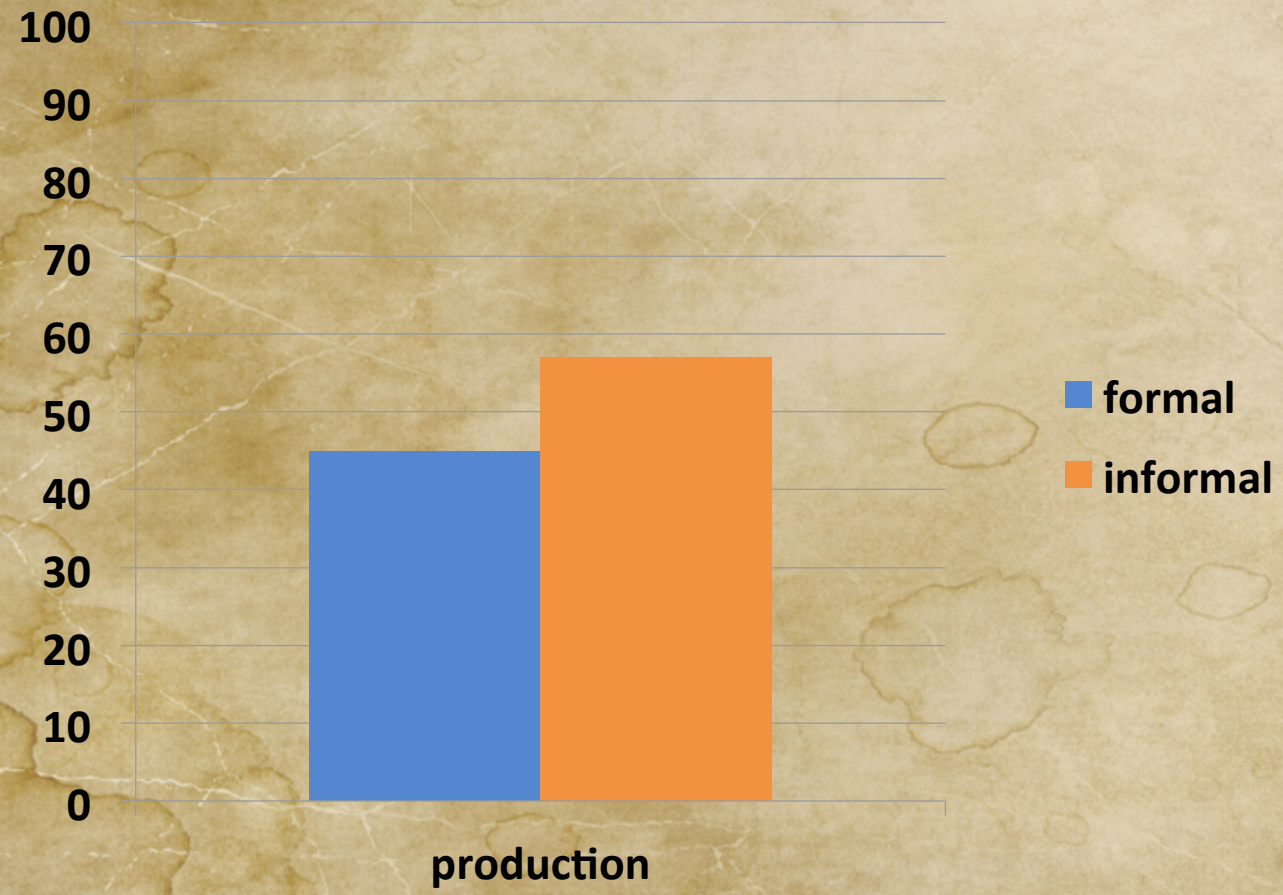
Table 20. The impact of task formality on production

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The median of differences between informal and formal equals 0.	Related-Samples Wilcoxon Signed Rank Test	.116	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 21. the difference between formal and informal tasks.



