Ling 113
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Homework 5: Hebrew
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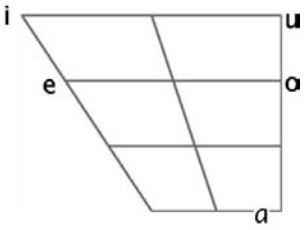
The analysis starts with the phonetic vowel and consonant charts based on the dataset:



	Bilabial	Labiodental	Dental	Alveolar	Post-alveolar	Retroflex	Palatal	Velar	Uvualar	Pharyngeal	Glottal
Plosive	p b			t d				k g			ʔ
Nasal	m			n							
Trill				r							
Tap or Flap											
Fricative				s z	ʃ					ħ ʕ	h
Lateral Fricative											
Affricate				ʦ							
Approximant											
Lateral Approximant				l							

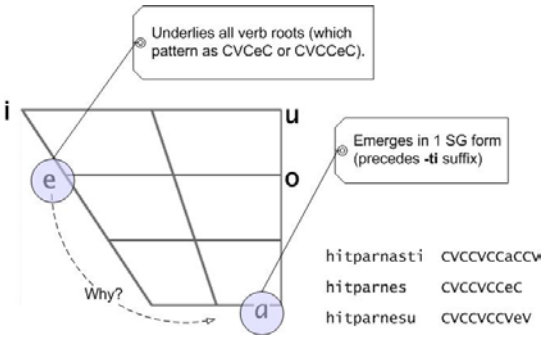
a) Given that the underlying representation for all verb roots is either CVCeC or CVCCeC, we can isolate presumed stems and presumed affixes as shown in Figure 1.

Figure 1: Dataset for part (a)

	1 SG			3 SG Masc			3 PL			Gloss
	Prefix	CVCCaC	Suffix	Prefix	CVCCeC	Suffix	Prefix	CVCCeC	Suffix	
1	hit	parnas	ti	hit	parnes	⊘	hit	parnes	u	'earn'
2	hit	parsam	ti	hit	parsem		hit	parsem	u	'become famous'
3	hid	balbal	ti	hid	balbel		hid	balbel	u	'be confused'
4	hid	galgal	ti	hid	galgel		hid	galgel	u	'roll'

In the 3 SG Masc and 3 PL forms, we can see the CVCCeC stem pattern quite clearly, while the 1 SG shows the alternation in which the low back vowel, ɑ, manifests instead of the front vowel, e. This alternation cannot be explained as vowel harmony, since the words in which it occurs end in the high front vowel, not the low back.

Figure 2: Vowel change cannot be explained as harmony



Looking at the Consonant clusters, we can note a difference in the pattern at the end of the word after the morpheme –ti is attached, where we end up with a cluster of two consonants. The three environments:

3 SG Masc	e/__C#
3 PL	e/__CV
1 SG	ɑ/__CC

We see elsewhere among the stems in this dataset (1-4) that two-consonant clusters are preceded by [ɑ] (bɑlbel, pɑrnes, pɑrsem, gɑlgel). A preliminary proposal for the rule is that CC pattern is preceded by low vowel. My initial proposal for this rule is:

Lower vowel before CC clusters

> *Change the second vowel in the stem to the low back vowel (a) when it precedes a two consonant cluster.*

In addition to the vowel lowering alternation in a), we also see that the final consonant of the prefix matches the voicing of the initial C in the presumed stem. The two forms of the prefix alternate between voiced and unvoiced based on the [voice] feature of the consonant to which the prefix attaches. For /p/, we have /t/; for /b/, we have /d/.

- voiced (d) when the initial consonant in the verb stem is voiced, as in hidbɑlbɑlti, hidbɑlbel, hidgɑlgel;
- unvoiced (t) when the initial consonant is unvoiced, as in hitpɑrnɑsti, hitpɑrnes, hitpɑrsem, and so on.