Discussion

- difference between the clusters was not statistically significant in production (/sn/ 50%, /st/ 49%, and /sl/ 44%), the following order is noticed: /sn/=/st/=/sl/

- difference between the clusters was statistically significant in perception: (88%)>st (86%)>sl (78%). : /st/=/sn/ >/sl/

- mean averages were much higher in perception: (84% in perception vs. 48% in production). This difference turned out to be significant after running statistical tests (z=-2.919, p=.004)

- proficiency had significant impact on production, sig=. 008, p<. 005 (rising from 23% in beginner to 31% in intermediate to 89% in advanced groups)
-
- the effect of proficiency was not significant on the perception(from 75% to 86% to 91%).

- no significant difference between the two formal and informal tasks (sentence reading and picture-based interview). Although there was a difference between the mean averages of the two the tasks (45% in formal vs. 57% in informal), this difference was not statistically significant (p=. 116)

Table 22. Comparing predictions and results

Model	Prediction	Results: /sl/=sn/=/st/ in production and sn=st>sl in perception
1.Markdness on sonority	Hyp 1. sl>sn>st	Not confirmed
2.Redeployment	Hyp 3. sl=sn=st	Confirmed in production, partially confirmed in perception
3.OPM proficiency:	beginner<intermediate<advanced	Confirmed in production Rejected in percetion
4.OPM task:	more formal> less formal	rejected in production NA in perception

Table 23. A summary of production study

Hypothesis	Findings	Results
1. Markedness: sl>sn>st	sl=sn=st	rejected
2. Redeployment:sl=sn=st	sl=sn=st	confirmed
3. OPM proficiency: beginner<intermediate<advanced	beginner< intermediate< advanced	confirmed
4. OPM task: more formal> less formal	less formal= more formal	rejected

Table 24. A summary of perception study

Hypothesis	Findings	Results
1. Markedness: sl>sn>st	sn=st> sl	rejected
2. Redeployment: sl=sn=st	sn=st> sl	partly confirmed
3. OPM proficiency: beginner< intermediate<advanced	beginner= Intermediate= advanced	rejected
4.OPM task: not applicable in perception	NA	NA

Cluster Variation

- **Yet the fact that our subjects have [sl] as significantly less accurate is, to say the least, unusual**

Table 3. sC clusters in other Interlanguages: Previous studies

Study	Participants	L1	L2	sC order of acquisition
Carlisle (1991)	11 adults	Spanish	English	sl > **st**
Carlisle (2006)	17 adults	Spanish	English	sl > sn > **st**
Tropf (1987)	11 adults	Spanish	German	ʃl, ʃn > **ʃt**
Escartin (2005)	23 adults	Spanish	English	sn > sl, **st**
Abrahamsson (1999)	1 adult	Spanish	Swedish	sn > **st** > sl
Boudaoud (2008)	30 adults	Farsi	English	sl > sn, **st**

Summary

Japanese L1

Those who produce [u], hear illusory [u]

Probably [u] is part of the underlying representation

Thai L1

- They *produce* [ə] in initial sC but not in medial C.C
- They *hear* it in initial sC but not in medial C.C
- This is mediated by *grammar*

Implications

- redeployment of L1 grammar rather than markedness on sonority is a better explanation for the development of sC clusters in Persian
- while perception and production are correlated, Persian learners are better in perception than in production
- Production is not an accurate reflection of their underlying knowledge

Implications

- Work on conscious communication strategies to improve intelligibility and comprehensibility (Munro,1999)