If one were to base this rule just on examples 1 through 4, we'd have to readjust later, but looking ahead, I can see that there's a voicing alternation throughout the data that is influenced by the qualities of the Consonant in the stem to which the prefix attaches. Actually, it seems we have allomorphs of the prefix—hit ~ hid ~ it ~ id. Here's a summary of all the Consonants organized by surface prefix:

hit-	hid-	it-	id-
p	b	s	z
ħ	g	ħ	
m	d	ʃ	
ʔ			

t͡s			
t			
n			

I am unable to find a pattern that suggests why the initial glottal fricative exists in some cases and not others, so I'll limit my discussion to just the voicing alternation t ~ d.

We can see that the allomorphs that end in voiced consonant (hid ~ id) are limited to manifesting in front of voiced consonants, while the voiceless consonant manifests not only in front of voiceless stops and the affricate but also in front of nasals, which differ from 'normal' consonants in that they are [+sonorant]. Given this context (and given that the , it seems we have an underlying voiceless consonant for the prefix morpheme that becomes voiced when placed in the right environment, that is, in front of a voiced, non-sonorant Consonant in the stem.

Prefix Final Consonant Voicing for Stem Initial Voiced Consonant

> *When the initial Consonant of the stem is a voiced non-sonorant C, voice the final C of the prefix (change the voiceless alveolar stop to the voiced alveolar stop).*

It makes sense to choose /t/ as the underlying form since it 'shows up' in more environments than the /d/.)

Here's the schematic for the rule:

$$CVC \sim VC_{[prefix]} \longrightarrow d_{[prefix]} / [_{stem}]C[+voice, -sonorant]$$

The [-sonorant] feature must be specified to avoid changing the voice quality in the case of nasals.

Sample Derivations

	1 *'earn'*			3 *'be confused'*		
Underlying forms	/hitparnesti/	/hitparnes/	/hitparnesu/	/hitbalbelti/	/hitbalbel/	/hitbalbelu/
Application of rules:						
1. Voicing rule	–	–	–	t -> d	t -> d	t -> d
	hitparnesti	hitparnes	hitparnesu	hidbalbelti	hidbalbel	hidbalbelu
2. Vowel alternation	e -> a			e -> a		
Surface form	hitparnasti	hitparnes	hitparnesu	hidbalbalti	hidbalbel	hidbalbelu

b)

The **e ~ 0 alternation** can be seen in the difference between surface forms of the 1 SG and 3 SG Masc forms and the 3 PL form. As shown in Figure 3, we can see that in the 3 PL, we can see that the Vowel has only been deleted when the Consonants flanking it are the same (words shaded blue).

Figure 3: Dataset for part (b)

	1 SG			3 SG Masc			3 PL			Gloss
	Prefix		Suffix	Prefix	CVCeC	Suffix	Prefix	CVCC/CVCeC	Suffix	
5	it	ħamak	ti	it	ħamek	⊘	it	ħamk	u	*'turn away'*
6	hit	labaʃ	ti	hit	labeʃ		hit	lapʃ	u	*'get dressed'*
7	hid	badar	ti	hid	bader		hid	badr	u	*'make fun'*
8	hid	garaʃ	ti	hid	gareʃ		hid	garʃ	u	*'divorce'*
9	hit	palal	ti	hit	palel		hit	palel	u	*'pray'*
10	hit	ħamam	ti	hit	ħamem		hit	ħamem	u	*'warm'*
11	hit	mota[t]	ti	hit	motet		hit	motet	u	*'collapse'*
12	hit	ʔoʃaʃ	ti	hit	ʔoʃeʃ		hit	ʔoʃeʃ	u	*'recover consciousness'*
13	hid	boda[d]	ti	hid	boded		hid	boded	u	*'seclude oneself'*

Delete consonants for e ~ ∅:

> *"If the Consonants flanking the final Vowel (/e/) in the verb stem are not the same, delete the intervening V (when another V immediately follows the C, as when suffixed by –u). "*

Since this rule only applies in the 3 PL, I'm assuming it's because of the influence of the suffix /-u/ and some modification in the syllabification of the stem.