- Intelligibility: accurate recovery of the intended message

- Comprehensibility: processing load in doing so

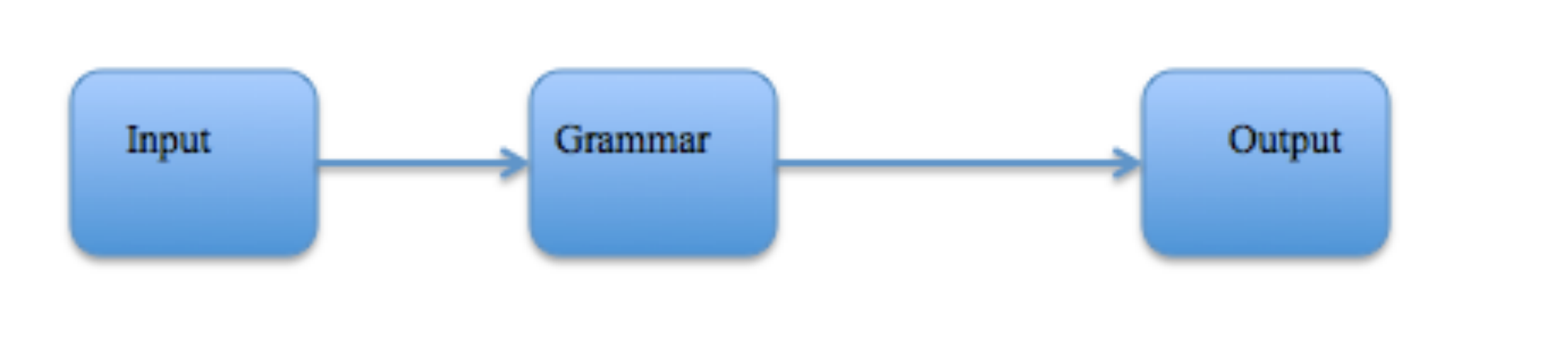
Neither are highly correlated with accentedness; strong accents can be intelligible

- Munro: “Nativelikeness is neither common nor necessary”

- Important for both teachers and learners to know

Pedagogic Implications

- **Instruction should address both production and perception:**
  - **Work on changing perception (e.g. processing instruction (van Patten)) in the learners:**



Input Processing (IP) VanPatten (1993):

- principles are stated that describe how learners either miss grammatical markers in the input or how they get them wrong (VanPatten, 2002b)

- learners process input for meaning before form.

Processing Instruction (PI):

- an explicit focus on form that is informed by the model of IP

- a practical solution to IP model

- The goal of PI is to help L2 learners derive richer intake from input by having them engage in structured input activities that push them away from the strategies they normally use to make form-meaning connections (Wong, 2004).

Teachers can:

- **be aware of the presence of the same sC sequences in Persian codas. They can explicitly refer to these sequences in Persian.**
- **include a variety of task types in their syllabi while teaching English onset clusters**
- **be more patient with lower proficiency learners.**
- **use Input Processing instruction model (Van Patten, 2002) to address Persian L2 learner.**
- **first identify a potentially problematic processing strategy and then provide activities that push learners away from that strategy**

Based on PI basic features, the following guidelines can be suggested for teaching sC onset clusters to Persian ESL learners:

1. **Learners are given information about English sC onset clusters.**

2. Learners are informed about a particular PI strategy (e-epenthesis) that may negatively affect their picking up of the form or structure during comprehension or production.

3. Learners are pushed to process the form or structure during activities with structured input: input that is manipulated

Limitations

- the number of participants

- composition of cluster (comparing two-member CC onsets such as *stamp* with three-member CCCV such as *spring*

- the effect of preceding phonological environment (clusters being preceded by a vowel, a consonant, or a pause)

Future Studies

- the effect of word frequency
- Comparing sC clusters with other consonant clusters
- -Study coda clusters

Thank you very much!

Thank you very much!

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Back up slides

Enochson (2014)

- L1 Chinese and Japanese (n=8) read from a list of words

- She found the following order of accuracy:

[st]	86%
[sn]	79%
[sl]	60%
[sw]	43%

This is consistent with what we would expect if [s] were in the preceding coda (but not in the onset).

What's Up With [sl]?