This rule applies <u>before</u> the voicing rule for (a). The word hitlapʃu ('get dressed,' sample 6) shows us that the devoicing rule must occur after the intervening vowel is dropped—otherwise, we'd expect to see **hitlabʃu** as the surface form rather than hitlapʃu.

This also tells me that a voicing rule applies not only to prefixes, but to stems as well? Or, is it that this language doesn't distinguish in some cases between voiced/voiceless stops in some cases?

The **Cα ~ CαCα alternation** becomes apparent when the surface data is organized into presumed prefixes, suffixes, and stems as shown in Figure 3 above—it's easier to see that a stem final Consonant has been deleted in "collapse" (11) and "seclude oneself" (13), which we'd expect to see surface as "hitmotatti" and "hidbodadti," respectively. These demonstrate that an underlying C has been deleted.

Sample Derivations

	6 *'get dressed'*			11 *'collapse'*		
Underlying forms	/hitlabeʃti/	/hitlabeʃ/	/hitlabeʃu/	/hitmotetti/	/hitmotet/	/hitmotetu/
Application of rules:						
1. Vowel alternation	e -> a	--	--	e -> a	--	--
2. Delete V flanking Cs≠	--	--	hitlabʃu		--	--
3. Voicing	--	--	hitlapʃu	--	--	--
4. Delete double C				t -> 0	--	--
Surface form	hitlabaʃti	hitlabeʃ	hitlapʃu	hitmotati	hitmotet	hitmotetu

Given that in both cases the suffix –ti follows the alveolar stop (t ~ d), it appears that Hebrew has a <u>constraint against adjacent duplicates of the same sound (a constraint against geminates)</u>. This same constraint may be the reason for the apparent deletion? It also seems that this rule is not

sensitive to the voicing (t ~ d) of the consonant, but may be limited to location (alveolar). (Examples from part c, "hitamamti," and "hidardarti" similarly demonstrate the effect of this rule and the apparent lack of influence of voicing.)

At this point, I'm fairly certain that many of the rules proposed thus far have to do with syllables, word boundaries, or simply consonant cluster patterns. In any event, CC pattern where Cs are the same (geminate) seem to be prevented from occurring.

c) In this dataset, the words that begin with sibilants undergo a reconfiguration of the prefix such that the sibilant from the stem precedes the alveolar stop from prefix.

This doesn't happen when the initial C is not a sibilant, as in the case of [tamim] (20) and [dirdur] (21), whose verb forms are [hitɑmɑmti], etc. Figure 4 identifies the consonants in red (just in 1 SG) and shows the effect of this rule on the surface form.

Figure 4: Dataset for part (c)

	1 SG			3 SG Masc			3 PL			Gloss		
	Prefix		Suffix	Prefix	CVCeC	Suffix	Prefix		Suffix			
14	it	[i]s[t]apar	ti	it	[i]s[t]aper	⦸	it	[i]s[t]apr	u	*'get a haircut'*	cf. sapar	*'barber'*
15	it	[i]s[t]arak	ti	it	[i]s[t]arek		it	[i]s[t]ark	u	*'comb hair'*	cf. ma-srek	*'comb'*
16	it	[i]ʃ[t]apar	ti	it	[i]ʃ[t]aper		it	[i]ʃ[t]apr	u	*'improve'*	cf. ʃipur	*'improvement'*
17	hit	[hi]t͡s[t]alam	ti	hit	[hi]t͡s[t]alem		hit	[hi]t͡s[t]alm	u	*'have one's photo taken'*	cf. t͡salam	*'photographer'*
18	id	[i]z[d]akan	ti	id	[i]z[d]aken		id	[i]z[d]akn	u	*'age'*	cf. zaken	*'old'*
19	id	[i]z[d]aras	ti	id	[i]z[d]arez		id	[i]z[d]arz	u	*'hurry'*	cf. zariz	*'alert'*
20	hit	[t]amam	ti	hit	[t]amem		hit	[t]amem	u	*'feign innocence'*	cf. tamim	*'innocent'*
21	hid	[d]ardar	ti	hid	[d]arder		hid	[d]arder	u	*'decline'*	cf. dirdur	*'rolling'*

Proposal given examples 20 (hitamamti, hitamem, hitamemu; "innocent") and 21 (hidardarti, hidarder, hidarderu; "rolling"): it seems that voiced/unvoiced alveolar stops are treated similarly? Or, is there an underlying /t/ in initial position in the word /darder/ that undergoes change

Reconfigure the prefix to accommodate initial sibilant in verb stems

> *When a verb stem begins with an initial sibilant consonant, reconfigure the prefix so that the alveolar stop follows the sibilant.*

Nowhere in the data do we see an alveolar preceding a sibilant (although the affricate could be considered a combination of an alveolar followed by a sibilant. Perhaps the language is avoiding the alveolar followed by sibilant to avoid confusion with the affricate?)

The word for "become mad" demonstrates the same effect – iʃtagati (proposed underlying stem would be /ʃageʕ/

Sample Derivations

	14 *'get a haircut'*			18 *'age'*			20 *'feign innocence'*		
Underlying forms	/itsaperti/	/itsaper/	/itsaperu/	/itzakenti/	/itzaken/	/itzaken/	/hittamemti/	/hittamem/	/hittamemu/
Application of rules:									
1. Vowel alternation	e -> a	itsaper	itsaperu	e -> a	--	--	e -> a	--	--
2. Delete V flanking Cs≠	--		itsapru	--	--	e -> 0	--	--	--
3. Voicing	--			t -> d (id)	t -> d	t -d	--	--	--
4. Delete double C	--			--	--	--	t-> 0 (_amamti)	t -> 0	t -> 0
5. Reconfig prefix + init sib	it -> ist	it -> ist	it -> ist	idz -> izd...	idz -> izd...	idz -> izd	--	--	--
Surface form	istaparti	istaper	istapru	izdakanti	izdaken	izdaknu	hitamamti	hitamem	hitamemu

d)

Figure 5: Dataset for part (d)

	1 SG			3 SG Masc			3 PL			Gloss
	Prefix		Suffix	Prefix	CVCeC	Suffix	Prefix	CVCeC	Suffix	
22	hit	male	ti	hit	male	⊘	hit	mal?	u	*'become full'*
23	hit	pale	ti	hit	pale		hit	pal?	u	*'become surprised'*
24	hit	nase	ti	hit	nase		hit	nas?	u	*'feel superior'*
25	hit	patah	ti	hit	pateah		hit	path	u	*'develop'*
26	hid	galah	ti	hid	galeah		hid	galh	u	*'shave'*
27	hit	na͡tsah	ti	hit	na͡tseah		hit	na͡tsh	u	*'argue'*
28	it	iʃtaga	ti	it	iʃtagea		it	iʃtagʕ	u	*'become mad'*
29	hit	para	ti	hit	parea		hit	parʕ	u	*'cause disorder'*

In this dataset we see a pattern of three different alternations within the stem. Stripping away the suffix from the 3 PL form, we see what remains is one of three consonant endings:

- the glottal stop [ʔ]
- the voiced pharyngeal fricative [ʕ], and
- the voiceless pharyngeal fricative [ħ].

Elsewhere in the data we find only one other example of the glottal stop; it appears as the initial consonant of the presumed stem for "recover consciousness," **ʔoʃeʃ**, but find this in no other environments at the end of words.

When the final pharyngeal is deleted and the stem shortens in the 3 SG Masc form, the low vowel is inserted in front of the final pharyngeal fricative.

This occurs for both voiced and voiceless pharyngeal fricatives.

Observations include: we see final pharyngeal fricatives in any of the data.