- Who predicts [sl] should be the hardest?
- Markedness: X
- L1 frequency: X
- L2 frequency: X
- Redeployment: X
- Inter-constituent Licensing: ✔

Empty-Headed Syllables

- Kaye (1992); Goad (2016; 2012); Enochson (2014)
- Archibald (2003) – intra-consituent licensing
- The [s] is in the coda of an empty-headed syllable and the patterns we see are consistent with syllable contact across syllables (e.g. Vennemann, 1987)
- Accounts for both prothesis and epenthesis facts

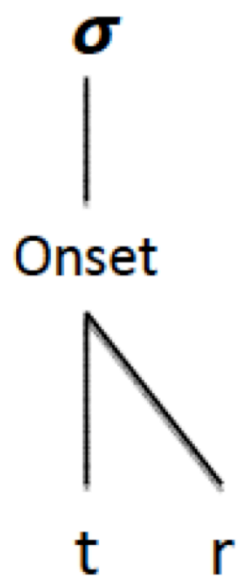


Figure 1. Branching Onset

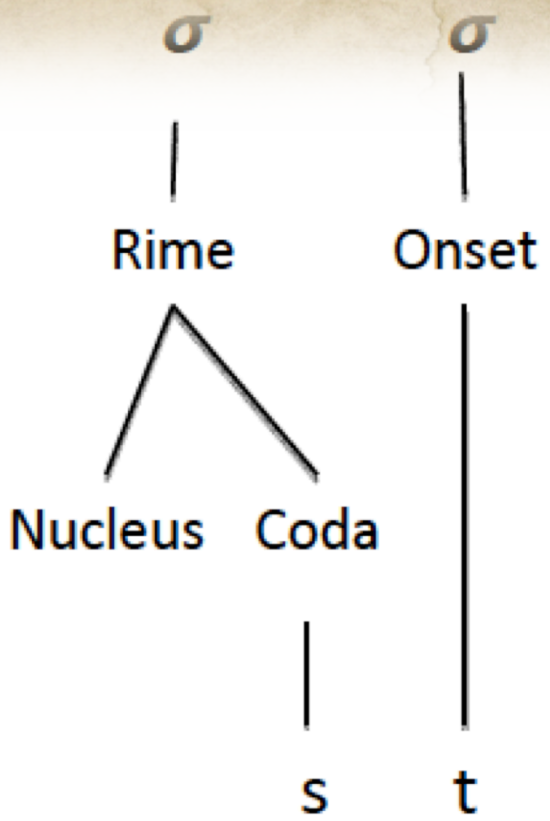


Figure 2. Coda-Onset Pair

Epenthesis

- CC clusters are repaired to CeC

Prothesis

- sC clusters are repaired to [esC]

Persian Perception accuracy

- sn = st > sl

Syllable Contact

- [st]> [sn] > [sl]

Why is [sl] the worst for Persian L1 but not for Portuguese or Spanish L1?

Preliminary thoughts: Spanish and Portuguese are treating the [sC] sequences as types of *onsets*
While the Persian L1ers are treating them as types of *codas*

Just for our own information, is there a significant difference between the identification and discrimination perception tasks? N o, see the table below.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The median of differences between idnperc and discperc equals 0.	Related-Samples Wilcoxon Signed Rank Test	.232	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

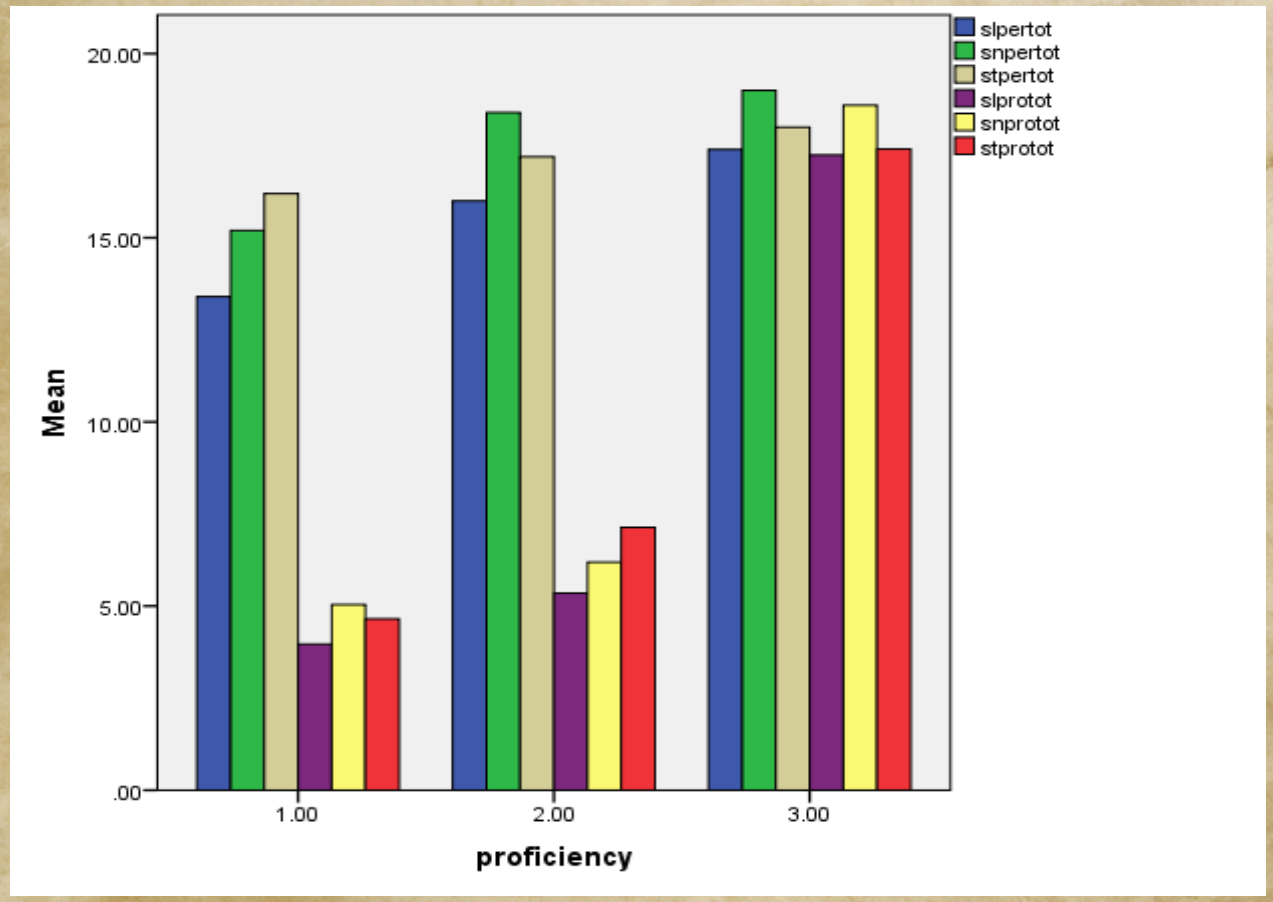
Is there a correlation between the two? Yes, see the following table

.

Correlations			
		idnperc	discperc
idnperc	Pearson Correlation	1	.660**
	Sig. (2-tailed)		.007
	N	15	15
discperc	Pearson Correlation	.660**	1
	Sig. (2-tailed)	.007	
	N	15	15
**. Correlation is significant at the 0.01 level (2-tailed).			

Inter-rater reliability

Correlations			
		me	tess
me	Pearson Correlation	1	.999*
	Sig. (2-tailed)		.029
	N	3	3
tess	Pearson Correlation	.999*	1
	Sig. (2-tailed)	.029	
	N	3	3
*. Correlation is significant at the 0.05 level (2-tailed).			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proficiency

Production gets better; perception doesn't? Perception doesn't cause they start out so good (because of L1 transfer of marked MSD) and production gets better which is good news for learners and teachers (and is consistent with this being under executive control)

You gonna have anything to say about the lack of task effects?

Raises the intriguing question of "which clusters to start with"? Beyond our concern today….